

Rail Delivery Group

Response to:

National Infrastructure Commission call for evidence: London's transport infrastructure

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[contact redacted]

Business representative organisation/trade body

Introduction: The Rail Delivery Group (RDG) was established in May 2011 to lead the industry in delivering a higher performing, more cost effective and sustainable rail network for Britain's rail users and taxpayers. The RDG brings together the chief executives of passenger and freight operator owning groups with Network Rail. RDG develops policies, strategies and plans for the coherent management of the rail industry and advances the provision of a safe, efficient, high quality rail service for users and taxpayers.

The RDG mission is to promote greater co-operation between train operators (passenger and freight) and Network Rail through leadership in the industry and by working together with Government, the supply chain and stakeholders. It is committed equally to the long-term health of the railway as well as the need to see improvement in the shorter term. It does this by developing strategies for the industry to put into practice and by proposing solutions for policy makers to implement.

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What are the major economic and social challenges facing London and its commuter hinterland over the next two to three decades?

London's economy is continuing to grow, encouraging further population growth and demand for rail services within and beyond the capital.

The Long Term Planning Process (LTPP) has been developed to provide robust, consistent growth forecasts; and to allow the rail industry to respond flexibly to the challenge of growing demand and plan the long-term capability of the rail network. The LTPP consists of a number of studies:

- Market Studies forecast demand over a 10 and 30 year period for freight and for three passenger 'markets' – long distance, regional urban and London and southeast.
- Route Studies then develop options for all future train services, local as well as long distance, based on the demand forecasts and priorities set by the market studies.
- Network wide issues, including the requirements of freight and the potential for technological innovations, are addressed through a series of network studies (also known as Network RUS).

The London and South East Market Study included a comprehensive review of the key drivers for future rail growth, based around four scenarios determined by the trade-offs between the economy and social/environmental planning. In every scenario growth in employment in central London continues, reflecting London's unique status as a global employment market. The density of employment in central London is high, driving agglomeration and enhancing productivity.

The high density of employment in central London and the lack of capacity of the road network has created a strong market for rail travel, which is expected to grow further in line with increases in central London employment. The current mode share of rail, Underground and DLR for peak travel into London is 80%, and in recent years the number of people entering Central London by car in the peak has fallen – from 143,000 in 1996 to 64,000 in 2012. This is attributed to measures to improve bus and cycle flow (and safety) that have in effect reduced road capacity for cars, as well as to some extent the effect of the congestion charge. The need to cater for a growing commuter market amplifies the existing challenge of providing sufficient capacity for peak travel, which may remain underutilised at other times (although a growing economy should deliver increasing levels of disposable income which would encourage further off-peak travel).

The presence of employment attracts people to live in London, and the mayor's London Plan forecasts continuing high rates of population growth. However, given existing low levels of housing affordability and limited availability of land the likelihood is that many employees will be forced to live either in outer areas of the city or in the towns beyond the green belt. In both cases rail is well placed to meet this demand, as distances become too long to be undertaken feasibly by other modes and, assuming roads policy remains broadly consistent, it is unlikely that sufficient road capacity will be available for journeys to be made by car. Network Rail is particularly conscious that, in addition to strategies which support investment in rail within London, it is critical that investment supports settlements beyond the city itself, given the significant proportion of the London employment market comprised of employees who live outside the city.

It is also anticipated that the number of Londoners in older age groups will increase, strengthening the need for investment to improve the accessibility of the transport system. Although potentially of less relevance for the rail market, a number of other demographic challenges are identified in the London Plan. These include an increasing proportion of ethnic minorities and children, and the need to address continuing levels of social deprivation.

Whilst accommodating demand for peak travel (particularly into Central London and Docklands) clearly poses the greatest capacity and connectivity issue for transport infrastructure, it is also vital that connections to international gateways (particularly airports but also HS1 stations) are maintained and improved. Providing sufficient connectivity to HS2 will also be a key future requirement.

What are the strategic options for future investment in large-scale transport infrastructure improvements in London - on road, rail and underground - including, but not limited to Crossrail 2?

It is critical to the London and southeast economy, and the wider UK economy, to continue to enhance rail services in and around the London area. The demand from passengers continues to grow, and both the infrastructure (including stations) and many specific train services are operating

beyond capacity. If further investment in both the digitisation of railway network and more conventional infrastructure and rolling stock enhancements are not progressed over the next 5 to 10 years then it is predicted that passengers will see significant overcrowding and a consistent deterioration in the reliability of performance of these railways.

Options for enhancing the network in London and the southeast are identified in the Route Studies, which form part of the LTPP. Network Rail has just completed and published, on behalf of the industry and in collaboration with DfT and TfL, four Route Studies that cover in detail investment priorities on four of the major routes into London. To complete the set of studies covering all routes into London a further five Route Studies are also underway or are yet to commence. The challenge each of the Route Studies faces is to balance the need for high-frequency commuter services with long-distance passenger and freight services connecting a diverse range of destinations.

The text below references the key conventional infrastructure-based solutions currently proposed for resolving the capacity, and in some cases service reliability, gaps. The prioritisation is down to a combination of the currently understood demand and resulting business case, but also importantly Network Rail's assessment of works that are likely to be implementable in CP6 (2019 -2024), given the current planning and consents framework. In each case where large infrastructure investment is referenced development work is already underway at Network Rail.

It is important to note that infrastructure enhancements do not offer the sole means of enhancing the capability of the network to keep pace with demand. Although peak trains tend to run with the maximum number of vehicles permitted by platform lengths on the respective routes there remains some scope for off-peak trains to be lengthened where required to accommodate passenger demand. Reconfiguration of interiors by franchisees might also enable higher numbers of passengers to be carried on individual trains.

Demand could also be more effectively managed through a combination of changes to the fares structure and improved information provision. Where they have freedom to set fares, operators have attracted increasing numbers of passengers with discounted tickets, demonstrating the potential for some demand to be attracted to times of the day where there is more spare capacity. A key factor in supporting the take-up of these cheaper fares is clear and accessible information, combined with simpler technology-enabled means of ticket purchase. Improved information on train loadings and availability of seats could further encourage a more efficient use of capacity. However, a more extensive shift of travel from peak periods would require changes to established working patterns including more widespread adoption of remote working.

Brighton Main Line and South Central suburban

The Brighton Main Line (BML) links the top three most densely trafficked parts of the UK railway network (the approaches to London Bridge, the area between East Croydon and Selhurst/Norwood Junction, and the railway through Clapham Junction), and the particularly complex way that the route is configured, with numerous branches and two major London terminals, makes this the toughest railway in the country to operate reliably. There is minimal grade separation, so the timetable requires an almost uniquely high level of flat junction crossing moves, with a routine need for trains having to be planned across busy tracks running in the opposite direction. There is also a very high level of platform utilisation at several locations and many areas where fast and stopping trains must share the same pair of tracks.

Whilst leisure based journeys and inter regional trips have grown substantially on the route in the last decade, it remains predominantly a peak commuter route, both into central London and outer London hubs such as East Croydon. Gatwick Airport is a key destination and consequently the nature of future demand on the route will be strongly influenced by the government's response to the Airports Commission. The main operator on the BML, Govia Thameslink Railway (GTR), is to provide an additional 10,000 seats on this and connecting routes by 2018. Simplified ticketing and improved passenger information will also help to ensure that this capacity can be effectively utilised.

There is already regular existing peak standing from the Gatwick Airport area into London today, with some individual services with significant standing from as far out as Haywards Heath and Hove. The BML faces substantial demand growth – by 2023 consistent standing on most peak services is forecast to extend to at least as far south as Haywards Heath; and by 2043 to Brighton, Hove and Lewes. By this date it is likely that the number of standing passengers would routinely lead to passengers being unable to board trains at key intermediate stations such as Gatwick, East Croydon and Clapham Junction, which would then, in turn, increase dwell times potentially leading to fewer trains being able to run. It is notable that this type of constraint is already manifesting itself at some

times during the high peak, particularly at Clapham Junction and East Croydon. Accommodating these levels of forecast demand can only be achieved through running more trains than the existing infrastructure can currently accommodate.

In addition to the demand challenge, and due to the operational constraints arising from the existing route configuration, it is unlikely that long term performance levels will reach those desired by stakeholders, unless capacity bottlenecks are addressed. GTR currently accounts for around 16% of national Public Performance Measure (PPM) – the largest single TOC contributor.

The South East Route: Sussex Area Route Study set out a number of key interventions which would free up capacity at major operational bottlenecks, to meet forecast CP6 and CP7 (2024-2029) demand and improve performance. For CP6 the proposals focus on the operationally critical East Croydon to Selhurst area, with new grade separated junctions to remove the need for flat crossing moves, additional platforms and concourse space at East Croydon station and additional tracks between these two elements. This would be supplemented with some much smaller scale work at a small number of other locations on the route, delivering additional peak capacity and performance improvements. In CP6 it is assumed that four additional trains per peak hour would be facilitated, split equally between Victoria and London Bridge and also equally between the Redhill route and the BML, with some services starting from Haywards Heath. However the infrastructure design is flexible so several other combinations are possible.

For CP7 and beyond a choice would arise as to whether to run further additional trains to the London Bridge or Victoria route. Running additional trains via the London Bridge route would require Norwood Junction remodelling and potentially an extension of Automatic Train Operation and ETCS Level 2 south of the Thameslink core down the Sydenham corridor. The delivery of ECTS/ ATO and Traffic Management systems on the Route would all be delivered as a joint package for a subdivided area of our Three Bridges Regional Operations Centre (ROC). Grade separation of Keymer Junction enabling more trains to start from Eastbourne, Brighton or Hove is also anticipated at this time.

The BML upgrade would provide a major catalyst for the ongoing redevelopment of central Croydon, potentially with significant oversite development above the new station. The reconfiguration of East Croydon platforms, together with the additional of new concourse space, could enable provision of large numbers of homes and office space above, consistent with demand. The London Borough of Croydon is a major stakeholder of the scheme and is a strong supporter of Network Rail's proposals.

The ongoing redevelopment of the central Croydon area means that there is potentially a limited window of opportunity to upgrade the BML in this critical area, due to the risk of development of the land outside the railway boundary which would be required. If the opportunity is not taken in CP6 it cannot presently be assumed that the option would be available in CP7.

The Croydon area upgrade proposals would, as well as enabling more trains to run fast north of Croydon, also unlock a key bottleneck on suburban slow line routes which serve a densely populated area of London not served by the London Underground network. Further work is ongoing with Transport for London to further identify which other constraints would need to be resolved to increase suburban services in CP6 and beyond.

South West Main Line

The South West Main Line (SWML) is one of the busiest and most congested routes on the network. It serves a major commuter area as well as providing long distance services from the South and South West of England to London Waterloo.

Work being delivered in Control Period 5 will see the Main Suburban and Windsor Line services extended to 10 car operation which along with the new Class 707 Desiro City rolling stock currently under construction will support the capacity needs in the suburban area. The key challenge is for main line services which use the Fast Line. The density of operation on the single Up (London bound) Fast Line inwards of Surbiton during the peak is higher than on any other single stretch of main line in the UK. The significant growth in passenger numbers alongside the constraint on network capacity means even the smallest delay can quickly be transferred to other services.

For the main line services, it is critical to note that even before growth is considered approximately 20% capacity is required to deal with existing overcrowding. Standing is commonplace from Woking and Basingstoke on main line services today, and without further, large scale, intervention beyond CP5 the SWML could see levels of crowding resulting in passengers being unable to board services from inwards of Farnborough.

The Wessex Route Study describes a strategy to meet demand to 2043. At least 37 trains per hour will need to be operated on the Main Fast Line by CP9 (2034-2039), compared with the capacity to deliver 24 trains per hour today. The key challenge on the SWML is increasing the capacity between Surbiton and Clapham. To unlock further services on this section will require a significant infrastructure intervention (or combination of):

- Crossrail 2 (delivers 32-36 peak Main Line trains per hour)
- ETCS + ATO (30-34 peak trains per hour)
- Fifth track from Surbiton inwards (30-34 peak trains per hour)

There are a number of other interventions also needed on the route to complement any combination of the above 3 options in the inner area, these are predominantly grade separation of junctions.

The scale of intervention required across the whole route is significant and therefore would need to be delivered over multiple control periods.

Several interventions have been prioritised for CP6 to provide resilience and reliability in the short term and support achieving the capacity required once combined with further interventions. The priorities for CP6 interventions are:

- Woking Grade Separation
- Woking Platform 6
- Extension of the Up Main Relief Line between Queenstown Road and London Waterloo
- Clapham Junction passenger congestion relief

Grade separation of Woking Junction will, in the short term, improve performance through the removal of the need for Portsmouth Direct Line services having to cross the opposite flow on the SWML towards Southampton. In the longer term it will enable the reliable operation of the increased level of service proposed by the implementation of the 'inner' solutions. To achieve an increased level of service at Woking will also require additional platform capacity.

A key constraint to reliably increasing the capacity on the Main Line is the section between Clapham Junction and Waterloo. To support the future train service uplift modifications will be required to the layout to support operation of an Up Main Relief Line between Nine Elms Junction and London Waterloo to support segregation of the Windsor Line and Main Line services.

Great Eastern Main Line

The Great Eastern Main Line (GEML) carries a fast-growing long distance flow from Norwich into London, key commuter flows from Southend Victoria, Chelmsford, Clacton on Sea and Braintree, as well as a significant amount of freight generated by the port of Felixstowe. Crossrail, which completes in 2019, brings significant investment to the London end of the GEML, benefiting local suburban passengers inwards of Shenfield with new rolling stock and direct connectivity to and beyond central London.

The GEML services face substantial growth between now and 2043. With services already operating at full length and no affordable solution for further lengthening due to constraints at London Liverpool Street, accommodating the forecast demand can only be achieved through running more trains.

Without intervention, services on the route to London Liverpool Street via Chelmsford will be over seated capacity and between 40 per cent and 100 per cent of standing capacity will be taken up for well over 20 minutes. Services that start from Norwich, Stowmarket, Witham and Chelmsford tend to have the highest load factors and demand is at or exceeds seated capacity now inwards of Chelmsford.

The main line inwards of Shenfield is already highly congested in the peak hour in terms of the number of services operating on the fast lines. This means that increasing the level of service above 24 trains per hour, achievable in early CP6, comes with a likely adverse effect on reliability and performance without a series of interventions to improve the capability of the infrastructure.

The Anglia Route Study set out a number of key interventions that are required over multiple control periods to accommodate the forecast demand and improve performance. For CP6 the proposals focus on delivering additional capacity on the Norwich to Shenfield corridor where current crowding and future growth is greatest. There is also a focus on improving the journey times for services on this

corridor to London and therefore the interventions provide both capacity and journey time benefits. A passing loop to the north of Witham will support an increase in peak passenger services from Norwich and Ipswich to London. The passing loop will also support journey time improvements as in the off peak it can be used to overtake slower moving freight services travelling to/from the Port of Felixstowe. Additional platform capacity at London Liverpool Street is required to support any increase in main line trains services. Trowse single line on the approach to Norwich is a critical constraint on the route which restricts the number of additional services which can service Norwich. The single line section includes a swing bridge and would need to be replaced with a two track structure to support the increase in train services required.

For later control periods, further interventions will be required to improve the signalling headway on the route to support an increase in the number of services on the section between Chelmsford and London Liverpool Street, this will require ETCS and ATO technology, part of Network Rail's Digital Railway plans for the Route. Network Rail is currently assessing whether ETCS Level 2 could be implemented earlier on the GEML in CP6 to release capacity benefits earlier. The delivery of ETCS/ATO and Traffic Management systems on the Route would all be delivered as a joint package for a subdivided area of the Romford Regional Operations Centre (ROC).

Great Western Main Line

The Great Western Main Line (GWML) operates from London Paddington station through the Thames Valley towards the West of England and South Wales. It serves a variety of passenger markets and carries a significant amount of freight (second only to the WCML). It suffers from on-train crowding at peak times, congestion at London Paddington station, and significant constraints to operating more train services. Heathrow Airport is a key destination at the London end of the route, and if the government approves the Airports Commission's recommendation of a third runway the volume of demand it generates will increase further.

Significant investment is taking place to enhance the capacity and capability of the route. The Great Western franchise is to introduce new trains and will provide 4,000 extra morning peak seats into Paddington every day by December 2018.

On the Relief Lines, Crossrail will complete in 2019 and will provide a significantly enhanced service for passengers at stations between Reading, Heathrow Airport and London. Opportunities exist to further increase capacity through running more trains west of London Paddington, and through potentially lengthening the trains from 9 to 11 cars in the future.

On the Main Lines, the rolling stock currently used for passenger trains will be replaced with new Intercity Express trains with greater overall capacity than today. Peak frequency will also be slightly enhanced to provide 20 trains per hour arriving at London Paddington in the peak period. However, the capacity provided will only be sufficient to accommodate the demand forecast during CP5. Additional capacity will be required to accommodate forecast demand for CP6 and beyond whilst meeting crowding standards etc.

The Main Line train service required for capacity is as follows (assuming the same capacity per train as at the end of CP5):

- End CP5 20 trains per hour
- CP6 22 trains per hour
- CP7 24 trains per hour
- 2043 29 trains per hour

To run a frequency of train service above 20 trains per hour will require infrastructure changes due to the constraints of the signalling system, and the physical constraints of trains needing to cross the paths of other trains approaching or leaving London Paddington station (throat).

The Western Route Study assessed what would be required to run 24 trains per hour and developed an option to provide a grade-separated junction in the area of Ladbroke Grove in west London. A number of configurations are possible but in essence a flyover or dive-under would take one track or pair of tracks over or under another to remove the physical constraint of trains crossing on the same level. Grade separation of Ladbroke Grove Junction would increase the capability of the whole system, reducing the level of conflicting train movements creating greater timetable capability, increasing flexibility in the platforming and operation of services using London Paddington and associated depots. Signalling improvements would also be required to allow trains to follow each other more closely.

Linked to this is the opportunity to rationalise the layout of the throat at London Paddington station. The track in this area was installed in the early 1990s and is due for renewal during CP6. If a grade separated junction is provided at Ladbroke Grove then it is possible to reconfigure the track layout to reduce complexity (and potential for asset failure), increase safe access for maintenance while trains are running, and change which trains use which platforms at London Paddington station, which will potentially ease crowding at pinch points within the listed train shed.

The interventions would allow 24 trains per hour to operate, and potentially more subject to further signalling technology improvements in later years.

The opportunity exists to align the enhancement of Ladbroke Grove Junction and Paddington approaches with the renewal and the opening of the new HS2 station at Old Oak Common. Such an approach could minimise passenger impact while achieving efficient delivery of a system enhancement through alignment with the renewals.

Midland Main Line

The East Midlands Route Study examined forecast service levels on the Midland Main Line (MML) out of London St Pancras International together with local routes that radiate out of Derby, Leicester and Nottingham. The MML carries Thameslink services from the capital as far as Bedford along with Long Distance High Speed (LDHS) services to Corby, Leicester, Nottingham, Derby and Sheffield.

Enhancements planned over CP5 and CP6 will allow a new, 6 train per hour electric LDHS service to operate on the Midland Main Line. Electrification to Kettering and Corby is planned to be delivered during CP5, with the remainder of the MML to Nottingham and Sheffield via Derby being delivered during CP6. It is envisaged that new electric rolling stock to operate this service will provide the additional capacity required to meet demand for long distance journeys to London. To facilitate this, interventions will be required to lengthen platforms at certain stations along the route. These interventions will, where possible be delivered alongside electrification works; as such, Phase 1 of this work will be complete in CP5, with Phase 2 (stations north of and including Leicester) planned to be delivered during CP6. Capacity improvements enabling the sixth LDHS path are planned to be completed during CP5. Passenger growth on cross-country, regional urban local routes can be met by train lengthening where required and will not require infrastructure interventions.

While electrification also delivers stated HLOS outputs regarding energy usage and operating costs, the project will additionally provide a freight route cleared to W6, W7 and W12 gauge. Freight growth, particularly along the Felixstowe to West Midlands corridor is the other key driver for infrastructure intervention in the East Midlands in CP6. While CP5 capacity schemes between Bedford and Kettering, and between Kettering and Corby will provide for additional freight paths along the North South route, growth in these paths along with an increase in freight from Felixstowe ports will exacerbate capacity constraints in the Leicester area. A package of interventions have therefore been proposed for this area to remove conflicts between east-west (freight) and north-south (passenger and freight) flows and provides additional regulation points for freight services to provide additional pathing options and improve performance.

East Coast Main Line

For London and the southeast, the East Coast Route Study is looking at the strategic requirements for suburban services to Moorgate and Kings Cross. This part of the route also supports outer suburban services from Peterborough, Kings Lynn and Cambridge, and the growing long distance commuter market from places such as Grantham and Newark.

The new East Coast franchise will offer an additional 12,000 seats on 65 new Intercity Express trains, and it is anticipated that growth in demand will continue, supporting further investment in new rolling stock but further increasing pressure on the infrastructure. The southern part of the East Coast Main Line (ECML) is one of the first parts of the national network due to made compatible with the ETCS (European Train Control System) during CP6. This will offer opportunities to bring digital railway solutions to bear on capacity constraints.

Demand analysis to 2023 indicates that growth on the peak inner suburban services to Moorgate will quickly outstrip current capacity, but could be accommodated through higher capacity rolling stock being procured as part of the current TSGN franchise. To accommodate that rolling stock, additional turnback facilities will be required at Stevenage. This is an enhancement that will be recommended as a priority for delivery in the next control period.

Analysis shows that significant growth continues through the period to 2043. The route study will consider the impact of accommodating additional services on the Moorgate branch infrastructure, which is known to be operating close to its design limits. Again, digital railway solutions will be key to enabling the high frequency metro-style service needed here.

The route study is also looking at how forecast growth on outer suburban routes impacts service levels: the need to balance sufficient capacity whilst minimizing the time passengers have to stand on longer journeys will focus the range of enhancement options. Given the current numbers of trains using the main line, infrastructure interventions will be required to accommodate the additional train paths identified as required by 2043.

For the services using the ECML into Kings Cross, the challenges are to accommodate long distance high speed services along with freight and outer suburban traffic carrying passengers from Peterborough, Cambridge and beyond. This mix of traffic focuses attention on pinch points such as the two-track viaduct near Welwyn. The high cost of civil-engineering solutions here will mean that options that can improve traffic management will be attractive.

The strategy to increase line capacity by finding ways to run trains closer together naturally places greater emphasis on infrastructure resilience and performance management. The future railway serving Moorgate and Kings Cross will have to run closer to maximum capacity, more of the time; that means that the infrastructure put in place will have to be specified to be more reliable. Robust industry-agreed procedures for managing perturbations to the timetable will also be important.

Chiltern Main Line

Under the Chiltern Railways franchise there has been significant investment in infrastructure and rolling stock which has led to considerable growth in demand on the Chiltern Main Line. It is likely that sufficient capacity can be provided on-train to meet demand through to the end of CP6, however there will be the need for interventions at London Marylebone to meet forecast passenger growth and facilitate passenger circulation and interchange with London Underground, for example the extension and reconfiguration of the gateline and relocation of concourse facilities.

The West Midlands & Chilterns Route Study is in development and is not due to report in draft until spring 2016. However, it is likely to identify that within and beyond CP6, further growth on the route is likely to be particularly constrained by flat junctions between Princes Risborough and London Marylebone, and two key factors at London Marylebone itself:

- The passenger capacity of the station
- The number and length of trains that can be accommodated into the station (and the difficulty of expanding a physically constrained station approach and footprint)

The Route Study is expected to also identify an option to enable some Chiltern Main Line services to divert via an enhanced Wycombe Line to an alternative London terminus at Old Oak Common. In addition to easing capacity at Marylebone, this would provide additional and improved connectivity from locations served by the Chiltern Main Line to High Speed 2 and Crossrail services. A solution is required for London Marylebone in CP7, however it is likely to be appropriate to develop and deliver the latter option in conjunction with the Old Oak Common station and in readiness for High Speed 2 Phase 1 opening in 2026.

Beyond the immediate Marylebone area, in the longer-term (for example from late CP7/the late 2020s), we would foresee a modernisation of the route to provide increased capacity and opportunities for improved journey times and performance through a package of enhancements including electrification and the implementation of ETCS as part of the Digital Railway programme.

Potential electrification of the main line highlights the need to consider options for the Metropolitan line from Amersham to Marylebone.

West Coast Main Line

The key issue for the West Coast Main Line (WCML) is the construction of HS2, with Phase 1 planned for 2026 and Phase 2 in 2033. It is anticipated that the LTPP will fully assess the implications for the WCML once the route decisions for Phase 2 are confirmed. An industry study (Capacity Plus) is currently underway to develop strategic options for train services on HS2 and WCML for HS2 Phase 1.

From a WCML perspective, the need for HS2 is based on capacity. There are three capacity challenges on the WCML:

- Capacity for future growth in commuting to London Euston, predominantly on the WCML Slow Lines.
- Demand by franchised and open access operators for additional long distance services, both to existing destinations and for through services to new destinations. The underlying driver is the need for improved connectivity.
- Capacity for freight growth, especially intermodal traffic.

Significant demand growth is expected to continue, with options to increase capacity very limited. In the short term, a programme of train lengthening will be required to meet demand but this will only be sufficient on parts of the route until the mid-2020s.

Given the mixed traffic and stopping patterns on the route, the WCML is effectively full at current levels of performance, over a number of key sections. The Network Rail report *West Coast Main Line and Trans-Pennine Capacity and Performance Assessment* concluded that with the current traffic mix and stopping patterns, there was little spare capacity for additional fast line paths. The report indicated a maximum of one fast line path may be available with a modest overall impact on PPM. Even if growth could be achieved on existing services, the full range of aspirations for additional passenger services (franchise and open access) cannot be accommodated.

Beyond the mid-2020s, a fundamental step change in capacity provision will be required. Although train lengthening schemes are required to increase capacity, the total capacity does not make the step change necessary to meet future demand predicted. That step change in capacity is provided by HS2 from 2026, releasing significant capacity on the WCML Fast Lines.

What opportunities are there to increase the benefits and reduce the costs of the proposed Crossrail 2 scheme?

Crossrail 2 has the primary objective of improving public transport connectivity to key opportunity areas in London and the southeast, promoting economic growth in the region. The project will also address significant existing capacity constraints on the national rail network, particularly on the SWML from London Waterloo, and the West Anglia Main Line (WAML) from London Liverpool Street. The project is consistent with rail industry long term strategy set out in the London & South East Route Utilisation Strategy (RUS) of 2011, the recently established Wessex Route Study and the soon to be published Anglia Route Study.

The route study process includes examination of alternative options that result in changes to benefits and expected capital and/or operational costs. These are assessed by a common methodology to provide choices and recommendations. Options to increase capacity on both the WAML and SWML and are set out in the relevant route studies, and summarised in the response to the preceding question.

Crossrail 2 is a substantial project with very significant benefits to the economy. Network Rail has been working with TfL to assess alternatives, including but not limited to those indicated in the route studies.