

Illustrative Option schemes in CP5 HLOS

The Department worked with Network Rail, the train operators and the transport authorities in the major cities to build up shared information on current rail usage. As far as practicable a shared view was also agreed on forecast demand, using standard rail industry models but adjusting these where there was evidence of likely stronger growth. This forecast growth is stated as a peak demand to be met in the HLOS.

The forecast growth was assessed against current plans for train service provision in 2019. Illustrative train service enhancements that provided the capacity to meet this demand were identified and modelled for the morning peak services in London, Birmingham, Manchester and Leeds. In many cases these were directly based on the work undertaken by recent rail industry Route Utilisation Strategies (RUS). In some cases, notably in Leeds and Manchester, recent Government commitments to funding electrification and capacity enhancements had happened after the RUS and so the Department worked with key stakeholders to determine the most likely train service patterns the infrastructure changes might produce.

The illustrative peak train services are not what will happen; that will be guided both by the rail industry's response to the HLOS in the Strategic Business Plan for CP5 where the industry will set out how it proposes to meet the HLOS, and by the outcome of future train operator franchise competitions. But the illustrative train services are needed for the Department to confirm that a value for money solution can be provided to meet peak demand. It is likely the rail industry will produce a more detailed and efficient solution, and in this context the illustrative option can be viewed as the simple answer that should be bettered.

A number of infrastructure enhancements were demonstrated as necessary to operate the illustrative peak train services, such as a power upgrade to provide for longer trains. To this the Department added infrastructure enhancements required either to further the national strategy, such as the electrification of the Midland Main Line, or because rail industry work and guidance confirmed these were the best value for money schemes to improve the value of the railway. In appraising these schemes the Department used a mix of in-house and Network Rail evaluation, and is grateful to Network Rail for the assistance.

The HLOS covers these infrastructure requirements in three different ways:

It specifies major strategic schemes such as the provision of the Northern Hub capacity through central Manchester. The industry is expected to design and deliver these schemes by 2019 but is able to define the detailed scope of the scheme and the timing of delivery, so as to maximise efficiency and reduce costs.

It describes strategic outcomes without referring to specific schemes but a specific scheme has been assumed for cost purposes. For example, sufficient capacity is sought at Ely to provide for forecast freight flows across East Anglia and to enhance passenger services to Kings Lynn. The industry could resolve this in a number of ways but the Department has assumed the most efficient solution is the reconstruction and expansion of Ely North Junction. If another better way of providing the capacity is identified the industry should put this forward as a solution.

And, finally, the HLOS describes a strategic requirement such as the number of passengers to be accommodated into London Bridge. In this example the illustrative peak train service suggested that there would be substantial crowding on the Uckfield Line and tested the value of lengthening the diesel trains to 10-cars, as recommended by the rail industry's London and South East RUS. This proved an efficient solution and the specimen option infrastructure enhancements includes the costs of platform extensions and other modification on the Uckfield line. Again, if another better way of providing the capacity is identified the industry should put this forward as a solution.

The Office of Rail Regulation (ORR) will evaluate the rail industry's response to the HLOS, considering if it has achieved an efficient solution and if the costs are reasonable. It will use the Department's illustrative options as a guide to what is possible but is not in any way bound by them. **Inclusion of a train service or an infrastructure scheme in the Department's illustrative options does not guarantee it will be delivered; that only happens if the scheme is named in the HLOS.** It does, however, mean the Department found the scheme to be a viable solution and this solution is likely to be amongst those considered by the rail industry in deciding the best and most efficient way to deliver the outputs specified.

Illustrative peak train Services

These train service enhancements are one way of providing the necessary capacity to meet the metrics set out in Appendix A Tables 2 and 3.

London

Paddington (GW) Higher capacity electric suburban trains replacing existing diesel trains. Intercity Express electric and bi-mode trains replacing diesel HSTs on Bristol, South Wales, Gloucester/Cheltenham and Worcester/Hereford services. Stopping services from Maidenhead and Heathrow T4 operated by Crossrail using high capacity 10-car Crossrail electric trains¹ with enhanced frequencies. Full extent of HLOS capacity enhancement specified in new franchise or delivered by Crossrail.

Marylebone (Chiltern) Routes extended to Oxford – Bicester Town – London and Milton Keynes – Bletchley – Aylesbury – Princes Risborough – London service. Remains a diesel operation. Peak services lengthened with additional carriages.

Euston (London Midland) Peak train lengthening with additional electric units.

Euston (West Coast) Full use of 11-car Pendolino trains. Deployment of peak capacity as determined by new franchise.

¹ Heathrow Connect services scheduled to transfer to Crossrail operations in May 2018 with frequencies doubled to four trains an hour; Crossrail services to Maidenhead scheduled to begin in late 2019 alongside full Crossrail services through central London. At peak times two trains an hour are expected to start/end at West Drayton.

St Pancras (East Midlands Trains) High speed electric trains replace existing diesel HSTs and Meridians. Enhanced Corby – Kettering – London service. Accelerated Sheffield – Derby – London and Nottingham – London service.

St Pancras (IKF) No change (scope for train lengthening if required).

St Pancras Thameslink Introduction of full Thameslink service with switching of Cambridge and Peterborough services from Kings Cross to run through Thameslink to south of river destinations. New high capacity 8 and 12-car Thameslink rolling stock.

Kings Cross (Thameslink) Peak train lengthening with additional electric units for a small number of east of England services that continue to terminate at Kings Cross.

Kings Cross (East Coast) Intercity Express trains replacing diesel HSTs. Deployment of peak capacity as determined by new franchise.

Moorgate No change.

Liverpool Street (Greater Eastern) Additional Brimsdown – Stratford service. Transfer of Shenfield suburban services to Crossrail and use of high capacity 10-car Crossrail electric trains². Additional Chelmsford and Wickford services after diversion of services to Crossrail releases platform capacity in Liverpool Street.

Fenchurch Street (Essex Thameside) Peak train lengthening with additional electric units and possible introduction of Metro-style inner suburban stock.

London Bridge (South Eastern) Peak train lengthening with additional electric units.

London Bridge (Southern) Peak train lengthening with additional electric units. Peak train lengthening on Uckfield branch with additional diesel units and platform extensions.

(London Bridge includes trains terminating there and services that continue to Cannon Street, Charing Cross and Blackfriars)

Blackfriars Introduction of full Thameslink service with increased frequency of services via London Bridge linking across London to north of river destinations. New high capacity 8 and 12-car Thameslink rolling stock.

Waterloo Peak train lengthening with additional electric units. 10-car operation on Reading line.

Victoria (Southern) Peak train lengthening with additional electric units. Also 8-car operation on West London Line.

Birmingham

² Crossrail services between Shenfield and Paddington via the Crossrail Tunnel are scheduled to commence in May 2019. Some residual Crossrail services will operate into Liverpool Street at peak times.

New Street (West Coast) Full use of 11-car Pendolino trains. Deployment of peak capacity as determined by new franchise.

New Street (London Midland) Cross City South extended to Bromsgrove. Rugeley - Walsall (Chase Line) electrified and integrated service with New Street. Peak train lengthening with additional electric units. Opportunity for revised electric suburban route linkages across New Street not developed.

New Street (Cross Country) Small amount of peak train lengthening with additional diesel carriages.

Snow Hill and Moor Street (London Midland) Peak train lengthening with additional diesel carriages.

Manchester

Victoria (Transpennine)

Half-hourly fast Liverpool – (Chat Moss) – Victoria – Leeds – York – Newcastle electric service.

Half hourly fast Manchester Airport – Piccadilly (Ordsall Chord) – Victoria – Leeds – York electric service.

Victoria (Northern)

Leeds via Bradford / Dewsbury and Rochdale to Victoria.

Local service to Huddersfield transferred to Piccadilly.

Services from Liverpool, Southport, Wigan, Blackburn and Clitheroe extended to Stalybridge or Rochdale and revised to match current patterns of demand.

Blackburn/Accrington via Todmorden diesel services introduced.

Peak train lengthening with revised diesel and electric train formations; Wigan – Kirby becomes self-contained diesel service.

Piccadilly (Transpennine)

Half hourly fast Manchester Airport – Piccadilly (Ordsall Chord) – Victoria – Leeds – York electric service.

Hourly semi-fast Piccadilly – Leeds – Selby electric service.

Hourly semi-fast Piccadilly – Leeds – Selby – Hull diesel service.

Hourly fast Piccadilly - Wigan – Preston – Carlisle – Scotland electric service.

Hourly Piccadilly – Blackpool North electric service.

Piccadilly (Northern)

Buxton – Piccadilly service linked across Manchester with Liverpool – Warrington – Manchester service (assumes Castlefield capacity enhancement).

Liverpool – Earlestown – Piccadilly local service electrified, extended to Manchester Airport and frequency increase to half-hourly.

Local service to Huddersfield (replaces service from Victoria).

Local services to Glossop/Hadfield, Marple (both routes), Hope Valley, Stoke, Crewe, Chester via Altrincham, Bolton and Preston revised to match current patterns of demand.

Services from Manchester Airport revised to match current patterns of demand.

Piccadilly (West Coast)

Full use of 11-car Pendolino trains. Deployment of peak capacity as determined by new franchise.

Piccadilly (others)

Liverpool via Warrington semi-fast services continue to Sheffield.

North Wales service transfers to Victoria (and beyond); South Wales service unchanged.

Cross Country services unchanged.

Leeds

Transpennine

Half-hourly fast Liverpool – (Chat Moss) - Piccadilly – Leeds – York – Newcastle electric service.

Half hourly fast Manchester Airport – Manchester Piccadilly – Manchester Victoria – Leeds – York electric service.

Hourly semi-fast Manchester Piccadilly – Leeds – Selby electric service.

Hourly semi-fast Manchester Piccadilly – Leeds – Selby – Hull diesel service.

Northern

Half-hourly Huddersfield – Dewsbury – Leeds electric service with increase in train capacity.

Leeds – Bradford Interchange – Huddersfield – Wakefield Westgate split at Huddersfield with revised formations.

Leeds – Mirfield – Calder Valley – Rochdale – Manchester Victoria with revised train formations.

Leeds – Bradford Forster Square, Leeds - Ilkley and Leeds – Skipton trains (Airdale line) lengthened with additional electric carriages.

Leeds – Barnsley – Sheffield (Hallam Line) and Leeds – Castleford – Sheffield strengthened by revised train formations.

Leeds – Knottingly (Pontefract Line) strengthened by revised train formations and additional peak services.

Leeds – Wakefield Westgate – Sheffield with revised train formations.

Leeds – Harrogate strengthened by revised train formations and additional Leeds – Horsforth shuttles.

Half-hourly Micklefield - Leeds – Bradford – Rochdale – Manchester Victoria diesel services (fast Bradford – Manchester, assumed in Manchester to extend to Warrington/Chester).

Blackpool – Blackburn – Burnley – Bradford – Leeds - York – Scarborough diesel service, stopping Garforth only between Leeds and York.

East Coast

Deployment of peak capacity as determined by new franchise.

Other Cities

Bristol Intercity Express electric and bi-mode trains replacing diesel HSTs on London services. Full extent of capacity enhancement specified in new franchise.

Leicester Adequate scope for train lengthening on local diesel services. Substantial change in CP5 through electrification and capacity enhancement of the Midland Main Line. Not evaluated in detail.

Liverpool (excluding Merseyrail) Extra capacity through peak enhancements described in Manchester section for Northern and Transpennine services. Adequate scope for train lengthening on local diesel services. Not evaluated in detail.

Newcastle Extra capacity through peak enhancements described in Leeds section for Transpennine services. Adequate scope for train lengthening on local diesel services. Not evaluated in detail.

Nottingham Adequate scope for train lengthening on local diesel services. Substantial change in CP5 through electrification and capacity enhancement of the Midland Main Line. Not evaluated in detail.

Sheffield Extra capacity through peak enhancements described in Manchester and Leeds section for Northern and Transpennine services. Substantial change in CP5 through electrification and capacity enhancement of the Midland Main Line. Adequate scope for train lengthening on local diesel services. Not evaluated in detail.

Illustrative infrastructure enhancements

Some of these schemes are specified. Others are described as a strategic requirement or are assumed to be required to enable an illustrative train service option to operate.

The Electric Spine

- Southampton Port – Basingstoke enhancement from 750 DC third rail electrification to 25 kv AC overhead electrification;
- Basingstoke – Reading 25 kv AC overhead electrification;
- Oxford – Banbury - Leamington Spa 25 kv AC overhead electrification;
- Leamington Spa – Coventry capacity enhancement 25 kv AC overhead electrification and additional double track;
- Coventry – Nuneaton 25 kv AC overhead electrification;
- Oxford – Bicester Town - Bletchley – Bedford 25 kv AC overhead electrification and double track (core of East West Rail);
- Bedford – Nottingham and Derby, and Derby – Sheffield (Midland Main Line) 25 kv AC overhead electrification;
- Leicester area capacity enhancement (freight/passenger crossing flows);
- Derby station area remodelling in conjunction with renewals;
- Sheffield station area remodelling in conjunction with renewals;
- Kettering – Corby 25 kv AC overhead electrification;
- Kettering – Corby capacity enhancement (additional double track);

And, where applicable, on all routes loading gauge enhancement to W12

South Wales Electrification

25 kv AC overhead electrification of

- Cardiff Central to Cardiff Queen Street,

- Cardiff Queen Street to Aberdare,
- Cardiff Queen Street to Cardiff Bay,
- Cardiff Queen Street to Coryton,
- Newport to Ebbw Vale,
- Cardiff Central – Pontyclun – Bridgend – Maesteg,
- Abercynon - Merthyr Tydfil,
- Grangetown to Penarth,
- Cardiff Central – Danescourt – Radyr (City Line),
- Cardiff Queen Street to Rhymney,
- Pontypridd to Treherbert,
- Cardiff Central – Barry – Bridgend (Vale of Glamorgan),
- Barry to Barry Island, and
- Bridgend to Swansea.

Thames Valley

- Acton – Willesden 25 kv AC overhead electrification.
- Slough – Windsor 25 kv AC overhead electrification.
- Maidenhead – Marlow 25 kv AC overhead electrification.
- Twyford – Henley-on-Thames 25 kv AC overhead electrification, and
- Oxford station area capacity and station enlargement.

Midlands

- Walsall – Rugeley 25 kv AC overhead electrification,
- Water Orton – Tamworth capacity, and
- Depot and stabling enhancement for extra trains.

Yorkshire

- Micklefield – Selby 25 kv AC overhead electrification,
- Micklefield turnback,
- Huddersfield Station capacity enhancement,
- West Yorkshire platform lengthening including Leeds,
- South Yorkshire platform lengthening, and
- Depot and stabling enhancement for extra trains.

Airports and Ports

- Heathrow Western Access subject to business case and conclusion of an agreement with the aviation industry,
- Ely area capacity enhancement (freight/passenger crossing flows) and
- Redhill additional platform

Northern Hub and Manchester

- Liverpool – Manchester track capacity (Huyton – Northern Hub),
- Manchester Airport fourth platform (Northern Hub),
- Castlefield corridor additional capacity and additional through platforms at Manchester Piccadilly (Northern Hub),
- Rochdale turnback (Northern Hub), and
- Depot and stabling enhancement for extra trains

South East

- London Waterloo platform lengthening and station throat expansion,
- Virginia Water - Reading line platform lengthening for 10-car operation,
- Gordon Hill turnback,
- West Anglia Lower Lea Valley capacity enhancement (turnback facilities),
- Bow Junction capacity enhancement (potentially CP6),
- East Kent capacity enhancement including relocation of Rochester Station,
- Uckfield line platform lengthening for 10-car operation,
- Norwood Junction capacity enhancement (turnback facilities),
- Paddington station passenger capacity improvements,
- Victoria station passenger capacity improvements,
- Clapham Junction station congestion relief,
- Wimbledon station congestion relief,
- Traction power upgrade – Kent, Sussex, Wessex, Anglia, LNE,
- South London HV traction power upgrade, and
- Depot and stabling enhancement for extra trains

West

- Filton – Bristol capacity enhancement (four-track).
- Bristol Temple Meads station capacity and incorporation of historic Digby Wyatt train shed. Station potentially a focus of wider city regeneration.
- Route gauge clearance for different DMUs.

East Coast (Ring fenced £240m enhancement fund)

- Stevenage Down platform addition,
- Huntingdon – Fletton capacity enhancement (four track),
- Peterborough Down LDHS call time reduction,
- Peterborough grade separation for access to GE/GN line,
- Doncaster bay platform and track capacity, and
- ERTMS signalling system fitted on the south end of the East Coast Main Line (renewals item and not funded as an enhancement).

Enhancement Funds

- £200m Strategic Freight Network
- £300m Passenger Journey Improvement
- £100m Station Infrastructure Improvement
- £100m Station Access for All
- £140m Development and Innovation
- £65m Level Crossing Improvement

Committed schemes confirmed in CP5 HLOS

Approximately £5.2bn of funding for infrastructure enhancements has been committed by the government for Control Period 5, covering the five financial years from 2014/15 to 2018/19. The projects are:

- Thameslink
- Crossrail
- Intercity Express Programme
- Birmingham New Street Station upgrade
- Reading Station expansion
- West Coast Main Line Stafford capacity upgrade
- West Coast Main Line power upgrade
- East West Rail (Oxford – Bedford, Aylesbury – Calvert and links)
- Electrification of the Great Western Main Line to Cardiff, Oxford and Newbury
- Electrification of the ‘North West Triangle’ (Manchester – Liverpool via Chat Moss, Huyton - Wigan, Manchester - Euxton Junction and Blackpool North – Preston)
- Electrification of the ‘North trans-Pennine’ (Manchester Victoria and Guide Bridge – Huddersfield – Leeds – Colton Junction)
- Elements of the Northern Hub (New Ordsall Chord, capacity improvements between Manchester and Sheffield and line speed improvements on Manchester to Sheffield, Preston and Bradford routes)