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# East West Rail – Phase 2

## Outline Business Case (Draft final)

# Document history

**Document no:**
**Classification:**
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| Version | Date | Reason for issue | Prepared By | Reviewed By | Approved by |
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| V1 | 31/01/19 | Collated draft for DG review | [text redacted under FOI section 40] | [ text redacted under FOI section 40] | |
| V2 | 08/02/19 | Incorporating PPM CoE, financial CoE, and additional DfT comments | | [text redacted under FOI section 40] | |

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# 1. Executive Summary

## Purpose

1.1. This EWR Phase 2 Outline Business Case (OBC) has been updated, since June 2018, and is being submitted to BICC to support a request for continued funding for the project through to September 2019 by which time a Full Business Case (FBC) will have been submitted. BICC, meeting on 18 February 2019, will be asked to:

- Endorse this OBC which sets out the case for the EWR Phase 2 project and supports the request to release interim funding;
- Approve an interim funding envelope of £115m for 6 months (1 April 2019 to 13 September 2019) to enable the project to continue through to FBC and the signing of a target price contract.

## Background

1.2. When complete, the East West Rail (EWR) programme will provide a direct rail link between Oxford and Cambridge and join up key towns and cities across the corridor.

1.3. EWR Phase 2 reinstates and upgrades railway lines to enable new train services to run between Oxford and Milton Keynes, between Oxford and Bedford and between Milton Keynes and Aylesbury.

1.4. OBCv1 for EWR Phase 2 was taken to BICC in June 2018, requesting retrospective approval for "Design" phase funding, to bring the project in line with the new Rail Network Enhancement Pipeline process. BICC requested that further work took place particularly on the economic case. Annex A summarises what's changed in the business case from June 2018 to now.

1.5. EWR Co has taken this work forward and BICC and the Secretary of State approved publication of *The case for East West Rail Phase 2 Western Section* in December 2018. This report was published to support the planning consent process and sets out why the government supports the project. Network Rail (NR) applied for a TWAO in July, a Public Inquiry starts on 6 February 2019. The published strategic and economic cases from December form the basis of this current updated OBCv2.

1.6. BICC are asked to approve the current revised OBC, recognising that the specific request at this time is for interim funding approval for April to September 2019 and that an FBC will be submitted later this year, by September 2019, with an updated cost to reflect an agreed target cost.

## Strategic Case

1.7. The strategic case sets out how EWR Phase 2 meets the government's priorities for transport (set out in its *Transport Investment Strategy*), which are closely aligned to the specific objectives of the project, by facilitating economic growth and new housing and employment opportunities in the Oxford-Cambridge Arc through the provision of improved rail connectivity.

1.8. The NIC published its final report in November 2017 and identified that EWR, along with the proposed Oxford-Cambridge Expressway, "will enhance connectivity across the Arc, expanding the labour markets of key towns and cities" and "can play a key role in tackling the Arc's housing crisis, unlocking major new development locations and enabling transformational growth around existing towns and cities."

1.9. The strategic case refers to evidence from the NIC and others on the strength and potential of the economy of the Arc which, without investment, could be constrained. The NIC estimate that, with the right actions, annual output of the corridor could increase by £163bn per annum by 2050 – approximately doubling the growth expected to happen without government intervention.

1.10. Removing the constraints resulting from the under supply of housing, facilitated by new infrastructure including EWR Phase 2, will help support the Arc to achieve its economic potential, in part by enabling more people that want to live and work in the Arc to do so and thereby increasing labour supply and helping business and organisations to grow by keeping them competitive. For the Arc to realise this potential, the NIC estimates that it will require a population growth of around 1% per year, which translates into a population increase of between 1.4 and 1.9 million by 2050.

1.11. Alongside Budget 2018, the government published its response to the NIC Partnering for Prosperity report where it confirmed its support of the NICs ambition to build up to one million high quality homes by 2050 to maximise economic growth of the Oxford-Cambridge Arc. The government also demonstrated its commitment to investment to support this level of ambition, including £1 billion for EWR Phase 2 (Western Section).

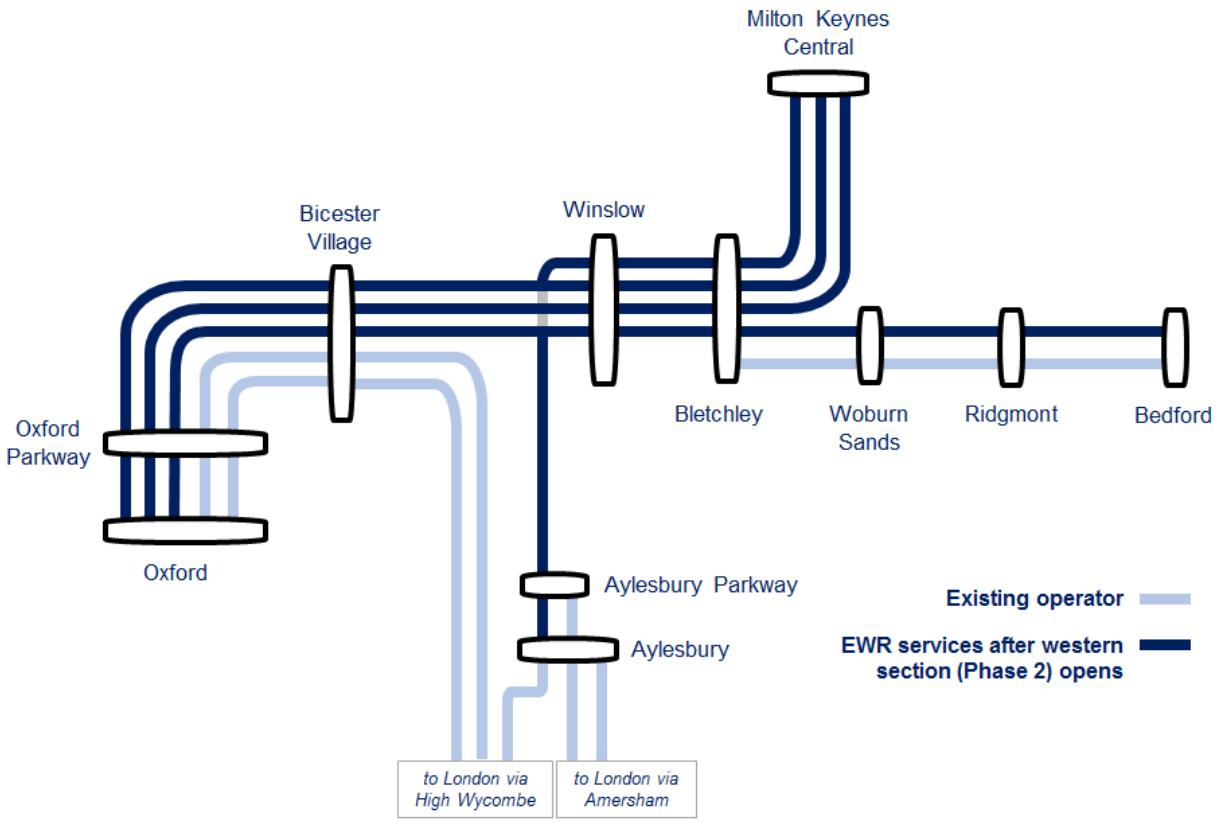
1.12. EWR also enjoys strong local support. The TWAO application elicited 409 letters of support compared to 235 objections. EWR is also well supported by local authorities in the area and the East West Rail Consortium (EWRC). The policy of local authorities and stakeholders recognises the important role of EWR Phase 2 in developing local communities and supporting opportunities for housing and job creation across the Arc, as summarised in Annex B of the business case. In November 2013, the EWR Consortium (EWRC) confirmed that it would make a £45m contribution in support of the project. A subsequent Memorandum of Understanding was put in place between the EWRC and the Department for Transport, which includes detail on how the EWRC's contribution may be used, either in cash or in kind. This significant contribution demonstrates the local authority / EWRC commitment and desire to see the project delivered.

1.13. A significant amount of work has previously been undertaken to test the feasibility and economic cases of a combination of Train Service Specifications (TSS), including route extensions off the immediate EWR Phase 2 network. Early TSS investigations looked at a selection of service options. Wider long-distance services were discounted as uneconomic. This confirmed a preferred TSS option introducing services on three new service across the

EWR Phase 2 network; 2 trains per hour (tph) Oxford to Milton Keynes, 1tph Oxford to Bedford and 1tph Milton Keynes to Aylesbury. Existing freight paths will be maintained, with appropriate provision to accommodate further freight traffic. This option meets the objectives by delivering a set of new, regular east – west services, interfacing with key north – south mainlines allowing for greater inter-regional journey opportunities. This TSS currently forms the basis of the Output Specification document agreed by DfT and NR and now owned by EWR Co A Concept Train Plan Working Group (CTPWG), led by NR, has undertaken a considerable level of validation and development of the capacity options and timetable modelling, their current assessment is that the preferred TSS is viable without significant impact on other services.

1.14. Planned EWR Phase 2 rail services are shown inFigure 1-1. The dark blue EWR rail services are entirely new as is the station at Winslow.

**Figure 1-1**
Planned EWR services (per hour) after completion of EWR Phase 2




1.15. The basis of this OBCv2 strategic case is as published in December 2018. In addition, responding to comments from BICC, CoEs and others, sections have been updated and added including progress on franchising and rolling stock strategies and risks to benefits and costs (see also Annex A on what's changed).

1.16. BICC also previously inquired about interactions with the Oxford to Cambridge Expressway. Current analysis suggests that there is limited duplication in terms of benefits between the two schemes. A section on this has been expanded (from paragraph 2.93), summarised as follows:

In early 2018 a demand model sensitivity test suggested the opening of the Expressway will have a limited impact on the value for money of EWR Phase 2 (there was a minor reduction in BCR between 0.01 and 0.02). More recently DfT have commissioned further work from Leigh Fisher and Jacobs to check the previous finding and to better understand the potential inter-dependencies of the two projects. This work is ongoing, though indicates the Expressway is likely to have a limited impact on EWR demand and benefits (and vice-versa). DfT will seek to conclude this work prior to FBC.

1.17. Key project risks and mitigations are now included in both the strategic and management case, summarised below:

- Delay to TWAO Approval - An accelerated timeframe of 13 months for TWAO approval is assumed in the schedule to conclude in September 2019. If this is not achieved then commencement of environmental mitigation works, enabling and permanent construction works would be delayed resulting in overall programme extension and additional indirect costs. NR led on the TWAO process, EWR Co (along with DfT) are providing oversight and ensuring objections are dealt with so far as possible before the public inquiry.

- Delay to HS2 interface milestones - HS2 Ltd programme prolongation as a result of ground conditions, design development or other internal HS2 issues. This is being manage through close HS2 Ltd / DfT interface and escalation. The target cost has been delayed until the HS2 Ltd programme is stabilised.

- Cost risk - NR work on design has led to a list of risks and issues which could increase GRIP 4 capex cost. NR and the EWR Alliance are also actively looking at opportunities to offset pressures (in the scope of earthworks and other potential construction efficiencies). Operating costs are also to be reviewed in more detail prior to FBC (including depot and train maintenance).

- Franchising strategy - tight timescales and integration risks with rolling stock and depot decisions. EWR Co have now developed initial rail operations and rolling stock strategies which are being integrated into the configuration plan and are being overseen by the Western Section Oversight Board.

- Timetable and existing network interfaces – work is ongoing to ensure the full EWR western section train service specification is viable without additional cost or significant changes to other services. Recent work by the Concept Train Plan Working Group has provided a high-level assessment that the full timetable is viable without significant disruption to other services (including use of WCML and existing stations at Oxford, Bedford, Milton Keynes etc). However, this will need to be kept under review and DfT / EWR Co will also need to work together to secure necessary train paths.

- Cross government integration – cross-Whitehall meetings are ongoing involving EWR Co who have presented plans at the DG and other groups to ensure they are aligned to the integrated government approach.

# Economic Case

1.18. Since the OBCv1 went to BICC in June 2018, Leigh Fisher, EWR Co and DfT have completed a significant amount of work on the economic case, particularly focusing on the development of demand and appraisal models and considering higher growth scenarios to improve alignment with wider government objectives of supporting housing and economic growth in the Arc. The previous lack of alignment was a key point raised in the June 2018 BICC discussion.

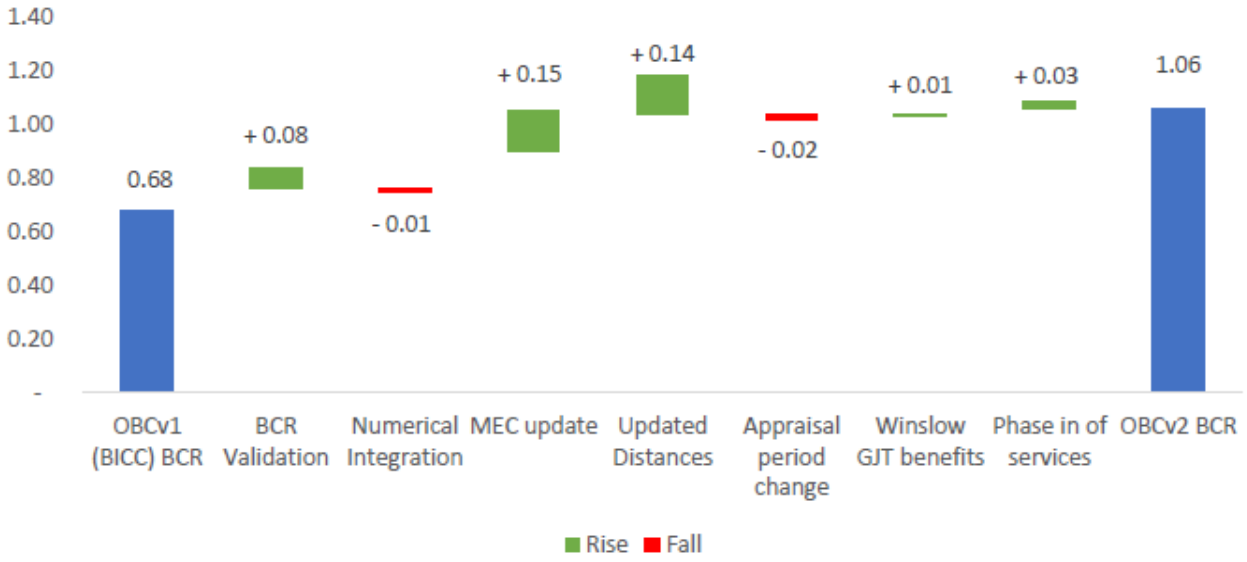
1.19. The baseline EWR Phase 2 BCR has been assessed as 1.3 (low value for money) which includes transport user benefits, Level 2 Wider Economic Benefits and reflects DfT National Trip End Model (NTEM) forecasts of population, housing and employment.

1.20. Further work has been done to assess a 'higher growth' scenario reflecting the National Infrastructure Commission (NIC) vision of up to one million new homes across the Arc by 2050; with a BCR of 2.4 (high value for money). Also, an intermediate growth scenario has also been tested which uses the higher of NTEM, the local assessment of housing need, or the indicative MHCLG assessment of housing need; with a BCR of 1.5.

1.21. It is also likely that EWR Phase 2 will bring other Wider Economic Benefits and impacts to the Arc, which have not been quantified in this report, work is ongoing to develop methods for their possible consideration in the FBC and in the SOBC for central section. These include land value uplift / dependant development from supporting house building and potential level 3 / dynamic land use impacts.

1.22. The baseline BCR presented to BICC in June was 0.85 including transport user benefits and level 2 wider impacts (0.68 without level 2 impacts). The change from 0.68 to 1.06 (or 1.3 including level 2 impacts) is largely due to improvements in the original model suite and also improved compliance with best practice, as set out in WebTAG. The largest impact (+0.15) was from updating the value of marginal external costs (benefits) of reducing the use of cars. The second largest impact (+0.14) was from developing the model to take into account benefits for routes where there are very few passengers before EWR (where some people where previously paying higher fares and travelling longer distances).

**Figure 1-2**
Change to level 1 BCR from June 2018 to December 2018




1.23. The basis of the Economic case is as published in December 2018. In addition, responding to comments from BICC, CoEs and others, the following sections have been added or updated:

- BCR sensitivity results (para 3.12) including higher capex cost sensitivities. An increase in capex of 20% (to c.£1.3bn nominal) reduces the BCR of 1.3 to 1.0. An increase of 40% (to c.£1.5bn nominal) reduced the BCR to 0.9.
- Changes in BCR from June ’18 (para 3.13)
- Train service specification deliverability (para 3.22): the current assessment is the full EWR Phase 2 TSS is viable (with further work on going)
- Expressway (para 3.27): current evidence suggests it has a limited impact on our benefits
- Capex / OB (para 3.33): added evidence from DfT on reference class forecasting, indicating the cost contingency (51%) appears reasonable.
- Opex (para 3.39): added BCR sensitivities of 3 and 4 car trains and on development and refinement of cost assumptions going forward.
- Modelling assurance and limitations added (within Annex C)
- Record of all modelling and appraisal assumptions added (Annex E)

1.24. BICC previously discussed the cost contingency included in the economic case. WebTAG (A5.3 May 2018) GRIP 3 optimism bias of 18% has been applied to the point cost estimate in addition to a P-mean (Quantitative Risk Assessment at the mean estimate) risk. This provides a total contingency of 51% (compared to the point cost estimate).

1.25. DfT have shared results of independent analysis conducted by Oxford Global Projects (OGP) using ‘Reference Class Forecasting’ (RCF) which provided a benchmark comparison against nearly 180 Western European rail upgrade programmes. The Reference Class Forecasting work provides an estimate of actual final costs compared to cost estimates made at different project stages. The OGP work suggests the P-mean for the reference class at OBC was 39%. In relation to this the current overall 51% contingency appears reasonable.

# Financial case

1.26. The financial case sets out the funding requirements and affordability of EWR Phase 2, including the projected capital and operating costs over the lifetime project.

1.27. The programme is currently funded in CP5, which will allow Network Rail to complete the GRIP 4 outline design phase. BICC will be asked to approve interim funding for the first 6 months of CP6. The recommended option is for £115m to commence the detailed design, progress planning permission and construction enabling works, and commence the procurement of future construction works. This all relates to work that would be done in any case, rather than being additional to the anticipated final cost.

1.28. The £115m consists of £54m forecast costs to progress from outline business case to final business case and £61m in contract commitments to be made in the first 6 months. This will take the total authorised programme funding for CP4, CP5 & CP6 to £297m.

1.29. Responding to previous BICC and CoE comments on continuing to challenge costs, paragraph 4.29 outlines EWR Co's responsibilities for approving the budget, reviewing and authorising payments to Network Rail and controlling access to contingency funds.

1.30. There are modest updates to the financial case throughout. In particular the following sections have been added or updated since June 2018:

- Inclusion of summary of interim funding request (para 4.2)
- Plans to progress to GRIP4 target price (para 4.6)
- Updated operating costs section (para 4.15)
- CP6 funding flows arrangements (para 4.29)
- Changes since GRIP3 cost estimate (4.42)

# Management case

1.31. The management case assesses whether a proposal is deliverable. It tests the project planning, governance structure, risk management, communications and stakeholder management, benefits realisation and assurance.

1.32. This case sets out the core principles behind the programme's delivery model for CP6, noting that there are several weeks remaining of CP5 and associated work is to continue to define the broader governance changes from Control Period 6 (April 2019), when the programme moves into its delivery phase.

1.33. The Secretary of State for Transport, as part of his speech in December 2016 on Rail Reform, announced the creation of a new East West Railway Company (EWR Co) to oversee and accelerate the delivery of the programme. Responding to previous CoE comments, the management case has been fundamentally updated to reflect the roles and responsibilities of EWR Co and how it relates to other parties. This revised categorisation sees the creation of the following roles:

- Strategic Sponsor (DfT): holds responsibility for defining the strategic objectives and high level requirements of the scheme, and holding final approval rights over the business case, funding and assuring itself that benefits can be delivered;
- Client (EWR Co): integrates responsibility for business case, scheme development and passenger services; has the required expertise and authority to effectively hold the Deliverer to account; is accountable for both the project budget (within limits set by Strategic Sponsor) and the realisation of scheme objectives and benefits, on behalf of the Strategic Sponsor; and
- Deliverer (NR): contracted by the Client to deliver the scheme – in Western Section, this continues to be Network Rail, comprising:
  - the NR Sponsor team within NR LNW Route, who interprets EWR Co's client requirements
  - NR Infrastructure Projects, which interprets and delivers the requirements and manages the EWRA2 (the Alliance)
  - The Alliance, which delivers the infrastructure

1.34. The delegations required by EWR Co to fulfil its role along with the relationship between EWR Co and DfT and NR are set out in the following documents which are to be finalised and agreed by end March 2019, overseen by the EWR Shareholder Board.

- Development Agreement - outlining the contractual obligations of the Company, with respect to delivery of the EWR scheme, as delegated to it by the Department for Transport.
- Protocol Agreement - between Network Rail and EWR Co to establish the relationship between the two parties for the delivery of the Western Section.

# Commercial case

1.35. The commercial case provides evidence on the commercial viability and procurement strategy be used for EWR Phase 2. It sets out how the outputs have been specified to achieve the benefits assumed in the strategic case, and the controls in place through project delivery and the supply chain to ensure the outputs are achieved, are delivered on time and provide value for money.

1.36. The programme is to be delivered by Network Rail in line with a Project Alliancing Agreement (between Network Rail and the EWR Alliance that sets out the performance of the works in return for specified payments). EWR Co was created in 2017 and will assume the role of Client from the beginning of Control Period 6 (CP6) in April 2019. EWR Co will be responsible (as set out in the Development Agreement between DfT and EWR Co) for holding Network Rail accountable for delivering the outputs to cost and schedule and for developing an integrated infrastructure, rolling stock and operations strategy for the whole railway.

1.37. There are modest updates to the commercial case throughout. The following sections have been added or updated since June 2018:

- Updates throughout including rail services operating model (franchising strategy) section (para 6.25)
- Development of section on commercial risk (para 6.51)
- New client programme management section (para 6.62)

# 2. Strategic Case

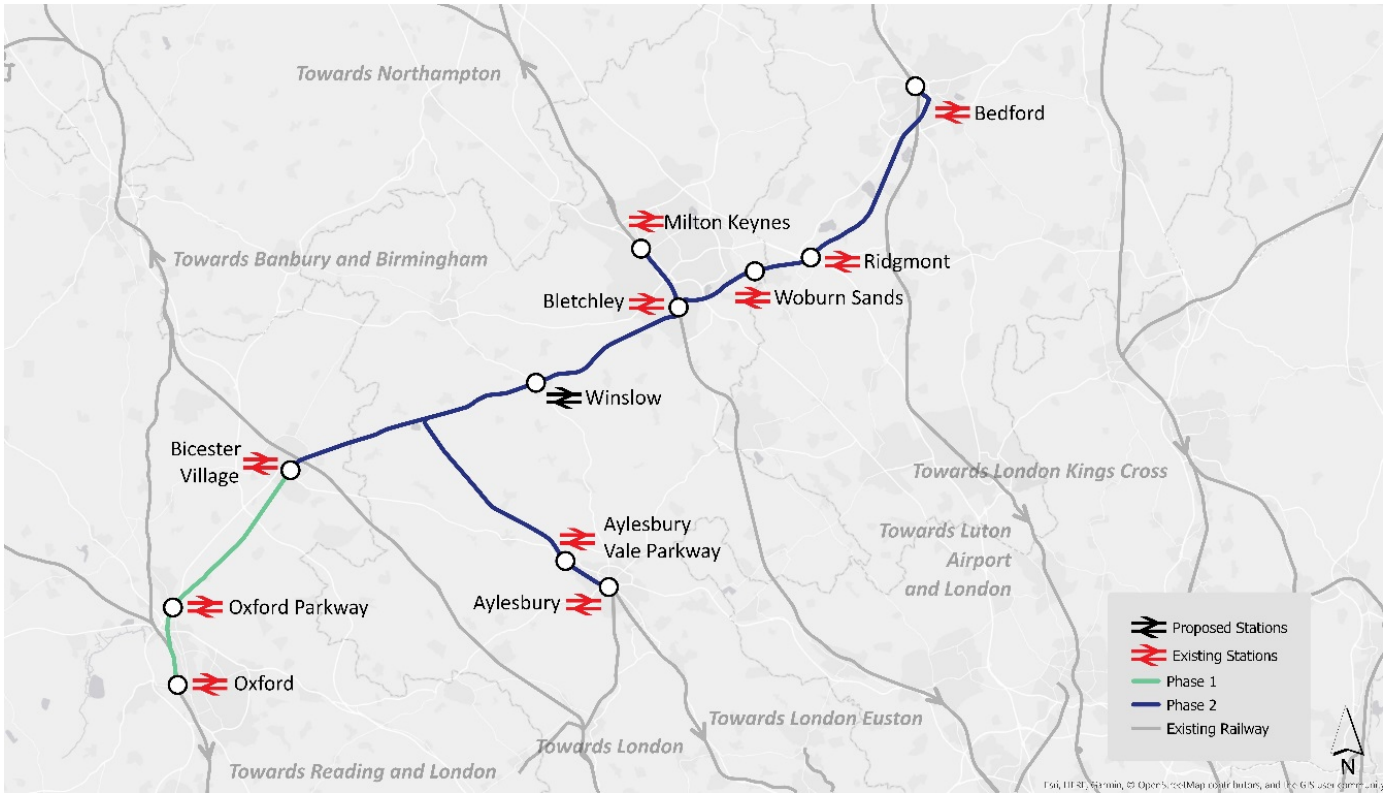
2.1. The purpose of this strategic case is to set out how investment in East West Rail Phase 2 meets the governments objectives to facilitate economic growth, new housing and employment opportunities in the Oxford-Cambridge Arc through the provision of improved rail connectivity and reduced journey times.

## The Scheme

2.2. When complete, the EWR project will provide a direct rail link between Oxford and Cambridge and join up key towns and cities across the corridor.

2.3. EWR Phase 2 (shown in Figure 2-1) reinstates and upgrades railway lines to enable new train services to run between Oxford and Milton Keynes, between Oxford and Bedford and between Milton Keynes and Aylesbury. EWR Phase 2 will follow on from the successful delivery of Phase 1 of the Western Section which upgraded the line from Oxford to Bicester Village, allowing the introduction of a new London Marylebone to Oxford service in December 2016[1].

**Figure 2-1**
EWR Phase 2 Map




*Source: EWR Co*

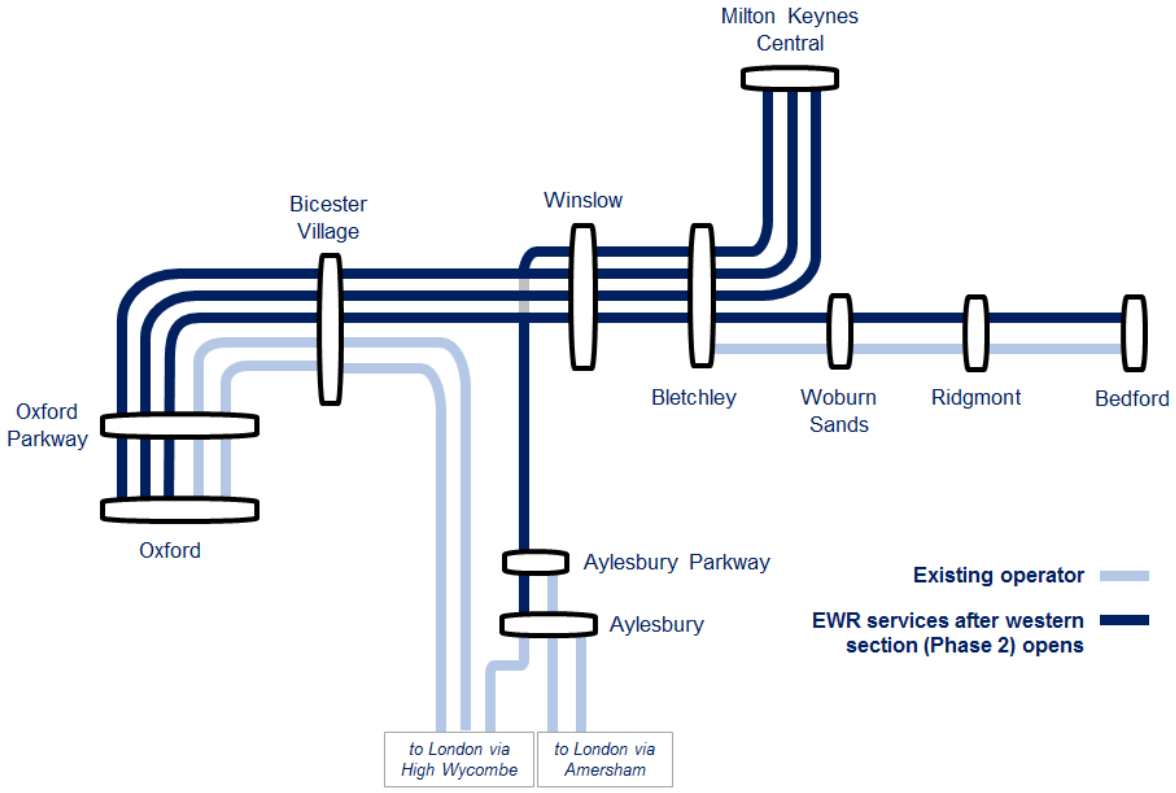
[1] The service to Oxford city centre commenced in December 2016. The line from Oxford Parkway to Bicester had been completed earlier, Chiltern Railways started an Oxford Parkway to London Marylebone service in October 2015.

2.4. Figure 2-2 shows the additional train services that are expected to run following the opening of EWR Phase 2. They consist of:

- 2 passenger services per hour between Oxford and Milton Keynes
- 1 passenger service per hour between Oxford and Bedford
- 1 passenger service per hour between Aylesbury and Milton Keynes

**Figure 2-2**

Planned EWR services (per hour) after completion of EWR Phase 2




*Source: EWR Co*

2.5. The planned Phase 2 rail services will:

- Provide new direct connections, for example, between Oxford and Milton Keynes;
- Add to the frequency of services between stations that already have a rail service (like Bicester to Oxford and Bletchley / Woburn Sands / Ridgmont / Bedford) and;
- Improve opportunities to interchange onto north-south rail lines, for example, for Winslow and London via Bletchley.

2.6. Stations will get between 1 and 4 new EWR rail services per hour in each direction under Phase 2 plans, as follows:

- 4 at Winslow and Bletchley;
- 3 at Oxford, Oxford Parkway, Bicester Village and Milton Keynes Central;
- 1 at Aylesbury, Aylesbury Parkway, Woburn Sands, Ridgmont and Bedford.

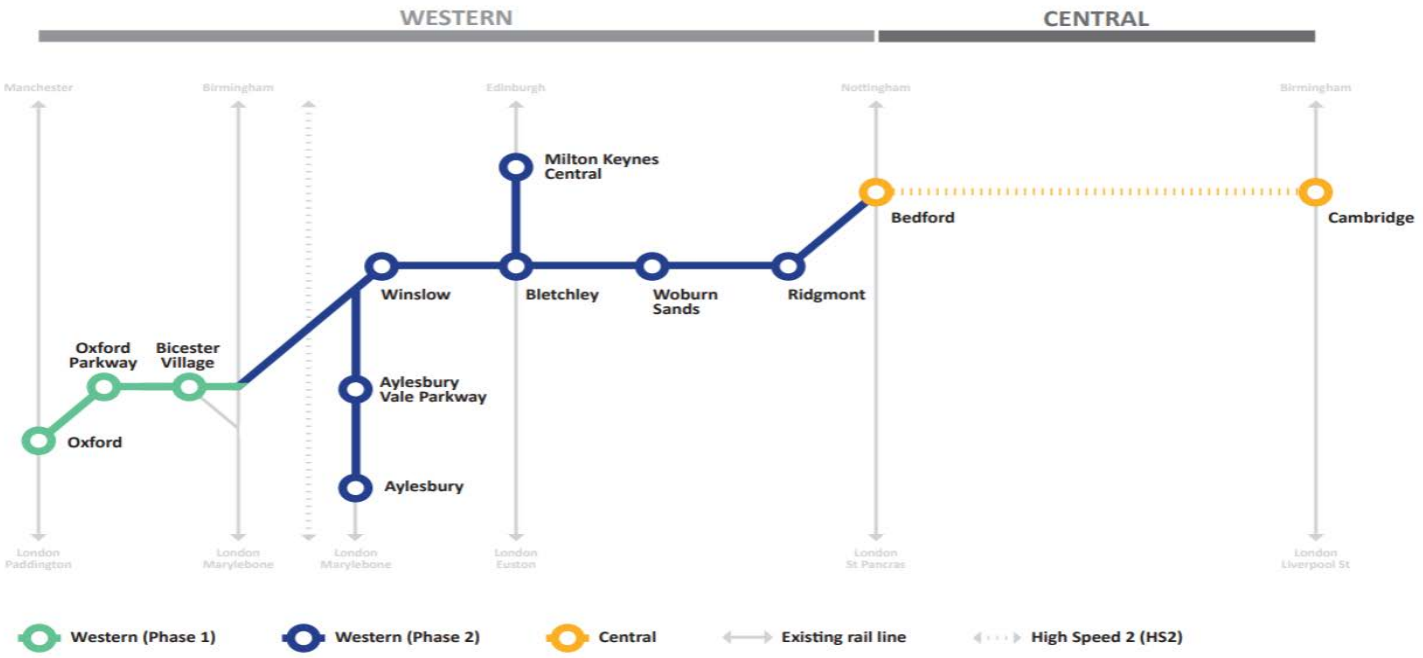
# Central Section

2.7. Once the entirety of the EWR between Oxford and Cambridge is completed, additional services will be added, yet further enhancing rail connectivity on the corridor. This is planned to include through services between Oxford and Cambridge as well as additional services between Bletchley and Cambridge. EWR Co launched a consultation on route options between Bedford and Cambridge, Phase 3 also known as central section, on 28 January 2019 with the objective of running services on this line in the mid to late 2020s. Figure 2-3 shows the three phases of the railway.

2.8. Some stakeholders also propose enhancing rail capacity between Cambridge and East Anglia, through the delivery of locally focussed projects, collectively referred to as the Eastern Section. Each project will be considered on its own business case and ultimately may allow for EWR train services to operate further east into East Anglia.

**Figure 2-3**

The three phases of EWR




*Source: EWR Co*

2.9. Key milestones across both western and central sections include:

- 2019 Central section: route consultation, SOBC and preferred route selection
- 2019 Western Section: target price submitted (April), Rolling stock option selection (June), western section phase 2 TWAO planning consent (Feb to Sept), FBC approved (by Sept), major work commence (by Oct)
- 2020 Western section: Rail operations option selected, franchise or alternative option (Jan)

- 2021 Western section: Franchise awarded, if that option is progressed (June) or alternative option progressed
- 2021 Central section: DCO application and completion, OBC
- 2023 Western section: train procurement complete, trains accepted (Aug)
- 2023 / 2024 Western section: Rail services commence (Dec 2023 for Oxford to Bedford and Oxford to Milton Keynes followed by Milton Keynes to Aylesbury in 2024)
- 2027 Central section: rail services commence

# The strategic case for investment in EWR

2.10. In July 2017, the DfT published its Transport Investment Strategy[2], setting out the government's priorities for transport investment and how it takes investment decisions to:

- Create a more reliable, less congested, and better connected transport network that works for the users who rely on it;
- Build a stronger, more balanced economy by enhancing productivity and responding to local growth priorities;
- Enhance our global competitiveness by making Britain a more attractive place to trade and invest;
- Support the creation of new housing.

2.11. EWR (Phase 2 and the overall scheme) supports the delivery of all of these priorities by delivering a new rail corridor linking the key economic centres between Oxford and Cambridge, facilitating new employment and housing opportunities and supporting regeneration, development and redevelopment schemes in the area.

2.12. The government also asked the National Infrastructure Commission (NIC) to consider how to maximise the potential of the Cambridge-Milton Keynes-Oxford corridor as a single, knowledge-intensive cluster that competes on a global stage, protecting the area's high-quality environment, and securing the homes and jobs that the area needs[3].

2.13. The NIC published its final report in November 2017 and identified that EWR, along with the proposed Oxford-Cambridge Expressway, "will enhance connectivity across the arc, expanding the labour markets of key towns and cities" and "can play a key role in tackling the arc's housing crisis, unlocking major new development locations and enabling transformational growth around existing towns and cities[4]."

2.14. Also in November 2017 the government published its Industrial Strategy White Paper, setting out its vision to drive productivity improvements across the UK[5]. Page 232 of the White Paper states that:

[2] Transport Investment Strategy, DfT (2017) https://www.gov.uk/government/publications/transport-investment-strategy
[3] https://www.nic.org.uk/our-work/growth-arc/
[4] NIC (2017) Partnering for Prosperity: a new deal for the Cambridge-Milton Keynes-Oxford Arc, page 8 https://www.nic.org.uk/wp-content/uploads/Partnering-for-Prosperty.pdf
[5] Industrial Strategy: Building a Britain fit for the future (2017) https://www.gov.uk/government/publications/industrial-strategy-building-a-britain-fit-for-the-future

"The corridor containing Cambridge, Milton Keynes and Oxford has the potential to be the UK's Silicon Valley. Two of its universities are consistently ranked in the world's top four, it competes for international high-tech and science investment, and it contains nationally significant industry concentrations such as information technology, life sciences, automotive engineering and professional services. Estimates by the National Infrastructure Commission (NIC) suggest that, with the right actions, annual output of the corridor could increase by £163bn per annum by 2050 – approximately doubling the growth expected to happen without government intervention.

In the Autumn Budget [2017], the government announced a vision for the corridor to stimulate economic growth. This includes an ambition for one million homes by 2050, starting with a housing deal with Oxfordshire comprising a government investment of up to £215m to fund local infrastructure in return for up to 100,000 homes in the area by 2031. And the government is investing in the rail and road infrastructure needed to boost productivity across the corridor and support the homes the area needs."

2.15. Alongside Budget 2018, the government published its response[6] to the NIC Partnering for Prosperity report where it confirmed:

- Its support of the NICs ambition to build up to one million high quality homes by 2050 to maximise economic growth of the Oxford-Cambridge Arc.
- The fact it has designated the Arc as a key economic priority, recognising the opportunity to amplify the Arc's position as a world-leading economic place. The Arc is already home to 3.3 million people, supports 1.8 million jobs and contributes £90 billion of Gross Value Added (GVA) to the UK economy each year7.
- Its support of the NIC finding that in order to deliver the full economic potential of the Arc, there needs to be an integrated approach to the planning and delivery of infrastructure, homes and business growth within it.
- The government also demonstrated its commitment to investment to support this level of ambition, including in relation to proposed new road and rail links, including £1 billion for EWR Phase 2 (Western Section)[8].

2.16. In summary, the strategic case for EWR relates to its potential to facilitate economic growth in the Arc, in part by helping to address potential housing and transport barriers, but also by offering new opportunities These three themes are elaborated on below.

# Economic growth and the role of EWR

2.17. The corridor is home to a high concentration of world leading research facilities and internationally significant business clusters, with a skilled workforce and track record for innovation and entrepreneurship[9].

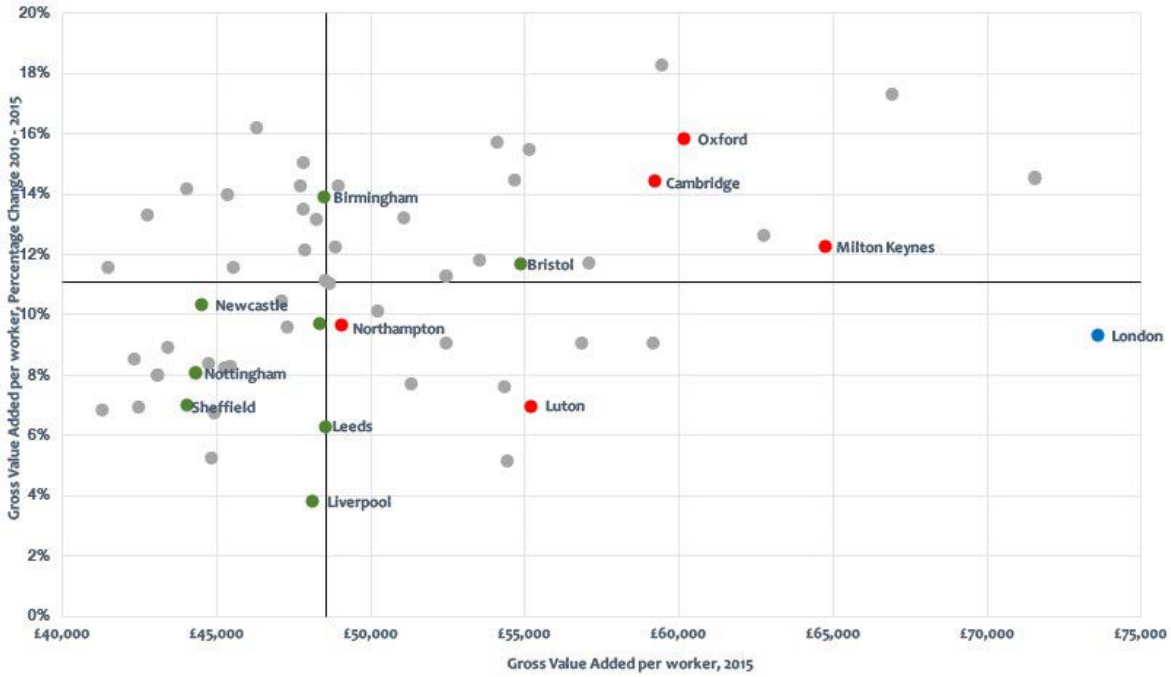
[6] Government response to 'Partnering for Prosperity: a new deal for the Cambridge-Milton Keynes-Oxford Arc' https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/752040/Government_response_to_Partnering_for_Prosperity_a_new_deal_for_the_Cambridge-Milton__Keynes_Oxford_Arc.pdf
[7] Central Bedfordshire Council 2018 http://www.centralbedfordshire.gov.uk/news/august/growth-corridor-partners-unite-at-mipim.aspx
[8] Government response to 'Partnering for Prosperity: a new deal for the Cambridge-Milton Keynes-Oxford Arc'
[9] NIC (2017) Partnering for Prosperity: a new deal for the Cambridge-Milton Keynes-Oxford Arc https://www.nic.org.uk/wp-content/uploads/Partnering-for-Prosperty.pdf

2.18. Oxford and the immediate surrounding area is known as the Science Vale and is home to a number of bioscience and medical technology centres, as well as telecommunications, computer hardware, engineering and electronics firms. Milton Keynes is home to a number of major financial and professional services companies, along with some major high performance technology and motorsport companies[10].

2.19. The combination of innovation, entrepreneurship and highly-skilled workers in the Arc has enabled the towns and cities to become some of the most productive and fastest growing in the UK, (see Figure 2-4).

**Figure 2-4**

Fast growing and highly productive cities




Source: Centre for Cities, published by NIC (2017)

2.20. In order to continue to support that growth the NIC recommended that "Government should progress work on East West Rail, the expressway and new settlements through a single co-ordinated delivery programme[11]". In its response to the NIC, the government endorsed this recommendation and confirmed it had "established a cross-Whitehall Programme to take an integrated approach to the planning and delivery of infrastructure, homes and business growth in the Arc."

2.21. The NIC found that removing the constraints to growth that result from the undersupply of housing in particular (covered below) "could support a step change in the arc's economic performance and make a significant additional contribution to national

[10] NIC (2017) Partnering for Prosperity: a new deal for the Cambridge-Milton Keynes-Oxford Arc, page 20 https://www.nic.org.uk/wp-content/uploads/Partnering-for-Prosperity.pdf
[11] Recommendation 1a, NIC (2017) Partnering for Prosperity: a new deal for the Cambridge-Milton Keynes-Oxford Archttps://www.nic.org.uk/wp-content/uploads/Partnering-for-Prosperity.pdf

output….supporting around 1.1m new jobs and increasing economic output by £163bn per annum[12]."

## Housing and the role of EWR

2.22. The Arc as a whole has experienced considerable growth in population from 2.7m people in 1990 to 3.3m in 2014. The NIC's report outlines that the economic success of the Arc has led to a demand for homes which is not currently being met by supply. The undersupply of new homes has contributed to high house prices and low affordability for both home ownership and future housing needs. The ratio of median house prices to household earnings is 12:1 in Oxford and together with Cambridge, with a ratio of 13:1, the two cities are some of the least affordable in the country[13] similar to London[14]. This issue extends beyond the major towns and cities where across parts of Buckinghamshire, Oxfordshire and Bedfordshire, house prices can be around ten times the average salary[15].

2.23. The NIC found, "there is powerful evidence that house prices are already diminishing firms' ability to attract employees. Workers are being priced out of local housing markets, restricting firms' access to labour and impacting on their competitiveness. Global businesses within the arc have told the Commission that, had they realised the impact that employees' housing costs would have on their business they may have located elsewhere. Others may yet choose to do so. This is as much an issue for high-tech firms and universities seeking to attract, recruit and retain globally mobile talent, as it is for public sector agencies looking to recruit key workers. These difficulties in accessing labour are exacerbated by poor east-west transport connections[16]".

2.24. Removing the constraints resulting from the under supply of housing, facilitated by new infrastructure including EWR Phase 2, will help support the Arc to achieve its economic potential, in part by enabling more people that want to live and work in the Arc to do so and thereby increasingly labour supply, helping business and organisations to grow by keeping them competitive. For the Arc to realise this potential, the NIC estimates that it will require a population growth of around 1% per year, which translates into a population increase of between 1.4 and 1.9 million by 2050[17].

2.25. The NIC estimate that between 23,000 and 30,000 new houses a year till 2050 would be required in the corridor as a whole to support the Arc's transformational growth potential. The lower estimate would be likely to meet the needs of the corridor's own future workforce requirement, with the higher estimate required to offset the impact of growth and under-delivery of homes in neighbouring land-constrained markets such as London[18].

[12] NIC (2017) Partnering for Prosperity: a new deal for the Cambridge-Milton Keynes-Oxford Arc,) which quotes Cambridge Econometrics and SQW (2016), Cambridge, Milton Keynes, Oxford, Northampton Growth Corridor - Final Report for the National Infrastructure Commission
[13] Savills, 2016 – The Property Market within the Cambridge – Milton Keynes – Oxford Corridor – Final Report p23
[14] MHCLG provisional 2013 data, 9:1 for Outer London and Oxford, 10:1 for Inner London and Cambridge https://data.gov.uk/dataset/6af32488-47fc-4fa4-a247-b3d1e83a51b2/ratio-of-median-house-price-to-median-earnings
[15] NIC (2017) Partnering for Prosperity: a new deal for the Cambridge-Milton Keynes-Oxford Arc, page 24 https://www.nic.org.uk/wp-content/uploads/Partnering-for-Prosperty.pdf
[16] NIC (2017) Partnering for Prosperity: a new deal for the Cambridge-Milton Keynes-Oxford Arc https://www.nic.org.uk/wp-content/uploads/Partnering-for-Prosperty.pdf
[17] Cambridge Econometrics and SQW (2016), Cambridge, Milton Keynes, Oxford, Northampton Growth Corridor – Final Report for the NIC
[18] Savills (2016) The Property Market within the Cambridge – Milton Keynes – Oxford Corridor – Final Report

2.26. In contrast, between 2012 and 2015, the average number of homes built each year in the Arc was 12,250, with a slight increase to 14,300 in 2016-17[19]. This is about half the level the NIC estimate is required to help secure the corridor's transformational economic growth potential.

2.27. The government has agreed an ambitious Housing Deal with Oxfordshire that will result in a significant increase in housing. The government is continuing to explore the opportunities for further housing deals across the Oxford-Cambridge Arc[20]. EWR will be an important enabler to accelerate development and re-development by improving connectivity and unlocking land for development. It is an integral part of realising the government's ambition to see up to one million high quality homes built across the Arc by 2050 to maximise its economic growth. However, there is no specific estimate for additional homes dependant on / unlocked by EWR Phase 2. In part this will be dependent on factors including future housing deals, local policy and completing EWR central section. Whilst land-use modelling has been undertaken since June 2018 it does not currently provide a sufficiently robust estimate on the specific number of homes that result directly from the scheme. The potential benefits of additional housing resulting from the scheme will continue to be an area of further work for FBC and SOBC of central section.

# Transport and the role of EWR

2.28. Rail patronage has more than doubled over the last 20 years to 1.71 billion in 2017/18 (from 846 million in 1997/98)[21]. This reflects the essential role Britain's railways continue to play in supporting economic growth by enabling the safe, fast and efficient movement of passengers and goods into, and between, major economic centres and international gateways in an environmentally sustainable way.

2.29. Even without an east-west link there has been strong growth in rail travel in the Arc. Background rail demand growth in towns and cities which will be connected by EWR Phase 2 (including Oxford and Milton Keynes) has been 3.6% per year over the last 10 years, slightly higher than the national average of 3.4%[22].

2.30. However, at present the corridor is not served by high-quality, east to west transport links, with journeys between the key economic centres often long and impractical. Many of the rail journeys EWR Phase 2 will enable aren't currently feasible without interchanging and travelling much further, travelling from Oxford to Milton Keynes via Coventry or London for example. This is in contrast to existing radial routes, where the existing economic centres all have regular train services to London, all with journey times within an hour.

2.31. The journey time savings between newly connected towns have the potential to be considerable. Table 2-1 shows that the time saving is particularly noticeable, where journey times between Oxford and Bedford and Aylesbury and Milton Keynes have the potential to be more than halved.

[19] DCLG (2017) – Live Table 256: Housebuilding: permanent dwellings started and completed by tenure 2016-17
[20] Government response to 'Partnering for Prosperity: a new deal for the Cambridge-Milton Keynes-Oxford Arc'
[21] ORR rail usage statistics, http://dataportal.orr.gov.uk/displayreport/report/html/a10e3c7b-7766-40ae-a87a-14c56cf85a63
[22] Compound annual growth rate, LeighFisher analysis of MOIRA data, 2007-2017. This compares to a national average of 3.4% from ORR Statistics (2007/08 to 2017/18) http://dataportal.orr.gov.uk/displayreport/report/html/a10e3c7b-7766-40ae-a87a-14c56cf85a63

**Table 2-1**
Current and future indicative rail journey times

| Journey | Current Rail Journey Time (National Rail) | East West Rail Journey Time |
|---|---|---|
| Oxford – Milton Keynes | 1h 19m | 42m |
| Aylesbury - Milton Keynes | 2h 28m | 38m |
| Oxford – Bedford | 2h 22m | 1h 6m |

*Source: National Rail Enquiries, and LeighFisher (modelled EWR Phase 2 timetable)*

2.32. Meanwhile, traffic growth in the Arc is forecast to continue to grow strongly[23]. EWR Phase 2 provides additional connectivity in its own right, but it will also help alleviate some congestion and traffic between places where people don't currently have a convenient rail option.

2.33. The lack of integrated transport infrastructure through the corridor has a direct impact on its ability to function as a single, integrated economic area. Without enhanced transport infrastructure, the corridor is unlikely to realise its potential as a globally competitive, knowledge intensive economic cluster[24].

2.34. There are also wider transport issues that extend beyond the infrastructure limitations of the Oxford – Cambridge corridor, for example:

- **Freight connectivity** – EWR could provide additional opportunities and potential cost savings for moving freight by rail, some of which could be re-directed away from the busy radial routes serving London where some capacity might be better used to enhance overcrowded passenger services.
- **London capacity** – many east-west rail journeys across the corridor can only be made at present by travelling into and back out of London, and transferring using the Underground, for Aylesbury to Milton Keynes, and Oxford to Bedford. This is potentially inconvenient for passengers. It also places pressure on London-bound capacity which would be otherwise freed up through the provision of a direct east-west service.

# Strategic Objectives for EWR Phase 2

2.35. In 2017 DfT, working with National Rail, updated the strategic objectives for EWR Phase 2 drawing on the themes highlighted above and by the NIC, including the opportunity for the railway to improve local connectivity and serve as a driver of economic growth and new housing. The objectives of the railway are to:

- Improve east-west public transport connectivity through rail links between Oxford, Bicester, Bletchley and Bedford/Milton Keynes, and between Aylesbury, Bletchley and Milton Keynes;

[23] Highways England, http://assets.highwaysengland.co.uk/roads/road-projects/Oxford+to+Cambridge+expressway/Oxford+to+Cambridge+Expressway+Corridor+overview+booklet.pdf
[24] NIC (2017) Partnering for Prosperity: a new deal for the Cambridge-Milton Keynes-Oxford Arc https://www.nic.org.uk/wp-content/uploads/Partnering-for-Prosperity.pdf

- Meet initial forecast passenger demand through new and reliable train services;
- Stimulate economic growth, housing and employment through new and reliable train services;
- Contribute to improved inter-regional passenger connectivity and journey times;
- Maintain current capacity for rail freight and appropriate provision for anticipated future growth;
- Consider and plan for future demand and economic growth; and
- Provide a sustainable transport solution to support economic growth in the area.

2.36. The NIC as part of its report, set out a number of objectives for the corridor:

- Link homes and jobs, connecting the places where people live and work;
- Open up both major strategic sites and smaller local sites for high quality housing development;
- Co-ordinate patterns of new development, creating focussed opportunities to build new communities around transport hubs and interchanges;
- Create inclusive, liveable places, connecting people and communities with opportunities for work and leisure;
- Provide a catalyst to private investment, unlocking broader local and national benefits; and
- Increase land values, allowing local authorities and Government to capture a share of uplifts to support infrastructure investment

2.37. A cross-Whitehall programme board, and associated governance, has been created to establish the owners for the numerous workstreams and ensure the timely and effective delivery of the corridor's ambitious objectives.

2.38. Alongside Budget 2018, the government published its response[25] to the NIC Partnering for Prosperity report where it confirmed its support of the NIC finding that in order to deliver the full economic potential of the Arc, there needs to be an integrated approach to the planning and delivery of infrastructure, homes and business growth within it.

## How EWR Phase 2 meets the strategic objectives

*Improve east-west public transport connectivity through rail links between Oxford, Bicester, Bletchley and Bedford/Milton Keynes, and between Aylesbury, Bletchley and Milton Keynes and meet initial forecast passenger demand through new and reliable train services.*

2.39. In contrast to strong north-south radial links extending from London, east-west trips across the corridor are difficult, slow and impractical but will be improved by EWR Phase

[25] Government response to 'Partnering for Prosperity: a new deal for the Cambridge-Milton Keynes-Oxford Arc' https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/752040/Government_response_to_Partnering_for_Prosperity_a_new_deal_for_the_Cambridge-Milton__Keynes_Oxford_Arc.pdf

2. As a result, commuting between key towns and cities on the corridor is almost non-existent and the area does not function as a single labour market[26].

2.40. The scheme and the planned rail services it will facilitate are described from paragraph 2.4 and shown in Figure 2-2.

2.41. The journey time savings between newly connected towns have the potential to be considerable. Table 2-1 shows that the time saving is particularly noticeable, where journey times between Oxford and Bedford and Aylesbury and Milton Keynes have the potential to be more than halved. This forms the basis of most of the transport user benefits assessed in the Economic Case.

2.42. Descoping of some infrastructure is covered below (from paragraph 2.61), however, this has not changed the assessment that the project can deliver on its strategic objectives and benefits.

*Stimulate economic growth, housing and employment through new and reliable train services*

2.43. EWR Phase 2 will support the creation of new homes and communities along the line of route and will support regeneration, development and redevelopment schemes.

2.44. The project is supported, particularly through the participation of the East West Rail Consortium, by the local authorities who are working in conjunction with housing developers to plan for the provision of new housing along the route.

2.45. In its 2017 report, the NIC identified the East West Rail project as part of a vital opportunity to support the area's future success. This report was endorsed in the 2017 Autumn Budget and again at the 2018 Budget when the government formally responded to the NIC recommendations and restated its support for the project.

2.46. The sections above (including those on the economy and housing in the Arc) outline how EWR will be an important enabler to accelerate development and re-development by improving connectivity and unlocking land for development. It is an integral part of realising the government's ambition to see up to one million high quality homes built across the Arc by 2050 to maximise its economic growth.

*Contribute to improved inter-regional passenger connectivity and journey times*

2.47. The lines to be upgraded by EWR Phase 2 will provide connections to the Great Western network at Oxford, the West Coast Main Line at Bletchley and the Midland Mainline at Bedford. This is in addition to the current connections at Bicester for the Chiltern Mainline.

2.48. By virtue of connecting these key lines, the new rail services to operate on East West Rail, whilst consisting of an initial primarily local service, will facilitate interchange between each route which will significantly shorten the journey times between a number of destinations; many of which, where travel is currently only possible via time-consuming interchange at London as shown in Table 2-1.

[26] NIC (2017) Partnering for Prosperity: a new deal for the Cambridge-Milton Keynes-Oxford Arc, page 25 https://www.nic.org.uk/wp-content/uploads/Partnering-for-Prosperity.pdf

*Maintain current capacity for rail freight and appropriate provision for anticipated future growth*

2.49. The existing operational rail infrastructure set for upgrade as part of EWR Phase 2 is currently used by freight, primarily conveying household waste to the landfill site and energy from waste facility located at Calvert, Buckinghamshire. EWR Phase 2 will retain the current freight capacity utilised by these services; as well providing additional opportunities and potential cost savings for moving freight by rail by making possible new freight flows through the increased inter-connectivity between main lines.

2.50. The railway will be built to accommodate current freight flows and new sections of the railway is being built to RA10 W12 gauge to allow for future freight opportunities.

*Consider and plan for future demand and economic growth*

2.51. Given the potential for housing growth along the line upon the commencement of the initial train service, there is a strong need to consider and plan for future demand. Network Rail has worked with the DfT and EWR Co to develop Phase 2 in a way that the right balance is taken between the initial capital costs and appropriate provision being made for future growth. The signalling is being designed to accommodate future service levels post 2027. New stations are being designed for future growth and existing stations are being assessed to ensure capacity is sufficient for future growth.

2.52. Once the link between Oxford and Cambridge is completed, additional services will be added further enhancing rail connectivity on the corridor. This is planned to include through services between Oxford and Cambridge as well as additional services between Bletchley and Cambridge and train lengthening.

*Provide a sustainable transport solution to support economic growth in the area*

2.53. It is intended that EWR Phase 2 will positively contribute to tackling climate change by minimising the potential adverse impacts of growth through providing opportunities for a more sustainable means of travel than alternatives.

# Local policy support

2.54. An east-west rail link has been on the agenda of local authorities in the region since the original rail connection was closed in 1967. It was closed despite high levels of local opposition and the impending large population influx resulting from a new town (Milton Keynes). There have been many subsequent studies commissioned to look at re-opening the lines, most commissioned by local organisations including the East West Rail Consortium (EWRC).

2.55. The EWRC was set up in 1995 with the objective of promoting and securing a strategic railway connecting East Anglia with Central, Southern and Western England. The EWRC brings together local authorities, Local Enterprise Partnerships (LEPs) and most recently England's Economic Heartlands Strategic Authority (EEHSA) as well as NR, the DfT and stakeholders from across the South East and East of England. The EWRC remit is to ensure that the full potential of the EWR link is realised in support of the delivery of economic growth, new employment opportunities and housing.

2.56. The policy of local authorities and stakeholders recognises the important role of transport in developing local communities; and opportunities for housing and job creation across the Arc. This is set out in their local plans and polices summarised in Annex B. In November 2013, the EWR Consortium (EWRC) confirmed that it would make a £45m contribution towards the support of the project. A subsequent Memorandum of Understanding was put in place between the EWRC and the Department for Transport, which includes detail on how the EWRC's contribution may be used, either in cash or in kind. This significant contribution demonstrates the EWRC's commitment and desire to see the project delivered.

# The preferred route and train services

2.57. A significant amount of work has previously been undertaken to test the feasibility and economic cases of a combination of Train Service Specifications (TSS), including route extensions off the immediate EWR Phase 2 network. Early TSS investigations looked at a selection of service options. Wider long distance services were discounted as uneconomic. This confirmed a preferred TSS option introducing services on three new service across the EWR Phase 2 network; 2 trains per hour (tph) Oxford to Milton Keynes, 1tph Oxford to Bedford and 1tph Milton Keynes to Aylesbury. Existing freight paths will be maintained, with appropriate provision to accommodate further freight traffic. This option meets the objectives by delivering a set of new, regular east – west services, interfacing with key north – south mainlines allowing for greater inter-regional journey opportunities. This TSS currently forms the basis of the Output Specification document agreed by DfT and Network Rail and now owned by EWR Co (Annex F). The Concept Train Plan Working Group (CTPWG) has undertaken a considerable level of validation and development of the capacity options and timetable modelling, their current assessment is that the preferred TSS is viable without significant impact on other services. Other details on train service specifications including do minimum services, which essentially include services for HS2 phase 1, Crossrail, Thameslink December 2018 timetable, East Midlands Trains timetable, post HS2 West Coast Mainline timetable, are in Annex E.

## Discounted TSS Options

2.58. Both Network Rail's timetabling team and LeighFisher consultancy have completed a considerable amount of work to support the identification of the preferred TSS options including testing options for running trains beyond the EWR network to other cities.

2.59. This work has identified the significant capacity bottlenecks and platforming limitations that exist at the main hubs across the route, limiting the ability of EWR Phase 2 services to extend further. The main discounted options and the associated challenges are identified below:

- **Oxford to Didcot / Reading** – analysis from 2017 (LeighFisher commission by DfT) included a TSS that extended services south through Oxford to Didcot and Reading. Subsequent studies have shown that the availability of new paths through Oxford station is extremely limited, with current EWR Phase 2 timetabling now assuming the termination of all new services at Oxford, using in the main the existing two bay

platforms. The Oxford Corridor Capacity Phase 2 project, which will significantly remodel the station and track, is likely to create additional capacity which could be used to allow EWR to introduce future Oxford to Cambridge services.

- **Aylesbury to London Marylebone via High Wycombe** – it was previously anticipated that the TSS would include a service between Milton Keynes and London Marylebone, via High Wycombe. As timetabling work has progressed, it has demonstrated that there are significant challenges with linking the West Coast and Chiltern mainlines, where pathing opportunities are limited, made more difficult with the relatively slow 40mph single track section between Princes Risborough and Aylesbury. Addition services would trigger significant infrastructure requirements on the Chiltern Main Line. A direct Milton Keynes to Marylebone service, has been considered which would redirect this via Amersham which would use a less congested, double-track route. It could however still require significant infrastructure improvements depending on the proposed TSS. Running this and other services beyond the EWR network is not currently in the preferred EWR TSS, but remains a possible option for government and a future train operator to consider in future, subject to capacity.
- **Milton Keynes to Northampton** – as part of TSS optioneering in 2017 and 2018 (LeighFisher commission by DfT), some of the Milton Keynes services were extended to Northampton to examine the impact on the economic case. Whilst spare capacity is likely to be available on the West Coast Mainline between Milton Keynes and Northampton, and the extension may be useful for platforming purposes, the economic modelling suggested that the additional revenue and Wider Economic Benefits generated would not be sufficient to cover the additional operating costs.
- **Bedford to Kettering** – Bedford station with its current layout is expected to reach near full capacity when the new Thameslink timetable starts in late-CP5. This poses challenges pathing the proposed Oxford to Bedford service through Bedford station to the north, unless significant changes can be made to the Midland Mainline timetable, which is likely to impact on the economic case. For these reasons, the Oxford to Bedford service proposes to use the existing bay platform at Bedford, isolating the service from the wider station operation. The length of the platform at Bedford limits the length of the train to 3-cars maximum. However, this is currently considered to be sufficient capacity for Phase 2.
- **Bournemouth to Manchester via EWR** – the previous business case discussed the potential of operating long-distance services over the new EWR Phase 2 network, focusing particularly on the diversion of the existing CrossCountry Bournemouth to Manchester service via Milton Keynes. A Network Rail study identified significant challenges with this proposal and as such the service has been removed from the proposed TSS.

## Infrastructure enhancements

2.60. Network Rail has previously identified the following key infrastructure works required to enable the delivery of the Preferred TSS which is built into the Output Specification. All infrastructure enhancements consider the longer-term objectives of the project in allowing for future demand growth and train frequency increases:

- Double existing single track section with 100mph line speed, between Claydon Junction and Bicester Gavray Junction (east of Bicester Village station)
- New double track section with 100mph line speed, between Claydon Junction and Bletchley
- Renew existing single track with 90mph line between Claydon Junction and Aylesbury Vale Parkway
- Gauge enhancement to W12 and RA10 between Bicester Gavray Junction and Bletchley
- New high-level platform at Bletchley station
- New platform at Aylesbury Vale Parkway
- New station at Winslow
- Platform extensions at Woburn Sands and Ridgmont stations
- Passive provision for future electrification between Oxford and Milton Keynes Central, to a definition agreed between Network Rail and the DfT

## Changes to previous specification

2.61. The scope of the EWR Phase 2 has evolved over time to ensure an efficient design that meets both the initial and future capacity needs and continues to delivery the strategic objectives for the railway. Continuous testing of the project's scope and a bottom-up cost challenge in spring 2017 have resulted in a number of significant scope changes. The descoping has not changed the assessment that the project can deliver on its strategic objectives and benefits.

2.62. **De-scoping of Electrification Infrastructure** – The EWR Phase 2 route was originally planned to be electrified as part of the Electric Spine programme, which was to create a new electric rail corridor between Southampton and Sheffield, via EWR Phase 2. When the Electric Spine programme was cancelled, the electrification of EWR Phase 2 was reduced to cover the route between Oxford and the West Coast Mainline at Bletchley, only. Passive provision is being made for new structures on the new EWR infrastructure.

2.63. In October 2016, the Department for Transport took the decision to remove the electrification of the route from the scope. This was in light of increasing capital costs for the project along with delays to neighbouring electrification programmes which would have meant that out of the three planned new services, only one (Oxford to Milton Keynes) would have been able to run on solely electric traction. This would however still have been reliant upon the acceleration of the electrification of the route between Didcot and Oxford.

2.64. **Single tracking Aylesbury Vale Parkway to Claydon Junction (MCJ)** – The project previously planned to deliver a double track section throughout the length of the MCJ, to deliver the hourly Aylesbury to Milton Keynes service. As part of the bottom-up, EWR

Company led cost challenge completed in spring 2017, it was identified that a single track would be sufficient in delivering the planned train service.

2.65. The northern 8km of the Marylebone to Claydon Junction section will share a narrow corridor with the HS2 programme. HS2 Ltd. will continue to deliver double track civils through this section as part of their integrated solution, allowing for future double-tracking, if and when required as passenger demand grows. The southern section, delivered by Network Rail, will also be designed in a way that does not prohibit its future double-tracking.

2.66. **Newton Longville loops and platform lengths** – In December 2016, Network Rail led a number of Value Management workshops to identify opportunities for reducing scope whilst maintaining the outputs of the project. It was agreed by all parties present that the westbound freight loop could be removed as there was no immediate timetable requirement for it, with further work to look at the eastbound loop. The EWR Co, as part of their cost challenge, promoted the removal the eastbound loop, which was accepted by the SoS and EWR Programme Board.

2.67. The December 2016 Value Management sessions also recommended that the platform lengths at both Aylesbury Vale Parkway and Winslow stations should be reduced to 101m, capable of facilitating a four-car maximum train length. This change was accepted by the EWR Programme Board.

2.68. **Princes Risborough – Aylesbury Line Upgrade** – The previous Train Service Specification included the extension of the proposed Milton Keynes to Aylesbury service to London Marylebone via High Wycombe. To support this service, the single track Princes Risborough to Aylesbury line was planned to be upgraded from 40mph to 80mph, with platform extensions at Princes Risborough, Monks Risborough and Little Kimble.

2.69. Since 2016, successive decisions have been taken that have removed the planned line speed improvements, platform extensions and level crossing closures. These were driven by the affordability challenges, the potential value for money of progressing the scope if double-tracking were planned for a future control period and the initial timetabling work.

# Constraints

***Physical constraints***

2.70. The project will significantly upgrade existing infrastructure through a rail corridor that is mostly intact, meaning that there are limited physical constraints to reopening the full route.

2.71. The present rail corridor has limited additional land space to act as a haul road for construction and future maintenance traffic. Network Rail has identified that to achieve the construction programme, it will need to acquire additional parcels of land throughout the main works corridor to provide the required access, compounds and small, targeted sections of haul road to reduce pressure on local highways. The powers for this will be granted through a Transport and Works Act Order (TWAO), the public inquiry for which commenced on 6 February 2019.

2.72. Network Rail has confirmed that, with the absence of sharp curves across the route, speeds of up to 100mph on the OXD (between Bicester and Bletchley) and 90mph on the MCJ (Aylesbury to Claydon Junction) can be achieved without additional land requirements.

2.73. The largest structure on the EWR Phase 2 project is the Bletchley Viaduct. At 700m long, it spans the WCML south of Bletchley station, connecting the OXD (from Bicester) to the BBM (to Bedford). The structure was originally completed in 1962 however since the section of railway was mothballed in 1993, only light, infrequent rail traffic has used the structure. To bring the viaduct back into regular use, providing an enhanced capability for freight services, Network Rail has identified that a significant programme of strengthening works is required. Its interface with the WCML means that significant possessions are likely over a period of up to 3 years. The possession strategy will take account of HS2 and existing infrastructure blockades to increase efficiency and reduce disruption to the railway.

2.74. The EWR Phase 2 project shares a 8 km section of the MCJ (Claydon Junction to Aylesbury) with HS2. As part of HS2 Ltd.'s programme and the HS2 Act, the existing Network Rail infrastructure will be realigned, with HS2 Ltd. responsible for providing the necessary civils and directly contracting with Network Rail as part of its On-Network Works to deliver systems. HS2 Ltd. are building a new Infrastructure Maintenance Depot at Calvert which will be connected to the EWR Phase 2 network, allowing it to be used for the transportation of spoil and materials during construction, pathing availability permitting.

***Operational constraints / impact to other services***

2.75. The EWR Phase 2 network will heavily interface with busy mainlines on the wider National Rail network. Network Rail identified as part of ongoing timetabling work, that there are a number of capacity pinch points across the route, particularly at Oxford, between Bletchley and Milton Keynes and at Bedford, which place significant constraints on the TSS available to EWR Phase 2.

2.76. In 2018 a Concept Train Plan Working Group (CTPWG) was constituted to continue work to identify a detailed timetabling proposal that delivers the preferred scheme TSS. Their current assessment is that the full TSS is viable and the current estimated impact on existing rail services has also significantly reduced. For example, it was previous thought that a London Southern service to Milton Keynes would have to terminate early (around Bletchley), but this is no longer required to make the timetable work. This change has been driven by the changes proposed on the WCML from May 2019, which frees up capacity as a result of the LNWR timetable changes. This assessment will conclude in April 2019 with an agreed report issued by the CTPWG and will be discussed at the Western Section Oversight Board.

2.77. Whilst the full train service specification is currently assessed to be viable, this will need to be periodically reviewed. The wider timetable could change subject to agreements with other operators on the network. Furthermore, the required train paths must be secured and EWR Co are developing a road map to safeguard capacity for EWR services along the corridor from December 2023.

2.78. The output specification calls for 4 car trains on services between Oxford-Milton Keynes and Aylesbury- Milton Keynes. However, Oxford-Bedford is limited to 3-cars due to the length of the bay platform at Bedford Midland station. Studies carried out to look at extending Bedford bay platform identified that it is likely to expensive to justify. LeighFisher, as part of its economic case analysis, tested the use of 2-car trains throughout the EWR- Phase 2 network and identified that the capacity would be sufficient to accommodate demand over the length of the appraisal period, although recent modelling suggests that for 'intermediate' and 'higher' growth scenarios 3-car trains will be required within the 60 year appraisal period.

2.79. The railway is being built to accommodate all types of freight traffic. There will be opportunities for freight services to be fitted around the proposed passenger operation, but opportunities are limited by existing capacity on adjoining routes. A notional freight path has been included in planned EWR train service specification and assessed as part of the project's environmental impact work.

# Interdependencies

2.80. The project has identified several significant inter-dependencies which will require careful management to fully achieve the objectives of the project.

**High Speed 2**

2.81. EWR Phase 2 runs near to HS2 for approximately 8km in the Calvert area. This interface area is split into two sections referred to as MCJ North and MCJ South. In the MCJ North area, the delivery of the required civil engineering earthworks for the combined schemes is included in the HS2 budget and the HS2 Act provides the necessary powers for the earthworks construction. It has also been agreed in principle that HS2 Ltd will deliver the combined civil engineering earthworks for the combined schemes on the MCJ South area. The costs attributable to EWR will be funded by the EWR Phase 2 project and Network Rail will acquire the necessary consents. In 2018, the limit of HS2 Ltd.'s civils works through the shared northern 8km section of the MCJ (Claydon Junction to Aylesbury) route, was extended to cover the full-length integrated section. This means that the EWR Phase 2 project is heavily reliant on HS2 Ltd's delivery programme and timely completion of the civils works. If there is a slippage to the HS2 programme, there is a risk that Network Rail's programme, which will deliver the rail track and systems, is delayed. Equally if the Network Rail programme is delayed, there is the potential that the EWR Phase 2 project misses the planned blockade for the route section, pushing the works back until such time as HS2 is complete. Equally if EWR's works and/or TWAO are delayed HS2's works would be delayed as they intend to use this route for rail/slab delivery.

2.82. The management case covers project plan and management of dependencies. The EWR Co Western Section Delivery Team will utilise the period end review with NR to manage and understand the impacts of any project plan change. For key dependencies such as the interface with HS2 at Calvert, regular senior level engagement is in place between CEOs of EWR Co and HS2 Ltd. Furthermore, the Calvert Integration Forum and its standing attendees (HS2 Ltd, EWR Co, DfT, NR) are aiming to ensure the interdependencies and risks between the schemes are managed properly.

**Franchising and rolling stock**

2.83. EWR Co working with NR and DfT has made considerable progress on the identification of a workable timetable (covered under Economic Case, Train Service Specification deliverability).

2.84. In 2018 EWR Co developed an initial rail operations / franchising strategy, work on which is reported to and overseen by the Western Section Oversight Board (Chaired by the DfT SRO and also comprising EWR Co and NR). This will continue to be developed and take account of the ongoing Williams Review of rail franchising.

2.85. As part of the franchising strategy work EWR Co and DfT (via the Western Section Oversight Board) need to decide how EWR Co, or DfT, will procure an operator of passenger services for the Western. Future franchising for the whole of EWR will continue to be considered as work on the Central Section continues to progress. The purpose of the work being undertaken is to provide structure for the evaluation of the options available to EWR, to:

- Clarify the passenger service-related objectives which should be supported by the choice of operator; and
- Identify any specific constraints or must haves, relating to preparing to operate and the operating environment which might influence from where EWR sources the operator.

2.86. The plan to complete this work consists of a number of stages consisting of the following activities:

- Agree the Critical Success factors
- Define and understand the constraints
- Develop summary document and long list of options to engage with stakeholders
- Evaluate long list to short list
- Agree evaluation criteria for short list and evaluate options
- Produce summary report with defined options

2.87. As part of this evaluation the following working assumptions have been or will be agreed with the DfT:

- EWR Co has identified the rolling stock and depot selection and therefore all potential options are agnostic to the selection, albeit operators are consulted on the specification of both the rolling stock and depots;
- Major stations such as Cambridge, Oxford, Milton Keynes and Bedford will not fall within Western Section operations remit (i.e. the operator of EWR services is not expected to operate the stations);
- Up to 36-month lead time post award (i.e. contracts may have to be let by the end of 2019) of franchise to; recruit and set up operational organisation, recruit and train drivers, meet all safety requirements and tests and early operator on-boarding to facilitate smooth transition to fare paying passenger services; and

- DfT lets any proposed franchises and negotiates direct awards and/or franchise 'changes'.

2.88. The Williams review into the organisational and commercial frameworks of the rail industry is currently ongoing and is intended to publish its findings in autumn 2019. The franchise evaluation work that is currently being undertaken by EWR Co is to assess the options for the Western section franchise/operation against a set of agreed critical success factors for the project designed to identify the 'best' option 'franchise' model to recommend to the DfT, based on what is known today. The programme for this current work is driven by DfT timeframes for franchise renewals or direct award (if a Chiltern DA or renewal is the identified option) if this is the chosen option. Findings and recommendations that arise from the Williams review will be considered and incorporated in the operator procurement where possible and appropriate.

2.89. There has been a significant level of work undertaken to date culminating in a long list of options. Work is now focused on the next stages of evaluation (including but not limited to inclusion in existing franchises such as Chiltern and a new separate franchise). This work will be completed and the strategy to be taken forward is intended to be included in the submission of the FBC in 2019.

2.90. Relatedly, EWR Co have produced a rolling stock strategy which has recommended two potential options to be considered in parallel: a legacy fleet solution (including class 185 trains) and new trains. A decision on which options to select is required in summer 2019, this decision and next steps will be included in the FBC in 2019.

2.91. The working assumption for the project was that spare depot capacity could be found as part of an existing franchise operation. Analysis and testing of the assumption has demonstrated that insufficient existing capacity exists at depots where likely train operators currently maintain fleets in the areas of EWR. This has led to other options being explored. Bletchley and Kings Heath (Northampton Siemens depot) have been identified as feasible options, both would require work to make them fit for purpose.

# Oxford to Cambridge Expressway

2.92. A proposed 'Oxford to Cambridge Expressway' is being developed by Highways England under the Roads Investment Strategy. The new road is expected to improve connectivity between Oxford, Milton Keynes and Cambridge, to divert through-traffic away from Oxford's ring road and mitigate congestion on the A3427. An east-west Expressway is intended to complement EWR in supporting growth across the corridor.

2.93. Leigh Fisher's analysis from 2018 used a mode share model to model the impact on rail demand from the introduction of the highway as a sensitivity test. This sensitivity test suggests the opening of the Expressway will have a limited impact on the value for money of EWR Phase 2 (there was a minor reduction in BCR between 0.01 and 0.02).

2.94. More recently DfT have commissioned further work from Leigh Fisher and Jacobs to better understand the potential inter-dependencies of the two projects. This work is ongoing,

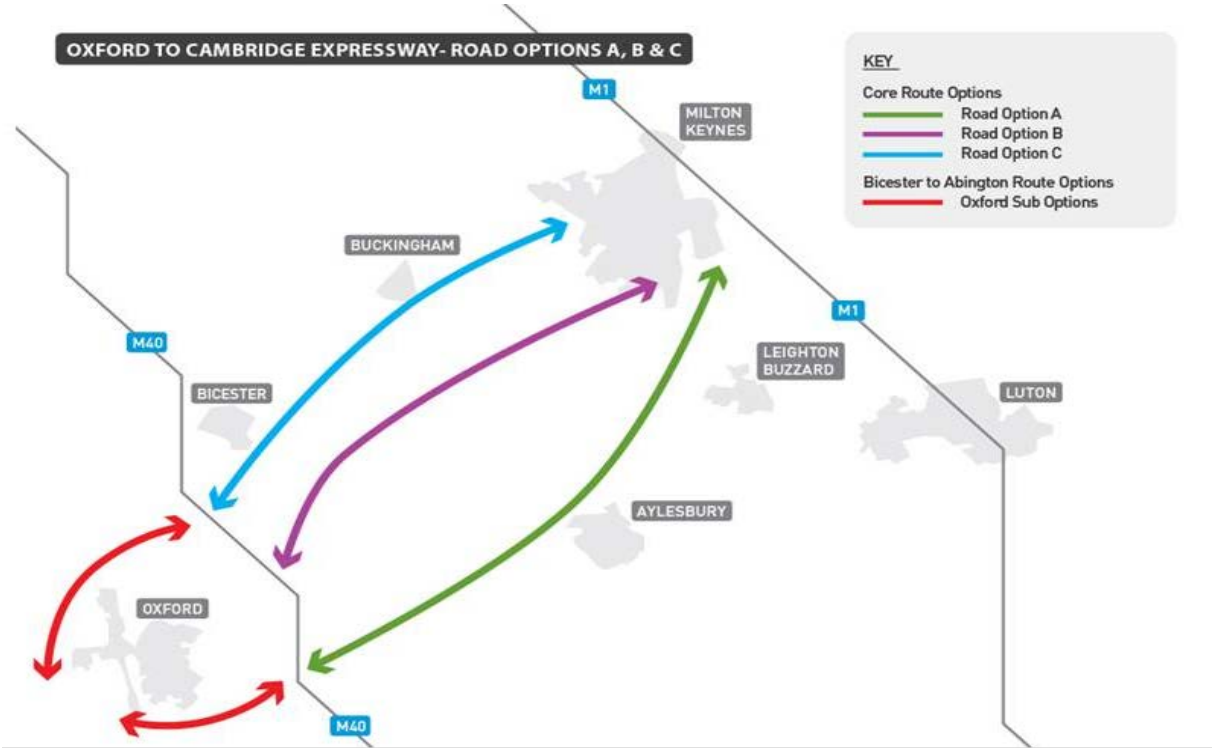
[27] Oxford to Cambridge Expressway Stage 3 Report from November 2016

though early indications are that there is limited duplication in terms of benefits. Two analyses have been considered:

- Mapping and comparing the origins and destinations of modelled EWR and Expressway journeys. Initial conclusions are that there is some overlap but that the schemes are also likely to serve distinct geographic segments.
- A comparison of demand model responses from the highways road model and the EWR rail model. Initial conclusions from this work suggests the Expressway is likely to have a limited impact on EWR demand (and vice-versa). Conclusions of this work will be included in the FBC.

**Figure 2-5**

Expressway route options




# Benefits and costs

2.95. Earlier sections of this Strategic Case outline how EWR will help facilitate **economic growth** in the Arc, in part by helping to address potential **housing** and **transport** barriers, and by offering new opportunities. It also summarises the benefits of the scheme, which are set out below in more detail, in relation to how it delivers against the strategic objective of the scheme.

2.96. The anticipated benefits of the scheme are unchanged from those set out in the June 2018 OBC. The prioritisation of benefits has been based on four aspects; contribution to project objective, stakeholder perception, reach of realisation and scale of realisation. The top benefits being taken forward have been identified in this process, split into 'primary' and

'secondary' benefits and their rationale linked to the strategic case. This can be found below in Table 2-2.

**Table 2-2**

Key benefits of EWR Phase 2

| Benefit | Description |
|---|---|
| **Improved connectivity** | Main driver for project. Aligns with NIC recommendations to aid realisation of economic and housing opportunities. |
| **Reduced journey times** | Aligns with NIC recommendations to aid realisation of economic and housing opportunities. |
| **Increased/better access to jobs** | Supports broader corridor's objectives relating to economic growth and jobs. |
| **Unlocked housing potential** | Supports broader corridor's objectives relating to economic growth and housing. |
| **Agglomeration** | Supports broader corridor's objectives relating to economic growth, housing and jobs. |
| **Increased and new passenger capacity** | Aligns with NIC recommendations to aid realisation of economic and housing opportunities. |
| **Increased service frequency for some origin destinations** | Aligns with NIC recommendations to aid realisation of economic and housing opportunities. |
| **Mode shift to rail travel** | Supports broader corridor's objectives relating to a sustainable transport solution. |
| **Enhanced freight capabilities** | Supports broader corridor's objectives relating to freight. |

2.97. Other benefits include:

- Reduced crowding on London services and interchanges (although there are potential up and down side impacts which will need to be considered)
- Improved customer satisfaction with service improvements (Oxford-Bicester/Bletchley-Bedford)
- Increased franchise revenue
- Reduced NOx emissions
- Reduction in energy usage and waste
- Reduced carbon emissions
- Increased funding to support local business regeneration
- Regeneration
- Improved business revenue due to increased station throughput
- Increased safety of network

2.98. The Economic Case assesses the benefits and costs and likely value for money of the project. Costs and benefits quantified are appraised in line with the approaches set out in

HM Treasury Green Book and, specifically, in line with the approach to transport appraisal set out in DfT transport appraisal guidance (WebTAG). The benefits included in the BCRs include transport user benefits and some wider economic impacts.

- The majority of the quantified benefits relate to the direct transport impacts of the scheme, the **transport user benefits**. These include improved connectivity and journey times for rail users and benefits related to a reduction in travel by car, compared to the future situation without EWR Phase 2. Changes in expected emissions from cars and rail vehicles are also quantified and included in the benefits.
- **Wider economic impacts** are additional to the direct transport user benefits. They include improvements in productivity through agglomeration – having the effect of bringing people and businesses closer together through improved connectivity and journey times.

2.99. The benefit cost ratio (BCR) of EWR Phase 2 is assessed to be between 1.3 (likely low value for money) and 2.4 (likely high value for money) depending on assumptions made about economic and housing growth in the Oxford-Cambridge Arc. The lower end of the range reflects baseline forecasts of population, housing and employment growth consistent with the DfT National Trip End Model (NTEM). The upper end of the range represents a 'higher growth' scenario which reflects the National Infrastructure Commission's vision, supported by the government, of one million new homes across the Arc by 2050.

2.100. There are a number of risks that are likely to affect the realisation of the project benefits each of which could delay realisation of the benefit and/or diminish the value of the benefit. There are also a range of cost risks.

2.101. The risks to the project and to the realisation of the project benefits are captured, monitored and mitigated by EWR Co, DfT, NR, HS2 Ltd and other parties such as MHCLG. These are communicated through a series of team and board meetings. Internally at EWR Co all risks to the project are recorded in a risk register and the main risks are escalated to senior staff for resolution support, they are also reported to the Western Section Oversight Board on a monthly basis in addition to other management meetings.

2.102. An overview of western section Phase 2 key project risks are set out below in Table 2-3.

**Table 2-3**

Risk Register

| Risk Title / owner | Risk Detail | Mitigating Actions | Timing |
|---|---|---|---|
| Delay to TWAO Approval (Geoff Leffek) | **Cause:** An accelerated timeframe of 13 months for TWAO approval is assumed in the schedule to conclude September 2019. It may not be possible to resolve all of the objections during the public inquiry. **Impact:** Delay to commencement of environmental mitigation works, enabling and permanent construction works, resulting in overall programme prolongation causing delay to EiS date and additional indirect costs. | NR led on the TWAO process, EWR Co (along with DfT) are providing oversight and ensuring: | |
| | | 1. Early and active stakeholder engagement to ensure approval is as timely as possible and resolution of objections prior to public enquiry. | March 2019 |
| | | 2. Progression of separately consented enabling works under permitted development rights. | Ongoing |
| | | 3. Delay to establishment of final project budget until TWAO approval is better understood | March 2019 |
| Delay to HS2 Interface Milestones (Geoff Leffek) | **Cause:** HS2 Ltd programme prolongation as a result of ground conditions, design development or other internal HS2 issues. **Impact:** Delay to handover of OXD and MCJ civil works from HS2 Ltd to Network Rail and EWR Alliance resulting in overall programme prolongation causing delay to EiS date and additional indirect costs. | 1. Delay to establishment of final project budget until HS2 Ltd programme is stabilised. | February 2019 |
| | | 2. Re-assessment of proposed engineering solutions and scope split between HS2 and EWR to protect EWR programme. | February 2019 |
| | | 3. Escalation to DFT for priority decision. | February 2019 |
| Cost risk (Geoff Leffek) | NR work on design has led to a list of risks and issues which could increase GRIP 4 capex cost significantly (covered in financial case). In addition operating costs are to be reviewed in more detail prior to FBC (including depot and train maintenance). | EWR Co engaged with NR to scrutinise and resolve the Target Cost for the full duration of the programme as early on as possible. An operating cost assumption review is ongoing, integrated with rolling stock and franchise strategies. | March 2019 |
| Franchising Strategy (Geoff Leffek) | In early stages of definition and could miss key decision points for rolling stock and depot/stabling. | EWR Co have now developed initial rail operations and rolling stock strategies which are being integrated into the configuration plan and are being oversee by the Western Section Oversight Board. | June 2019 |
| Timetable (Geoff Leffek) | That the full EWR western section train service specification is not viable without additional cost or significant changes to other services and / or EWR CO do not secure the require train paths. | Recent work by the Concept Train Plan Working Group has provided a high level assessment that the full timetable is viable without significant disruption to other services. More detailed work is ongoing and performance testing is expected to commence in summer 2019. | Next phase of CTPWG work complete April 2019 |
| Cross government integration (Will Gallagher) | Failure of integrated cross Whitehall programme – misalignment could reduce benefits for the corridor, particularly alignment with housing policy | Cross Whitehall meetings are ongoing involving EWR Co who are presenting plans and ensuring they are aligned to the integrated government approach. | Ongoing |

# 3. Economic Case

3.1. The purpose of the economic case is to demonstrate the value for money of investment in EWR Phase 2.

3.2. The benefit cost ratio (BCR) of EWR Phase 2 is assessed to be between 1.3 (likely low value for money) and 2.4 (likely high value for money)[28] depending on assumptions made about economic and housing growth in the Oxford-Cambridge Arc. The lower end of the range reflects baseline forecasts of population, housing and employment growth consistent with the DfT National Trip End Model (NTEM)[29]. The upper end of the range represents a 'higher growth' scenario which reflects the National Infrastructure Commission's vision, supported by the government, of one million new homes across the Arc by 2050[30].

## Approach

3.3. Costs and benefits quantified are appraised in line with the approaches set out in HM Treasury Green Book[31] and, specifically, in line with the approach to transport appraisal set out in DfT transport appraisal guidance (WebTAG)[32]. The benefits included in the BCRs include transport user benefits and some wider economic impacts.

- The majority of the quantified benefits relate to the direct transport impacts of the scheme, the **transport user benefits**. These include improved connectivity and journey times for rail users and benefits related to a reduction in travel by car, compared to the future situation without EWR Phase 2. Changes in expected emissions from cars and rail vehicles are also quantified and included in the benefits.
- **Wider economic impacts**[33] are additional to the direct transport user benefits. They include improvements in productivity through agglomeration – having the effect of bringing people and businesses closer together through improved connectivity and journey times.

3.4. In WebTAG agglomeration is explained as follows, "Agglomeration economies: Productivity is affected by the density of economic activity; this is one of the reason for the existence of cities and specialised clusters, such as financial hubs. The productivity impacts may occur within or across industries, termed localisation and urbanisation economies respectively. Agglomeration economies are externalities and so are not reflected in transport markets"[34]. The wider economic impacts quantified in this economic

[28] In line with DfT value for money categories as set out in the DfT value for money framework https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/630704/value-for-money-framework.pdf

[29] NTEM version 7.2 which forecasts the growth in trips by place up to 2051 based on projections of population, employment, housing, car ownership and trip rates. https://data.gov.uk/dataset/11bc7aaf-ddf6-4133-a91d-84e6f20a663e/national-trip-end-model-ntem

[30] In his November 2017 Budget speech the Chancellor said: "Last week the National Infrastructure Commission published their report on the Cambridge-Milton Keynes-Oxford corridor. Today we back their vision and commit to building up to 1 million homes by 2050. Completing the road and rail infrastructure to support them."

[31] https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-governent

[32] WebTAG https://www.gov.uk/guidance/transport-analysis-guidance-webtag Relevant WebTAG units include Rail Appraisal Unit A1.3 and Wider Economic Impacts Unit A2.1.

[33] The wider economic impacts which are quantified in this report are described as 'Level 2' impacts in WebTAG, Unit A2.1. https://www.gov.uk/government/publications/webtag-tag-unit-a2-1-wider-economic-impacts-may-2018

[34] Unit A2.1 page 7 https://www.gov.uk/government/publications/webtag-tag-unit-a2-1-wider-economic-impacts-may-2018

appraisal are those that can be estimated by assuming fixed land use (under an assumption that employment and population, in terms of totals and distribution, are the same with and without the scheme) as opposed to estimating any changes in the location of businesses and households as a result of EWR Phase 2 and the impacts these changes could have on costs and benefits.

3.5. Transport user benefits from EWR Phase 2 have been assessed using a transport model developed by LeighFisher for the DfT. Additional information on the model is provided at Annex C and a complete record of assumptions is provided separately at Annex E. The wider economic impacts have been assessed using outputs from the transport model, in line with WebTAG guidance on Level 2 wider impacts which are: agglomeration (static clustering); output change in imperfectly competitive markets and; labour supply impacts[35].

3.6. Phase 2 BCRs are calculated by comparing the costs and benefits associated with a do something forecast (with EWR) and a do minimum forecast (without EWR). The appraisal period is 60 years from opening (until 2084/85) and demand growth is capped in 2037 (20 years from the appraisal year) after which demand is grown in line with population projections in line with WebTAG guidance[36].

## Growth scenarios

3.7. The range in BCR depends on assumptions made about economic and housing growth in the Oxford-Cambridge Arc. Three growth scenarios have been tested:

- A **baseline** scenario using population forecasts derived from the National Trip End Model (NTEM version 7.2), (around 20,000 additional households in the Arc each year)[37],
- An **intermediate growth** scenario that for each local authority uses the higher of NTEM household projections, the local assessment of housing need, based on publicly available documents, or the indicative MHCLG assessment of housing need, (around 24,000 additional households in the Arc each year)[38], and
- A **high growth** scenario largely based on the NIC's transformational growth scenario, including specific locations and levels of housing where indicated in the supporting documentation accompanying the NIC's report (around 30,000 additional households in the Arc each year)[39].

3.8. Each growth scenario is applied in both the do minimum (without EWR) and in the do something (with EWR). So although Phase 2 has been modelled in high growth scenarios,

[35] Table 2, page 15 in Unit A2.1 outlines the Level 2 impacts. Units A2.2 to A2.4 provide methodologies for quantifying the impacts.
[36] Unit A5.3 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/715482/tag-unit-a5-3-rail-appraisal-may-2018.pdf
[37] Demand is forecast for a 20 year period until 2037-38 in accordance with DfT guidance, after which demand increases in line with the Office for National Statistics (ONS) forecast for national population growth.
[38] Figures for MHCLG indicative housing need assessments and local assessments of housing need are as of September 2017. Overall the MHCLG assessment of need is the highest of these three sets of numbers. However, for some places the local needs assessment or NTEM figures are higher. Where this is the case the highest of the three estimate is used, so that the 'intermediate growth' scenario is not lower than the 'baseline scenario' in these cases.
[39] NIC (2017) Partnering for Prosperity: a new deal for the Cambridge-Milton Keynes-Oxford Arc, page 26 https://www.nic.org.uk/wp-content/uploads/Partnering-for-Prosperty.pdf

the analysis in this economic appraisal has assumed that additional growth is background growth that is not dependent on EWR.

3.9. Annex D sets out the household projections from NTEM, the local assessment of housing needs, and the indicative MHCLG assessment of housing need. These are used in the baseline and medium growth scenarios, as set out above. In the 'high growth' scenario the amount and distribution of new households is taken from Table 3.3 in a report by Steer Davies Gleave (SDG, now known as Steer) for the NIC[40]. One alternative assumption was made in the high growth scenario, this was to remove the new settlement which SDG had assumed at Calvert. Instead this development was spread out across the rest of the Arc. This is because the current HS2 and EWR plans do not include a station at Calvert, so it was thought to be more robust not to include a significant settlement there.

3.10. Whilst the higher growth scenario is, in broad terms, in line with stated ambition of government[41] it is not intended to represent government policy on the scale of development at any particular location. Rather, the higher growth scenario represents a holding assumption prior to further central and local government decisions on where additional development could be located.

# Appraisal results

3.11. Table 3-1 provides appraisal results for each of the three scenarios. In line with WebTAG, costs and benefits are assessed over 60 years after the last service was introduced and discounted to 2010 values and prices[42]. Annex E (separately attached) provides a record of appraisal and modelling assumptions.

[40] SDG (2017), Oxford, Milton Keynes, Cambridge and Northampton Growth Corridor: Transport Infrastructure Assessment: Final Report November 2017, https://www.nic.org.uk/wp-content/uploads/First-Last-mile-Strategy-Assessment-Reports-Transport-infrastructure-Assessment-First-Last-mile-Strategy-Assessment-Report-SDG-2017.pdf

[41] Government response to 'Partnering for Prosperity: a new deal for the Cambridge-Milton Keynes-Oxford Arc', page 3, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/752040/Government_response_to_Partnering_for_Prosperity_a_new_deal_for_the_Cambridge-Milton__Keynes_Oxford_Arc.pdf

[42] See paragraph 2.6.1 and Table 4 in Unit A5.3 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/715482/tag-unit-a5-3-rail-appraisal-may-2018.pdf

**Table 3-1**

Appraisal results (£ millions, present values, 2010 prices)

| | Baseline growth | Intermediate growth | Higher growth |
|---|---|---|---|
| Revenue | £661m | £738m | £903m |
| Capital cost (Capex) | -£813m | -£813m | -£813m |
| Operating costs (Opex) | -£245m | -£268m | -£280m |
| Whole life costs | -£317m | -£317m | -£317m |
| **Cost to broad transport budget** | **-£713m** | **-£659m** | **-£507m** |
| Value of time savings | £391m | £440m | £543m |
| User charge benefits | £168m | £187m | £229m |
| Congestion | £286m | £322m | £398m |
| Indirect taxation | -£132m | -£146m | -£180m |
| Other road effects | £63m | £71m | £88m |
| Rail carbon cost | -£20m | -£25m | -£27m |
| **Transport user benefits** | **£757m** | **£848m** | **£1,050m** |
| **Initial BCR** | **1.1** | **1.3** | **2.1** |
| Wider economic impacts | £152m | £163m | £170m |
| **Adjusted BCR (including wider economic impacts)** | **1.3** | **1.5** | **2.4** |

# Sensitivity tests

3.12. To date, a range of sensitivity tests on the central case have been undertaken, including timetable changes, rolling stock options, phasing and growth forecasts, to assess the impact of varying key assumptions on the BCR. Table 3-2 provides results from several sensitivities undertaken in October/November 2018, leading up the submission of the case for EWR Phase 2 to BICC in December 2018, and a capex sensitivity undertaken more recently.

**Table 3-2**

BCR sensitivity tests

| | Initial BCR | Adjusted BCR (with WEIs) |
|---|---|---|
| Baseline | 1.1 | 1.3 |
| Capex + 20% (c.+£200m) | 0.9 | 1.0 |
| Capex + 40% (c.+£400m) | 0.7 | 0.9 |
| Lower whole life cost (20% of capex, base is 29%)* | 1.2 | 1.5 |
| Higher whole life cost (40% of capex)* | 0.9 | 1.1 |
| Low growth forecast (population and employment growth limited to 0.5% pa)^ | 0.9 | 1.1 |
| Intermediate growth forecast | 1.3 | 1.5 |
| High growth forecast | 2.1 | 2.4 |

* Percentages applied at GRIP 2 and then adjusted for comparison with GRIP 3 capex.

^ Wider economic impacts have been approximated at 20% of transport user benefits for the low growth scenario. This is in line with the proportion from the baseline scenario. Intermediate and high growth scenarios have been modelled.

# Changes in BCR compared to OBCv1 (June 2018)

3.13. The baseline BCR presented to BICC in June was 0.85, which included transport user impacts (level 1) and wider economic impacts (level 2). The BCR without level 2 impacts was 0.68. The equivalent BCR, presented to BICC in December was 1.3 (1.06 without level 2). The reasons behind the change was mainly threefold:

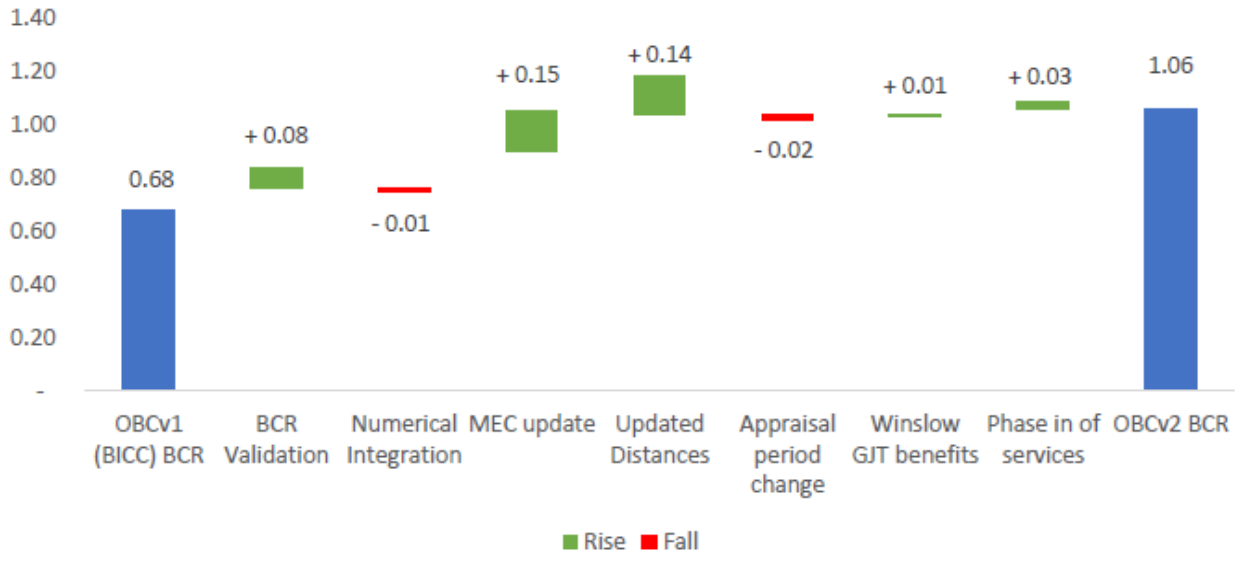
i. correction of a formula used to calculate the business user benefits, and correcting population inputs to passenger demand forecasts for some market segments *(+0.08 impact)*

ii. updating the value of the benefits associated with reducing car use through increased rail travel, in order to be consistent with webTAG *(+0.15 impact)*

iii. developing the model to take account of some benefits, previously not included, for routes where demand is very low in the do minimum *(+0.14 impact)*. For example, Aylesbury to Milton Keynes currently has to go via London, but under EWR this journey would be direct and would be cheaper/shorter in distance, which should induce demand.

3.14. There were three other minor adjustments made to the model. These were updating the mathematical approach to calculating the user benefits *(-0.01 impact)* in line with best practice, updating the core scenario assumption of EWR the Oxford-Bedford service being introduced in early 2025 instead of 2024 *(broadly neutral)*, and an update to proxy for how the new station of Winslow was modelled *(+0.01 impact)*.

**Figure 3-1**
Change to level 1 BCR from June 2018 to December 2018




3.15. Following the identification of these model suite issues and improvements a robust assurance plan has been put in place which has been reviewed at a senior level meeting between the consultants (Leigh Fisher) and the SRO.

3.16. There will be further model development leading up to FBC in 2019 notably including the integration of the modelling and appraisal of western and central sections of the railway.

## Passenger growth

3.17. Background rail demand growth to and from towns and cities connected by EWR Phase 2 (including Oxford and Milton Keynes) has been 3.6% per year over the last 10 years, slightly higher than the national average of 3.4%[43]. By comparison forecast demand growth for EWR Phase 2 is relatively conservative, 2.1% in the base scenario and 3.4% in the high growth scenario (over the next 20 years).

## Train service specification

3.18. The economic appraisal is calculated from the costs and benefits associated with the difference between the do minimum (rail services provided without EWR) and the do something (with EWR rail services).

3.19. The do something includes planned train services running on EWR Phase 2 consisting of:

- 2 passenger services hourly between Oxford and Milton Keynes (introduced by the end of 2023)
- 1 passenger service hourly between Oxford and Bedford (introduced by the end of 2023)
- 1 passenger service hourly between Aylesbury and Milton Keynes (introduced from the end of 2024)

3.20. The do minimum, against which the EWR Phase 2 scheme and associated train service assumptions have been tested, assumes known committed schemes and train service changes on other parts of the rail network, including:

- HS2 Phase One
- Crossrail
- Thameslink, Southern and Great Northern franchise December 2017 timetable
- East Midland Trains timetable
- Post HS2 West Coast Mainline timetable

3.21. See Annex E for further details on timetabling planning.

## Train service specification deliverability

3.22. In April 2018 the EWR Concept Train Plan Working Group (CTPWG) was established with DfT, EWR Co and NR working together to verify the feasibility of delivering the train services specified in the Output Specification v3.3 (2018, attached separately at Annex F).

3.23. The October 2018 CTPWG report demonstrated that two trains per hour between Oxford and Milton Keynes Central could be delivered, based on a Dec 2018 timetable base, although there were some significant constraints with the solution. Firstly, it required high performance train units (likely higher cost although also enabling the potential for some reduction in journey times). Secondly, it would have required the short turn back of a Sothern service at Bletchley with a significant negative financial impact on the OBC for

[43] Compound annual growth rate, LeighFisher analysis of MOIRA data, 2007-2017. This compares to a national average of 3.4% from ORR Statistics (2007/08 to 2017/18) http://dataportal.orr.gov.uk/displayreport/report/html/a10e3c7b-7766-40ae-a87a-14c56cf85a63

EWR. Thirdly, the timetable required revised rules, minimum turnaround time and may have involved unacceptable performance risk.

3.24. The CTPWG has now remitted the next piece of analysis in light of the anticipated May 2019 West Coast Main Line timetable. A high-level assessment has provided the Group some assurance that the full EWR train service specification is viable, subject to managing the assumptions and risks across a range of parallel industry work streams. In this timetable, favourable changes for timings of LNWR services provides more confidence that a reliable EWR train service can operate. The analysis is also now able to assume that the Southern Railway service to Milton Keynes remains in place (previously assumed to be curtailed at Bletchley).

3.25. Whilst the full train service specification is currently assessed to be viable, this will need to be periodically reviewed. The wider timetable could change subject to agreements with other operators on the network. Furthermore the required train paths must be secured and EWR Co are working with the DfT to ensure this happens through and alongside its rail operations strategy.

3.26. Relatedly, EWR Co have produced a rolling stock strategy which has recommended two potential options to be considered in a parallel: a legacy fleet solution (class 185) and new trains. Both options will be higher powered than the class 170 units currently assumed in the core appraisal results in this economic case. The impact of switching to class 185s has been tested as a sensitivity test. Class 185 are more costly in terms of leasehold operating costs (per vehicle and because they only come as 3 car rather than 2 car units). Secondly, slightly quicker journey times increase user benefits. The two impacts partially offset each other, the resulting impact on the baseline BCR was -0.01 (from 1.06 to 1.05 for the initial BCR without wider economic impacts).

# Oxford to Cambridge Expressway

3.27. A proposed 'Oxford to Cambridge Expressway' is being developed by Highways England under the Roads Investment Strategy. The new road is expected to improve connectivity between Oxford, Milton Keynes and Cambridge, to divert traffic away from Oxford's ring road and mitigate congestion on the A34[44]. The Expressway is intended to complement EWR in supporting growth across the corridor.

3.28. In LeighFisher's analysis from 2017/18 a mode share model was used to model the impact on rail demand from the introduction of an indicative Expressway between Oxford and Milton Keynes as a sensitivity test. This sensitivity test suggests the opening of the Expressway will have a limited impact on the value for money of EWR Phase 2 (there was a minor reduction in BCR between 0.01 and 0.02).

3.29. More recently DfT have commissioned further work from LeighFisher and Jacobs to better understand the potential inter-dependencies of the two projects. This work is ongoing, though early indications are that there is limited duplication in terms of benefits. Two analyses have been considered:

[44] Oxford to Cambridge Expressway Stage 3 Report from November 2016

i. Mapping and comparing the origins and destinations of modelled EWR and Expressway journeys. Initial conclusions are that there is some overlap but that the schemes are also likely to serve distinct geographic segments.

ii. A comparison of demand model responses from the highways road model and the EWR rail model. Initial conclusions from this work suggests the Expressway is likely to have a limited impact on EWR demand (and vice-versa).

## Capital costs

3.30. The capital cost of the scheme has been estimated by Network Rail who are promoting Phase 2. The cost used in this economic assessment is from Network *Rail's Guide to Rail Investment Projects* (GRIP) stages 3 Refresh stage[45]. In addition, HS2 integrated civils costs have been included which are currently an estimate from HS2 Ltd. These have been estimated to be £1m in 2018/19 and a further £17.8m between 2019/20 to 2023/24.

3.31. In line with HMT Green Book capital costs already incurred (up until 2017/18) are treated as "sunk" and hence are excluded from the economic appraisal.

3.32. WebTAG (A5.3 May 2018) GRIP 3 optimism bias of 18% has been applied to the point cost estimate in addition to a P-mean (Quantitative Risk Assessment at the mean estimate) risk[46]. This provides a total contingency of 51% (compared to the point cost estimate).

3.33. DfT have shared results of independent analysis conducted by Oxford Global Projects (OGP) using 'Reference Class Forecasting' (RCF) which provided a benchmark comparison against nearly 180 Western European rail upgrade programmes. The Reference Class Forecasting work provides an estimate of actual final costs compared to cost estimates made at different project stages. The OGP work suggests the P-mean for the reference class at OBC was 39%.

3.34. All costs are inflated to account for construction cost inflation (using the OBR RPI index) for input into the appraisal model. For the economic appraisal (in line with WebTAG) annual capital costs are converted in to market prices using the indirect tax factor (19%). This is then converted to 2010 prices using the GDP deflator. The net present values are then calculated for each year in the appraisal period. See Annex E for further detail.

## Whole life costs

3.35. Network Rail estimated Whole Life Costs (WLCs) as part of their 2015 GRIP 2 estimation and it is this estimate, expressed as a proportion of total lifetime cost, which is currently used in the appraisal. This includes spend attributable to maintenance/Network Rail operations and spend attributable to renewals of the infrastructure over time. GRIP 3 lifecycle cost work focused on optioneering for a limited number of assets, and did not provide a suitable estimate which covered the entire route. The GRIP 2 WLC estimate has

[45] GRIP refers to Network Rail's Guide to Rail Investment Projects. The cost used in the appraisal is consistent with Network Rail's current anticipated final cost as submitted as part of its Transport Works Act application (statement of cost) https://www.networkrail.co.uk/our-railway-upgrade-plan/key-projects/east-west-rail/western-section/

[46] In line with WebTAG UnitA5.3 Table 3, page 7 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/715482/tag-unit-a5-3-rail-appraisal-may-2018.pdf

been adjusted to be in line with the overall change in capital costs which occurred between GRIP 2 and GRIP 3. See Annex E for further detail.

## Operating costs

3.36. LeighFisher has produced an operating cost model to calculate incremental costs attributed to operations, maintenance and renewals as a result of operating the do something train service specification. Operations include rolling stock lease costs, energy costs, rolling stock maintenance, variable and capacity track charges, staff costs and station operating costs. See Annex E for further details.

3.37. Baseline assumptions for rolling stock operating costs are based on estimates for Class 170 2 car vehicles, although in the intermediate and higher growth scenarios this increases to 3 cars when, based on loading analysis, demand on 2 car vehicles exceeds capacity.

3.38. The Output Specification for western section Phase 2 is for 4 car services between Oxford and Milton Keynes and 3 car service between Oxford and Bedford. The baseline growth scenario has also been tested using all 3 car and all 4 car operations and this does not change the value for money category based on the resulting adjusted BCR. EWR Co have started a process of reviewing rolling stock and operating assumptions and will agree any necessary changes to core assumptions prior to FBC.

3.39. Table 3-3 shows the impacts of extending class 170 units from 2 car to 3 car and 4 car in the baseline demand scenario. However, as set out at paragraph 3.26 a rolling stock strategy is currently being followed to inform the future procurement of trains. Whilst longer and more high powered units can involve additional cost they can also increase user benefits (with quicker journey times) – the class 185 3 car sensitivity only had a small impact on the initial BCR to 1.05 (-0.01 from the baseline 1.06).

**Table 3-3**

Opex cost sensitivity

| | Initial BCR | Adjusted BCR (with wider economic impacts) |
|---|---|---|
| Baseline (2 car) | 1.06 | 1.27 |
| 3 car | 0.95 | 1.15 |
| 4 car | 0.86 | 1.04 |

3.40. The operational model developed by Leigh Fisher for this OBC is based on a set of assumptions created when the project was at an early stage of development. As the operational and franchise model options continue to be developed a greater level of granularity will be identified within the cost model to inform the Full Business Case. EWR Co will continue to review assumptions made within the operational model and the OBC to ensure robust and up to date costs are included as we work towards FBC and also rolling stock procurement and consider franchising options. These include:

- Train maintenance and depot refurbishment and fitment

- Train refurbishment (may be added to lease charges)
- Stabling upgrades and availability
- Franchise/Operators overheads ('TOC' costs e.g. HQ overheads, recruitment, training, uniform etc) including wider industry body costs
- Wider station access costs for stations that EWR use
- Station fit out costs for Winslow and Bletchley
- Station impact assessment requirements
- On-train customer service staff costs
- Output specification of 4 car trains verses 2/3 car train vehicles
- Review of staffing costs against wider industry comparisons

3.41. Between the submission of this refreshed OBC and the delivery of the Full Business case work will be undertaken to provide a greater level of confidence within the Operations and Maintenance costs.

## Environmental benefits and disbenefits

3.42. The modelling of transport-related environmental impacts such as noise, air quality and greenhouse gas emissions have been monetised and included in the BCRs, using standard DfT methodology[47]. Network Rail have also undertaken and published an Environmental Statement detailing land use and environmental impacts from the construction and operation of the scheme and how, where possible these will be mitigated[48], these impacts are not monetised and so are not included in the BCRs in the appraisal results.

## Other wider impacts

3.43. It is likely that EWR will bring other wider impacts to the Arc. These are harder to quantify, some involve estimating changes in land use as a result of EWR, and the methodologies to estimate these other wider impacts are not as well developed as those in standard transport appraisal. Such impacts include[49]:

- Enabled development: housing development which is enabled as a result of the scheme can generate benefits in the housing market over and above the transport market benefits in a standard transport appraisal. Whilst the transport user benefits (and some wider economic impacts) of EWR Phase 2 have been assessed in a 'high growth' scenario of higher economic and population growth, which implies additional homes, this modelling assumes that this additional growth is not dependent on EWR, and that EWR does not result in further growth on top. This no dependent growth assumption is made in the interests of simplicity and transparency. It means that the benefits of the scheme even under higher growth are limited to the transport market, and the fixed land use agglomeration effects described above. To the extent that the scheme does in practice induce additional development growth, there would be

[47] See WebTAG rail UnitA5.3 Section 3.3 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/715482/tag-unit-a5-3-rail-appraisal-may-2018.pdf Road decongestion benefits due to model shift from road, based on assumption that 33% of new rail miles have shifted from road. This is a flow weighted average of the WebTAG diversion factors. Other marginal external impacts of modal shift from road include infrastructure, accident, air quality, noise, and greenhouse gases

[48] Available on the Network Rail website, Transport Work Act application documents https://www.networkrail.co.uk/our-railway-upgrade-plan/key-projects/east-west-rail/western-section/

[49] Many of these additional wider economic impacts are described in WebTAG Unit A2.1. Those that involve land use change are described as 'Level 3' impacts https://www.gov.uk/government/publications/webtag-tag-unit-a2-1-wider-economic-impacts-may-2018

impacts in property markets as well as the transport market. The methodologies to estimate impacts in these markets are not as well developed as those in the transport market.

- The wider effects of business relocation: where businesses relocate to take advantage of the opportunities created by transport improvements, becoming closer together, forming clusters around better connected places (such as rail stations). This clustering can provide additional connectivity and journey time benefits, and thereby further agglomeration impacts and productivity gains of the type described above. Agglomerations gains in one location, however, may be offset by disagglomeration effects elsewhere in the UK.
- Additional labour market effects: including impacts via (1) relocation of labour to areas with different productivity levels, which could lead to net gains or losses depending on circumstances and the assumptions made about the effects on the labour that relocates; and (2) changes to labour supply by making work in the Arc more attractive and rewarding.
- Foreign investment and international labour: By facilitating economic growth in the Arc EWR, and other interventions, could attract jobs and investment from overseas as well as the rest of the UK.
- Supply chain: productivity gains to industries in one location or sector can impact on other sectors and locations via supply chains. This means that productivity gains within the Arc can, in a sense, be exported to other industries and locations across the country generating efficiencies and output gains in the supply chain.
- Freight benefits: EWR is being built to accommodate rail freight. Phase 2 and the complete EWR programme is likely to provide cost savings for moving freight by rail, which has the potential to deliver additional direct benefits, via lower costs to freight users, and indirect benefits by removing some freight traffic from the roads.

3.44. DfT and EWR Co will continue to consider the wider range of benefits and impacts of EWR and will continue to work across government on how EWR will help support and enable central and local government plans for growth in the Arc.

3.45. In addition to its longer-term connectivity and other benefits (set out above), the construction of EWR Phase 2 itself has the potential to support jobs in the region and beyond. The East West Rail Alliance (procured by Network Rail to build EWR Phase 2) have estimated they will directly support up to 900 on-site construction jobs in 2021. Additional jobs are also being supported in planning and designing the railway and will be supported in delivering rail and signalling systems, rolling stock construction and operating the railway. The Alliance is also undertaking a range of activities to support the development of skills and job opportunities in local communities and in promoting science, technology, engineering and mathematics (STEM) projects in schools and colleagues. The Alliance has an objective to recruit local people for local jobs, provide apprentice opportunities (which is already happening) and provide training and employment opportunities to workless local residents in the local authorities along the route of EWR in order to help grow their skills and improve their long-term employability.

# 4. Financial Case

## Purpose

4.1. The purpose of this section is to demonstrate the affordability of EWR Phase 2, considering the projected capital and operating costs over the lifetime of the programme and beyond. It will consider the funding profile of the programme and outline the contributing parties. All figures are in cash prices unless otherwise stated.

4.2. The programme is currently funded in CP5, which will allow Network Rail to complete the GRIP 4 outline design phase. In February 2019 BICC will be asked to approve, alongside this business case, interim funding for the first 6 months of CP6 amounting to £115m to commence the detailed design, progress planning permission and construction enabling works, and commence the procurement of future construction works. The £115m consists of £54m forecast costs to progress from outline business case to final business case and £61m in contract commitments to be made in the first 6 months. This will take the total authorised programme funding for CP4, CP5 & CP6 to £297m.

## Capital Costs

4.3. All capital costs in this financial case document are stated in current cash (nominal) terms unless otherwise stated.

4.4. The total capital cost for the programme is £1,110.3m, anticipated to be funded across CP4, 5, 6 & 7 and includes both NR infrastructure costs (£1,091.5m) and HS2 Ltd. costs associated with the integration of civils delivery through the shared corridor (£18.8m). This does not include operating costs (borne by a future operator).

4.5. The above figure is based on Network Rail's Formal Cost Plan Report produced January 2018 (P8) which represents a refresh of the GRIP Stage 3 Quantified Cost Plan. This reflects significant changes to construction methodology and scope, agreed following the 2017 Cost Challenge (see paragraph 4.11 below).

4.6. The GRIP Stage 4 Cost Plan is expected to be received from Network Rail in February 2019 (P10). This will reflect the detailed programme to completion for the works, which may subsequently change the forecast capital costs. Any changes from the GRIP 3 budget shall be subject to review by EWR Co with mitigations identified to make sure the budget for the scheme continues to align with the wider VFM objectives of the business case. The current forecast funding requirement over CP4, 5, 6 & 7 of £1,091.5m is outlined in Table 4-1. This forecast is based on GRIP 3 Cost Plan dated January 2018 and does not separate out the interim funding required to cover costs and commitments in the first 6 months of FY2019.

**Table 4-1**

GRIP 3 Refresh Network Rail capital cost estimates (in nominal/cash prices)

| Year | Capital cost (£m) | % of total spend | Phase |
|---|---|---|---|
| 12/13* | 0.085 | <0.01% | |
| 13/14* | 2.278 | 0.21% | |
| **CP4 Total** | 2.363 | 0.22% | Develop |
| 14/15* | 8.165 | 0.75% | |
| 15/16* | 16.586 | 1.52% | |
| 16/17* | 23.598 | 2.16% | |
| 17/18* | 35.185 | 3.22% | |
| 18/19* | 66.562 | 6.10% | |
| **CP5 Total** | 150.095 | 13.75% | Develop / Design |
| 19/20 | 152.294 | 13.95% | |
| 20/21 | 257.942 | 23.63% | |
| 21/22 | 232.502 | 21.30% | |
| 22/23 | 234.009 | 21.44% | |
| 23/24 | 57.884 | 5.30% | Start of service |
| **CP6 Total** | 934.631 | 85.63% | Deliver |
| 24/25 | 4.411 | 0.40% | |
| **CP7 Total** | 4.411 | 0.40% | Deliver |
| **NR Works AFC** | 1,091.5 | | |
| ***sunk costs** | | | |

4.7. A series of Quantitative Cost Risk Analysis (QCRA) workshops have been undertaken by Network Rail which have assigned costs to the evaluated risks. Risk allocation at P80, included in the programme's AFC in Table 4-1, is £263.6m. This is based on the January 2018 GRIP 3 Cost Plan. A subsequent risk analysis undertaken in July 2018 has calculated the risk exposure at P80 to be £281.1m (further information on the risk profile is available in the NR Formal Cost Plan Report (GRIP 3 Stage 3 Refresh). A further QCRA using the GRIP 4 cost data is planned in Q2 2019. This will be included in the GRIP 4 AFC and FBC.

4.8. Since the SOBC business case in 2015, Network Rail has completed a number of programme refreshes as the programme has developed and scope and output requirements have evolved. Table 4-2 outlines the Anticipated Final Cost (AFC) for each of these programme updates:

**Table 4-2**

Network Rail estimates of EWR Phase 2 programme costs (nominal)

| GRIP Stage | Cost Estimate (£m) |
|---|---|
| GRIP 2 (Sep 2015) | 1,209.2 |
| GRIP 2 "Refresh" (Dec 2016) | 1,483.5 |
| GRIP 3 (Jun 2017) | 1,233.0 |
| GRIP 3 "Refresh" (Jan 2018) | 1,091.5 |

## High Speed Two (HS2)

4.9. As part of Network Rail's formal cost estimates, an additional estimate has been produced as a supplement to identify scope that has been requested, to be funded by HS2 Ltd., where works are required for the integration between EWR Phase 2 and a wider programme of works, referred to as "On Network Works" (ONW). These are works required at interfaces between HS2 and Network Rail infrastructure and are driven solely by the HS2 programme i.e. would be required even without the EWR Phase 2 programme. The latest AFC for these works is £120.5m (Q1 2015 prices) and accrues to the HS2 programme, captured in their latest baseline. For that reason, these costs are excluded from the EWR Phase 2 AFC and is outlined for information only.

4.10. In January 2018, a change request was formally accepted by Portfolio Board that will allow the EWR Phase 2 programme to fund the design and delivery of an integrated civils programme through part of the EWR / HS2 shared corridor. The works will be delivered by HS2 Ltd, with funding paid directly from the DfT. This opportunity will deliver an optimised civils solution, reducing risk of differential settlement and presents industry efficiencies. Through the use of a single contractor, the solution also presents a simplified technical, safety and asset protection management requirement. £1m was allocated to be expended in CP5, but to date has not been invoiced by HS2 Ltd. These works will require £17.8m in CP6 for delivery. This has been approved by the Rail Investment Board, is within the CP6 allocation for the scheme and economic case but not in the Network Rail AFC of £1,091.5m as set out in Table 4-2.

## Cost Challenge

4.11. In early 2017, the Secretary of State commissioned the East West Rail Company (EWR Co) to conduct a thorough cost review with Network Rail and the East West Rail Alliance (EWRA) to identify how the programme could significantly reduce its costs and what compromises to outputs would need to be made.

4.12. The EWR Co identified a number of construction methodology and de-scoping opportunities to reduce the capital cost and presented three high-level infrastructure options, each with differing levels of train service potential.

4.13. The SoS selected the "Optimised Infrastructure" base option, plus additional scope elements that would protect the existing "Core" passenger TSS along with the capability of the route to handle large freight trains in the future. This includes:

- Upgrading the existing Bicester Village to Bletchley freight line as a double track 100mph multi-functional railway capable of accommodating three passenger services each way per hour and existing freight paths and two additional paths per hour for freight and inter-regional services.
- Upgrading the existing Aylesbury to Claydon Junction freight line so it can accommodate one passenger service each way per hour and existing freight paths.
- Minor upgrading of the existing Bletchley to Bedford passenger railway to accommodate one additional fast passenger service each way per hour
- New platform at Aylesbury Vale Parkway
- New station at Winslow.
- New high-level platforms and track remodelling at Bletchley

4.14. The reduced capital cost is reflected in Network Rail's Jan 2018 GRIP 3 "refresh" estimate, included in Table 4-2. This revises the previously produced GRIP 3 estimate following confirmation of the cost challenge scope, as confirmed at the EWR Phase 2 Programme Board on 21 September 2017.

# Operating Costs

4.15. LeighFisher has produced an operating cost model to calculate incremental costs attributed to operations, maintenance and renewals as a result of operating the do something train service specification. Operations include rolling stock lease costs, energy costs, rolling stock maintenance, variable and capacity track charges, staff costs and station operating costs. See Annex D for further details. Costs are being review in parallel with ongoing work on rolling stock and franchising strategies.

4.16. Baseline assumptions for rolling stock operating costs are based on estimates for Class 170 2 car vehicles, although in the intermediate and higher growth scenarios this increases to 3 cars when, based on loading analysis, demand on 2 car vehicles exceeds capacity.

4.17. The Output Specification for western section Phase 2 is for 4 car services between Oxford and Milton Keynes and 3 car service between Oxford and Bedford. The baseline growth scenario has also been tested using all 3 car and all 4 car operations and this does not change the value for money category based on the resulting adjusted BCR.

4.18. EWR Co have produced a rolling stock strategy which has recommended two potential options to be considered in a parallel: a legacy fleet solution (class 185) and new trains. Both train options will be higher powered than the class 170 units currently assumed in the core appraisal results in this economic case. The impact of switching to class 185s has

been tested as a sensitivity test. Class 185 are maybe more costly in terms of leasehold operating costs (per vehicle and because they only come as 3 car rather than 2 car units). EWR Co are exploring in more detail the market and cost of legacy trains (the current quote for 185s is coming in below current operating cost model assumptions). Secondly, slightly quicker journey times increase user benefits. The two impacts partially offset each other, the resulting impact on the baseline BCR was -0.01 (from 1.06 to 1.05 for the initial BCR without wider economic impacts).

4.19. The strategy currently focuses on leasing but EWR Co will consider including consideration of financing options.

4.20. Total operating costs over the 60 year appraisal (in present value terms, 2010 prices) are assessed below:

All 2 car units: £245m (baseline)

All 3 car trains: £318m

All 4 car trains: £392m

4.21. Revenue (£661m 60-year appraisal present values, 2010 prices) are forecast to exceed operating costs of the railway.

4.22. The operational model developed by Leigh Fisher for this OBC is based on a set of assumptions created when the project was at an early stage of development. As the operational and franchise model options continue to be developed a greater level of granularity will be identified within the cost model to inform the Full Business Case. EWR Co will continue to review assumptions made within the operational model and the OBC to ensure robust and up to date costs are included as we work towards FBC and also rolling stock procurement and consider franchising options. In doing so EWR Co will also consider options around where and when the cost borne. For example, the train operator and / or rolling stock provider could cover these activities and charge for them in franchise costs / lease hold payment. Or EWR Co / DfT could seek to pay for some up front if this were to be better value for money. Relevant costs include:

- Train maintenance and depot refurbishment and fitment
- Train refurbishment (may be added to lease charges)
- Stabling upgrades and availability
- Franchise/Operators overheads ('TOC' costs e.g. HQ overheads, recruitment, training, uniform etc) including wider industry body costs
- Wider station access costs for stations that EWR use
- Station fit out costs for Winslow and Bletchley
- Station impact assessment requirements
- On-train customer service staff costs
- Output specification of 4 car trains verses 2/3 car train vehicles

- Review of staffing costs against wider industry comparisons

4.23. Between the submission of this refreshed OBC and the delivery of the Full Business case work will be undertaken to provide a greater level of confidence within the Operations and Maintenance costs.

# Funding Cover

4.24. The EWR Phase 2 will be funded by UK Government as part of the Rail Enhancements Portfolio, managed by the Department for Transport.

4.25. EWR Phase 2 was originally committed for implementation in the High Level Output Specification (HLOS) in July 2012. Subsequently, following the final determination of the Office of Rail and Road (ORR), Network Rail published its CP5 Delivery Plan.

## Control Period 5

4.26. The CP5 budget for EWR Phase 2 to complete outline design and progress planning and consents was confirmed and committed, with Network Rail able to draw down on funding as its work progresses.

4.27. In 2015, against a backdrop of rising capital costs across the Enhancements Portfolio, a review known as the "Hendy review" was conducted. This reset the capital budget for the Enhancements Portfolio and the EWR Phase 2 programme. Broadly, this moved the majority of the programme costs from CP5 (2014-19), where the wider enhancement portfolio budget was under the greatest budgetary pressure, to CP6 (2019-24). It allowed the programme to continue the development of designs, up to Network Rail's GRIP 4 milestone (Single Option Development) by the end of CP5, with construction and Entry Into Service in CP6.

4.28. The 2016 Autumn Budget confirmed that Her Majesty's Treasury (HMT) would bring forward £97m in the projects baseline from CP6 to CP5, to enable EWR Phase 2 to accelerate designs to ensure effective integration with the HS2 programme. This is separate from ongoing HS2 integration works in CP6 and the works identified in paragraph 4.9 which are costs as a result of and funded by the HS2 programme. An agreement has been formalised between Network Rail and the DfT in June 2017 that confirms the availability of funding, permitting Network Rail to invoice the DfT as it completes the agreed work packages.

## Control Period 6

4.29. In conjunction with DfT and Network Rail, EWR Co has considered a number of funding model options. Based on this options analysis it is expected that the budget to complete agreed work sits with Network Rail and that the Department releases the grant funding (cash). It is also expected that contingency budget sits with the Department. EWR Co in its role as client on EWR Phase 2, are expected to provide an assurance and oversight

function to validate NR's work ahead of payment from DfT. Work is continuing to understand if the money will remain in the Rail Enhancement Portfolio in CP6 or if it due to be held elsewhere either in full or incrementally. These budget arrangements are subject to agreement with DFT and are intended to be in place by commencement of CP6.

4.30. Affordability of the CP6 elements of this business case/scheme/enhancement will be constrained by the limited availability of SoFA funding for enhancements.

4.31. Control Period 6 funding will be allocated incrementally as each enhancement moves through the decision gates (Commit to Develop, Commit to Design, Commit to Deliver), with funding agreed only for the next stage of works. This new pipeline process builds on the principles set out in the Memorandum of Understanding between Department for Transport and Network Rail.

4.32. Although funding assumptions for schemes deferred from CP5 to CP6 following the Hendy Review, were made for the purpose of preparing the SoFA this did not represent a CP6 budget for delivery of schemes/enhancements. This is because in line with the principles underpinning the new process it is only when a scheme has passed through the 'commit to deliver' that the budget for the completion of the scheme is confirmed. Up until this stage gate schemes only have a budget for the next stage of works - i.e. for development or design work to allow them to reach 'commit to design' or 'commit to deliver' – and an indicative cost for completion.

4.33. Based upon the most recent assessment (P8 2018/19) of assumed funding for EWR Phase 2 in the SoFA for CP6 (£1,100m), the CP6 element of the indicative cost of this programme is affordable at this time. However, this will be subject to further consideration as the design matures and the department continues to explore ministerial priorities for enhancements, including in the next Control Period. As designs mature, the EWR Co. and NR will apply value engineering to each project, review spend profiles and challenge the necessity of the proposed scope. The joint EWR Co/DFT Western Section Oversight Board will be responsible for overseeing the efficient and effective development, design and delivery of the scheme. Together this will ensure that an affordable programme is agreed prior to submission of the Final Business Case.

## Control Period 7

4.34. Network Rail currently forecast a cost of £4.4m in the first year of CP7 (24/25) for handover and project closeout. This funding would be expected to be authorised at a future fiscal event which deals 2024/25 and beyond. In the meantime, the forecast CP7 cost will be tracked and highlighted to HMT as part of DfT's regular reporting cycle as a future budgetary pressure.

## Budget / Indicative Baselines

4.35. Table 4-3 outlines the current funding lines (as of P09 2018/19) for EWR Phase 2 and demonstrates that the current CP5 budget and CP6 and CP7 indicative baseline covers

Network Rail's latest cost estimate and the EWR / HS2 integrated civils work, to be carried out by HS2 Ltd.

4.36. Work is on-going to identify additional opportunities to de-risk the programme whilst at the same time, bring forward its delivery. These considerations are likely to have an impact on cost and until such time as the cost becomes more fixed, likely to be at the preparation of the Target Cost, expected by April 2019. The cost of the programme will continue to be monitored by the joint NR/ DfT Enhancements Portfolio Board and unspent budget will be surrendered to the portfolio as and when appropriate.

**Table 4-3**

Funding allocated and forecast cost (including contingency)

| Code | Project | CP4 (£m) | CP5 (£m) | CP6 (£m) | CP7 (£m) | Total |
|---|---|---|---|---|---|---|
| CR003a | East West Rail - Phase 2 | 2.4 | 76.2 | 1,100.0 | 0.0 | 1,178.6 |
| CR003b | East West Rail - Oxford to Bletchley | 0.0 | 3.5 | 0.0 | 0.0 | 3.5 |
| DfT Grant | EWR/HS2 Integration | 0.0 | 97.0 | 0.0 | 0.0 | 97.0 |
| DfT Grant | EWR Co Western costs | 0.0 | **2.0** | **0.0** | 0.0 | **2.0** |
| DfT Grant | HS2 Civils Integration | **0.0** | **1.0** | (17.8m included in 1,100) | **0.0** | 1.0 |
| **TOTAL FUNDING** | | **2.4** | **179.7** | **1,100.0** | **0.0** | **1,282.1** |
| | Main Programme Forecast | 2.4 | 150.1 | 934.6 | 4.4 | 1,091.5 |
| | HS2 Civils Integration | 0.0 | 1.0 | 17.8 | 0.0 | 18.8 |
| **TOTAL FORECAST** | | **2.4** | **151.1** | **952.4** | **4.4** | **1,110.3** |
| Balance | | 0.0 | 28.6 | 147.6 | -4.4 | 171.8 |

4.37. EWR Co costs relating to western section for 2019/20 are estimated at around £10m and is forecast to remain at around this level for the next 5 years. This estimate is as submitted to the DfT as part of the Period 8 Medium Term Financial Planning (MTFP) exercise. This is RDEL and is covered by the wider DfT Admin Budget. EWR Co will be required to demonstrate that these costs represent value for money. This could include helping achieve overall cost savings, enhancing benefit realisation and ensuring timely delivery of the project. The counterfactual will need to be considered - for example, the costs NR and DfT would have incurred in the absence of EWR Co.

## Third Party Contributions

4.38. In November 2013, the EWR Consortium (EWRC) confirmed that it would make a £45m contribution to support EWR (although not contributing to the direct costs). A subsequent Memorandum of Understanding was put in place between the EWRC and the Department for Transport, which includes detail on how the EWRC's contribution may be used, either in cash or in kind.

4.39. The EWRC's contribution is not presently assumed to form part of the EWR Phase 2 funding sources. Further work is planned to identify the scope and work packages that the EWRC contribution will fund, in line with the MoU, which may include projects that boost benefits on a local level. Such projects may include multimodal station interchanges and additional station entrances. These contributions are not currently assumed to cover any core EWR Phase 2 scope.

**Table 4-4**

East West Rail Consortium Funding Contribution

| EWR Consortium Member | Contribution (£m) |
|---|---|
| Aylesbury Vale District Council | 5.36 |
| Buckinghamshire County Council | 10.16 |
| Milton Keynes Council | 7.65 |
| Bedford Borough Council | 2.60 |
| Central Bedfordshire Council | 4.20 |
| Cherwell District Council | 4.35 |
| Oxfordshire County Council | 11.06 |
| TOTAL | 45.38 |

4.40. The EWR Co / DfT along with a cross-Whitehall group overseeing government policy on the Oxford-Cambridge Arc has explored possible options to use land private funding for the development of the railway infrastructure. This could involve an "East West Rail Development Corporation" using compulsory purchase orders to acquire land at existing

use value and then obtain planning permission for a different use class – the resulting land value increment would be used to fund the new infrastructure.

4.41. Initial high-level analysis by EWR Co indicated that the benefits from land value increases could be in the range of £800m-£2.0bn. Options have been discussed at the cross-Whitehall DG group overseeing government policy on the Oxford-Cambridge Arc. This option could be very hard to deliver and may require political decisions and legislation beyond that currently being progressed by government. The general concept of seeking some land value capture is still being pursued although it is likely to be more applicable to the central section. This approach is not being considered for EWR Phase 2 which will be conventionally funded.

# Known changes since GRIP 3

4.42. Since the GRIP 3 Refresh Estimate was produced in January 2018 the programme has developed and some areas of change and emerging scope are now known to be required but have not yet been quantified. These changes shall be included in the GRIP 4 AFC, to be provided by March. Once an updated cost estimate is agreed it will be reflected in an FBC to be submitted later in 2019 in support of a final investment decision to proceed with EWR Phase 2. A sensitivity analysis has been included in paragraph 3.12 to model the effects of a change in the overall Capex cost on the BCR. The current known changes are:

- Updated Quantitative Cost Risk Analysis based on latest GRIP 4 design and construction planning data.
- Potential programme prolongation as a result of forecast delays to HS2 interface milestone dates.
- Additional infrastructure required at Claydon Double Junction
- Additional highways works arising from traffic surveys, public consultations and removal of haul roads.
- Bletchley Viaduct scope clarification
- Additional environmental mitigations arising from latest ecology surveys
- Additional works arising from TWAO development and objections
- Emerging scope arising from stations and rolling stock impact assessments

# Summary

4.43. The EWR-2 programme has been subject to an in-depth cost challenge in 2017, removing around £150m from the AFC. The exercise has helped to ensure that the scope is appropriate for the anticipated train service outputs, whilst considering future traffic growth potential as the corridor establishes itself.

4.44. The latest programme AFC of £1.091bn will be funded by UK Government from the DfT Rail Enhancement Portfolio budget subject to business case approvals and affordability. The required CP5 funding, up to end-18/19, is already available. Provision has been made

for the CP6 funding requirement in the DfT's Statement of Funds Available, subject to on-going business case testing. CP7 funding will be considered at a future fiscal event which deals with 2024/25 and beyond.

4.45. The project interface with the High Speed 2 (HS2) programme at Calvert and scope arising from TWAO process has introduced uncertainty into the East West Rail Western Section (EWR2) programme that has the potential to impact the planned entry into service dates of the scheme. It is not considered optimal to progress to FBC and enter into a target price contract while this uncertainty remains as this arrangement would not leverage the intended incentivisation for efficiency and on time delivery from the supply chain.

4.46. The agreement of the target price, and the accompanying FBC, are now planned in summer 2019 to allow release of funding to coincide with the award of the target cost contract at the commencement of Period 7 on 13 September 2019.

4.47. Therefore, BICC is being asked to approve interim funding of £115m to cover costs and commitments for the first 6 months of CP6, along with approval for this OBC. This includes £54m of forecast costs in the first 6 months for TWAO, detailed design, environmental mitigations and enabling works. The £115m also includes £61m of procurement commitments required to support the delivery schedule, expected from September 2019. Without the interim funding there will be no funding available in CP6 to continue the project, prior to agreeing the target price and seeking approval of the FBC by September 2019.

4.48. The risk associated with not receiving the interim funding when required includes delay of the TWAO process, delay in establishing the detailed estimates to support FBC, delay to detailed design, procurement of delivery contracts and works programmes leading to significant schedule prolongation and cost escalation and consequential impact on HS2 Ltd.

4.49. An FBC is planned to be provided by EWR Co between by September 2019 alongside a request for funds to deliver the scheme. The FBC will include updated capital cost estimates based on latest GRIP 4 designs, construction methodology, detailed programme to completion, agreed HS2 interface milestones, contingency provision based on updated QSRA and QCRA.

# 5. Management Case

## Overview

**Purpose**

5.1. The management case assesses whether a proposal is deliverable. It tests the project planning, governance structure, risk management, communications and stakeholder management, benefits realisation and assurance (e.g. a Gateway Review).

**Context**

5.2. The Secretary of State for Transport, as part of his speech in December 2016 on Rail Reform, announced the creation of a new East West Railway Company (EWR Co) to oversee and accelerate the delivery of the programme.

5.3. This case sets out the core principles behind the programme's delivery model for CP6, noting that there are several weeks remaining of CP5 and associated work is to continue to define the broader governance changes from Control Period 6 (April 2019), when the programme moves into its delivery phase.

5.4. Until September 2018, the programme was being delivered under existing DfT and Network Rail governance arrangements, which are defined in the Memorandum of Understanding (MoU) for Rail Enhancements between the two organisations and the associated guidance. This governance structure, including both organisations' internal governance arrangements, remains largely in place for the remainder of Control Period 5, with new governance agreed between all parties to formalise EWR Co's involvement in the programme.

5.5. EWR Co is expected to receive a greater delegation of authority at significant points during the delivery of Western Section, in line with BICC discussions in 2017 and 2018. It was previously anticipated that the Full Business Case (FBC) approval would be co-timed with the start of CP6, from 1 April 2019. This is no longer the case, so this paper sets out the arrangements from 1 April and sets out anticipated further developments in advance and at FBC approval.

**Introduction**

5.6. The creation of the EWR Co has provided an opportunity to address several issues identified in the typical governance and division of roles between the Department for Transport (DfT) and Network Rail for enhancement projects. These issues have been independently documented by Bowe, the NAO and others. They include:

- a lack of clarity over the organisational roles and responsibilities of the DfT, Network Rail and the Office of Rail and Road (ORR) when bespoke governance arrangements are not put in place for major, complex schemes;
- the DfT not having the required technical expertise to challenge effectively the solutions being developed by Network Rail and/or its ability to deliver the works on time and within budget;
- significant communication failures around scope and requirements due to business case and scheme development, as well as relevant expertise, being split across organisational boundaries; and
- unclear responsibility for integrating the programme as a whole and "no controlling mind" with the information and authority to make critical decisions, making it difficult to manage interdependencies between the projects effectively.

5.7. In many cases these issues can have serious implications for cost and schedule. Notwithstanding actions already taken by both the DfT and Network Rail to begin to address these issues, the creation of a new organisation has created an opportunity to promote:

- greater clarity around organisational roles and responsibilities, such that these are formalised, clearly defined and understood by all parties;
- the reallocation of certain roles and expertise between DfT, Network Rail and EWR Co to create a single client organisation that can robustly challenge both Network Rail and/or private sector delivery partners;
- greater focus on the integration of business case and scheme development (including the resources required to deliver these) in one organisation to avoid communication failures and ensure clarity on scope and requirements; this is particularly important for the integration of Phases 2 and 3 (Central Section); and
- the establishment of an organisation with the levers required to drive cost and schedule performance that can act as a 'controlling mind' and single point of accountability for planning and delivery.

5.8. As well as the issues identified around the effectiveness of the planning and delivery of rail enhancement schemes under the current model, consideration has also been given to the perceived lack of competition in rail infrastructure delivery, and to the findings of the Hansford Review on contestability. This stated that the lack of contestability in the industry is in part caused by a lack of clarity over roles and established interfaces which makes it difficult for third parties to participate in schemes.

5.9. The two core principles of (1) improving the effectiveness of planning and delivery and (2) promoting contestability have informed the new operating model for the East West Rail programme going forward, and EWR Co's role within that model.

5.10. There will continue to be a principle of earned autonomy for the EWR Co over the next year of the programme, with Review Points planned to assess the EWR Co's increasing capability and the incremental delegations to be granted.

**Key parties involved with Western Section delivery**

5.11. A division of roles has been adopted for the EWR Phase 2 project. This revised categorisation sees the creation of the following roles:

- **Strategic Sponsor:** holds responsibility for defining the strategic objectives and high level requirements of the scheme, and holding final approval rights over the business case, funding and assuring itself that benefits can be delivered – this role is being fulfilled by DfT;
- **Client**: integrates responsibility for business case, scheme development and passenger services; has the required expertise and authority to effectively hold the Deliverer to account; is accountable for both the project budget (within limits set by Strategic Sponsor) and the realisation of scheme objectives and benefits, on behalf of the Strategic Sponsor – this role will be fulfilled by the EWR Co; and
- **Deliverer**: contracted by the Client to deliver the scheme – in Western Section, this continues to be Network Rail, comprising:
    - The NR Sponsor team within NR LNW Route, who interprets EWR Co's client requirements
    - NR Infrastructure Projects, which interprets and delivers the requirements and manages the EWRA2 (the Alliance)
    - The Alliance, which delivers the infrastructure

5.12. With regards to comparator projects, Network Rail has considerable experience in delivering projects of similar size, complexity and nature. The Alliancing model, used successfully for the Staffordshire Improvements Programme, has been implemented by Network Rail for the delivery of the EWR Phase 2 project and includes the same participants, namely Laing O'Rourke, Volker rail and Atkins. The Alliance is governed by an established contract, the Project Alliance Agreement (PAA), which clearly sets out the roles and responsibilities of the parties. The relationship between EWR Co and Network Rail importantly enables EWR Co to provide direction and effective clienting for the programme, while allowing Network Rail direct control of the Alliance and the ability to execute their duties as client to the PAA.

**Principle of earned autonomy**

5.13. There will continue to be a principle of earned autonomy to enable the EWR Co to have the necessary powers to perform the Client role on EWR Phase 2 effectively, with the level of accountability it requires to fulfil the SoS's objectives. This is in line with the BICC submission for the setup of the company in 2017.

5.14. Review Points, as in Table 5-1 below, have been established to assess the capability of the EWR Co and to confirm the level of further delegation.

**Table 5-1**

Review points

| Review Point | Business Case Stage | Capability Assessment prior to passing of the Review Point | Delegations Required post passing of the Review Point |
|---|---|---|---|
| 1 | OBC and Entry into CP6 Interim funding arrangements | Does EWR Co have the people, processes and systems in place to be an effective Client to NR (As the Deliverer), and to report effectively to DfT as the Strategic Sponsor during the final development phase of the Western Section. | Set out in Table 5-3 |
| 2 | FBC approval (which no longer aligns with beginning of CP6) | Does EWR Co have the people, processes and systems in place to be an effective Client to NR, to manage the budget for the programme and to report effectively to DfT as the Strategic Sponsor during the construction and Entry into Service of Western Section. | To manage NR's delivery of the project within the project baselines granted by DfT |

### Principle of earned autonomy

5.15. To determine the appropriate delegations for DfT to provide, it is necessary to understand in more detail the activities EWR Co will be required to perform. In keeping with the Client role outlined above, EWR Co will be responsible for a range of activities prior the approval of the FBC. The roles of each responsible party are described in Table 5-2. Activities, and the delegations required for EWR Co to deliver these activities are summarised in Table 5-3.

**Table 5-2** Roles of responsible parties

| Enhancement Role Description | To-be Responsible Party in CP6 |
|---|---|
| **Sets overall network outcomes desired** | Strategic Sponsor (DfT) |
| **Defines high level enhancement requirements** | |
| **Selects delivery model** | |
| **Owns Business Case** | |
| **Secures funding** | |
| **Keeps track of benefits (and reports these to DfT)** | Client (EWR Co) |
| **Develop and maintain the Business Case** | |
| **Develop detailed project Objectives** | |
| **Manage Output Specification document** | |
| **Secure funding (with DfT)** | |
| **Owns relationship with ORR and Funder** | |
| **Manages Change Control process with NR and with DfT** | |
| **Reconciles differing industry requirements** | |

| | |
|---|---|
| **Authorising delivery consistent with authority** | |
| **Accountable for project budget** | |
| **Develop and deliver requirements programme** | |
| **Stakeholder management** | |
| **Provides an integrated view of performance across the Programme, incorporating inputs (e.g. from Deliverer and elsewhere)** | |
| **Selects Suppliers to meet project objectives (in addition to the Deliverer)** | |
| **Provide input to engineering design reviews held by the Deliverer** | |
| **Develop and manage the integrated schedule across infrastructure and non-infrastructure activities across Western Section and Central Section** | |
| **Manages risks, issues and opportunities, working collaboratively with NR and DfT** | |
| **Hold, manage and deploy a specified contingency allowance associated with the delivery of the programme** | |
| **Works with the Strategic Sponsor to determine timing and nature of any further delegations required** | |
| **Review and endorse the Deliverer's Target Cost** | |
| **Manage dependencies for the Programme, working with Deliverer, DfT and third parties (including HS2)** | |
| **Development of communications approach and plan, in conjunction with the Deliverer and the Strategic Sponsor** | |
| **Defines what will be delivered and at what cost** | |
| **Accountable to the Client for delivery to scope, cost and schedule** | Deliverer (NR) |
| **Fulfils and manages requirements and delivers benefits, in line with the framework set out by the Client** | |
| **Define Access Requirements and agree them with the route COO** | |
| **Delivers an asset that can be integrated into the Route** | |
| **Selects Suppliers to meet project objectives** | |
| **Selects Delivery Strategy** | |
| **Co-ordinate detailed possession requirements with Route** | |
| **Provide to the Client Project Reporting and Communication** | |
| **Build works / deliver service** | Deliverer (Alliance) |
| **Responsible for safe delivery of the work** | |
| **Manage planning and consents** | |
| **Assures Technical parameters and designs** | |
| **Assures compliance** | STED / 3rd Party |
| **Manage and operate the asset** | Regulator |
| **Specify operating and asset requirements** | Infrastructure Manager (Network Rail) |
| **Integrate project into route post asset acceptance** | |

**Table 5-3** EWR Co activities prior to FBC approval

| Category | Description of EWR Co role | Delegations |
|---|---|---|
| **Governance** | • Formalise and manage escalation and approval pathways for key outputs (including FBC), requiring DfT approval. | |
| **Financial controls** | • [Dependent on funding models]<br>• EWR Co provide challenge and assurance to NR project delivery costs<br>• Providing forecasts of financial requirements for period as well as actual costs incurred<br>• Cash flow forecasting (to DfT and from NR)<br>• Verify NR management costs | • Delegation to pay on the basis of forecasts, with retrospective assurance on NR's verification of Alliance costs required on actuals within 4-8 weeks. |
| **Commercial** | • EWR Co to perform cost verification re: NR management costs, and assurance to the sponsor's methodology of verifying project delivery (forecast and actual) costs<br>• Control of interim funding allowance delegated from DfT up to Target Cost agreement.<br>• Assure end to end Programme costs, including those associated with the Alliance and Network Rail.<br>• Report on end to end Programme costs (including **AFC** and budget), including those associated with Alliance and Network Rail. [Level of cost verification TBC] | • TBC may need to validate against Cabinet Office controls around level of spending. |
| **Change Control** | • Management of Output specification and associated control of Requirements<br>• Manage any changes associated with the Programme Output Specification, including reporting of Early Warning Notices and Changes to DfT | • Pay & Change instruction authority required<br>• DfT to delegate accountability to EWR Co for:<br>· Schedule change that doesn't impact the EIS date and other agreed key dates<br>• Scope change that does not impact the output specification |
| **Risk and issue Management** | • Manage key risks and issues across the programme.<br>• Report on key risks and issues to the DfT, including those held by the Company and being reported for escalation by the Alliance and Network Rail.<br>• Manage risk and issue exposure at the Company level.<br>• Report on Programme wide risk and issue exposure to the DfT. | • Needs alignment with contingency management arrangements<br>• Demarcation of risk owners between EWR Co, NR and DfT |

| Category | Description of EWR Co role | Delegations |
|---|---|---|
| **Contingency management** | • Report on contingency held by all parties, including Alliance and Network Rail to DfT<br>• EWR Co to manage contingency held by the company | • Delegation to EWR Co to hold [P80 – P95] contingency<br>• [Alliance to hold P50]<br>• [NR to hold P50-P80] |
| **Engineering Review** | • EWR Co to provide input to engineering design reviews, including IDCs and HAZOPs/HAZIDs.<br>• Involved in design derogation activities, especially those with potential customer impact implications.<br>• Assure NR collection and management of asset information | • Control of output specification, within scope of strategic objectives<br>• Delegations to EWR Co to instruct NR to consider change impact assessments (e.g. ETCS) |
| **Reporting** | • EWR Co to provide robust management of cost, programme, risk, scope, H&S, including enhanced reporting to, and as agreed with DfT | |
| **Data transparency and exchange** | • EWR Co will have access to procedural and technical data in eB, Projectwise, 3D/4D/5D BIM (CDE), Coins (cost reporting), and Alliance/NR reporting in PowerBI format. | |
| **Schedule** | • EWR Co to manage Programme wide schedule, including the control of Level 1 and 2 milestones, including inputs from the Alliance and Network Rail.<br>• Report on agreed Level 1 and 2 milestones across the Programme to DfT (e.g. progress against baseline; slippage; float).<br>• Manage third party (e.g. HS2) interfaces and associated schedule impacts. | |
| **Assurance** | • Assure costs developed by NR and the Alliance<br>Provide engineering review, challenge, advice (input, not accountable) | |

**EWR Co activities post FBC approval**

5.16. Whilst approvals for delegations post FBC will only be granted alongside that business case, a review of the potential activities and delegations has been carried out, in order that proper preparations can be made, and so that the initial delegations can be considered in broader context.

5.17. As Client, EWR Co will be responsible for a range of activities post the approval of the FBC. These activities will be confirmed by EWR Co as part of the submission seeking the approval of the FBC. An indicative set of new activities are summarised in Table 5-4 below; all other activities will remain consistent with Table 5-2. We will return to shareholder board and BICC once we have a clear view as to the upcoming requirements of EWR Co and delegations required from the Department.

**Table 5-4** EWR Co activities post FBC approval

| Category | Description of EWR Co Role [Subject to change, pending outcome of target operating model refresh] | Change to capability | Change to delegations |
|---|---|---|---|
| **Engineering** | | • Uplift to Systems Engineering | |
| | • Involved in quality assurance of physical work delivered (TBC) | • Increased role around quality assurance of physical works delivered (TBC) | |
| **Industry systems integrator** | • Act as the industry system integrator. | • Uplift to industry systems integrator capabilities | • Responsible for industry systems integration |
| **Shadow Operator** | • EWR Co to coordinate shadow operator activities<br>• Determine Train Service Specification (TSS)<br>• Determine Franchise options<br>• Scope and develop rolling stock strategies | • Develop Shadow Operator capabilities and outline Operations and Maintenance strategies | • Delegation for EWR Co to become counterparty to operator contract |
| **Cost** | • EWR Co responsible for releasing grant funding (cash) to the deliverer (Network Rail) [Dependent on funding model] | • Move to target cost arrangements – changes to reporting and commercial administration, via NR.<br>• Change to assurance of the Alliance costs<br>• Change to verification of NR management costs (TBC) | • Increase to scale of funding held and administered by EWR Co, including inter-year flexibility |

| | | | |
|---|---|---|---|
| | • Responsible for cost of the whole programme, including reporting to the Strategic Sponsor | | |
| **Schedule** | • Responsible for the schedule, including priority milestones, for the whole programme, including reporting to the Strategic Sponsor | • Manage the integrated master schedule for the Western Section in line with the target cost, including non-infrastructure delivery activities and perform analysis of interfaces with Central Section. | |

5.18. It should be noted that the approval of FBC will not coincide with the beginning of CP6 as anticipated at the time of the company go-live. As a consequence, the indicative delegations required for post FBC, would only come into effect at the point of FBC approval. Whilst such delegations would have proved challenging under CP5 portfolio arrangement, CP6 may well provide the flexibility to accommodate what is necessary.

# Governance

### East West Rail roles

5.19. The scale and complexity of the EWR Phase 2 programme necessitates a strong governance structure, which is likely to be adapted as the programme progresses. Based on lessons learned from other UK major infrastructure projects, the EWR governance structure will likely evolve as the project progresses through its lifecycle.

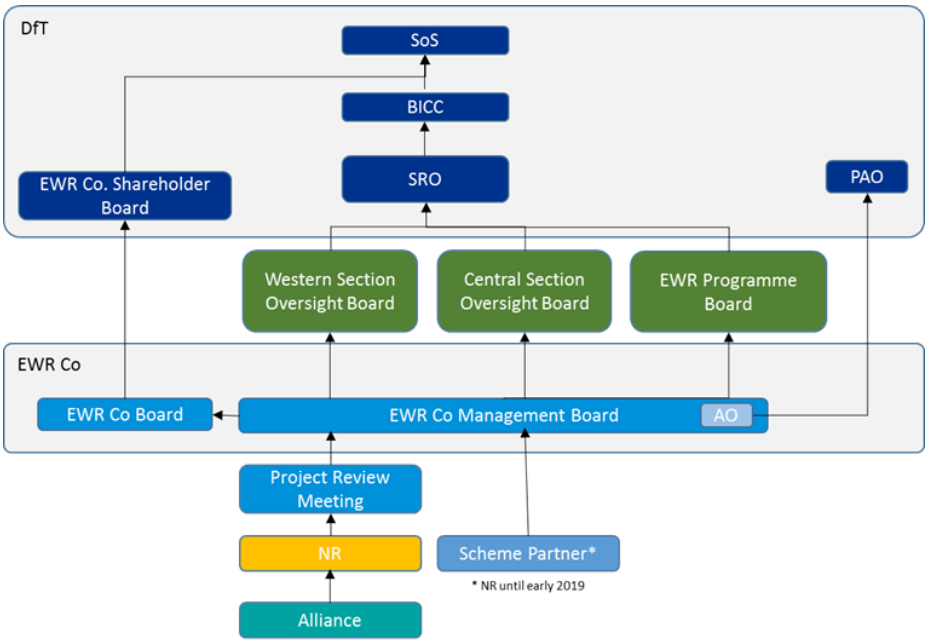
5.20. EWR Phase 2 is being jointly delivered by a number of parties, including the Department for Transport; East West Rail Company; Network Rail; and the East West Rail Alliance. The detailed role that each is playing is outlined in Section 1 of this document.

### East West Rail Governance

5.21. The programme reports into the DfT Board Investment Commercial Committee (BICC). Given the scale and anticipated cost of the EWR Phase 2 programme, it qualifies as a Tier 1 government programme and requires approval from BICC in order to proceed. BICC is a sub-committee of the DfT Board and has delegated authority to exercise functions of oversight, challenge and scrutiny.

5.22. On the 10th September 2018, EWR Co received delegations of authority to enable it to operate as an Arm's Length Body of the Department for Transport. At this time new governance arrangements for the EWR Phase 2 programme, plus the EWR-3 programme (Central Section) were established, as outlined in Figure 5-1 below.

**Figure 5-1**
EWR governance hierarchy



5.23. The governance arrangements and relationships between the different EWR Phase 2 organisations are set out in a suite of documents listed in Table 5-5.

**Table 5-5**
Governance arrangements between Phase 2 organisations

| Document | Description | Status |
|---|---|---|
| Framework Document | An agreement document between the DfT and EWR Co to establish the relationship between the ALB and its sponsoring department. | Document finalised in September 2018. |
| Development Agreement | Document outlining the contractual obligations of the Company, with respect to delivery of the EWR scheme, as delegated to it by the Department for Transport. | Document being worked on by EWR Co and the Department, and expected to be finalised in [March 2019]. |
| Delegations Letter | A letter from the DfT to EWR Co detailing the appropriate delegations of authority to EWR Co in order that it can fulfil its roles on both the Western and Central Section. | Document finalised in July 2018. |
| Strategic Sponsor's Requirements | Outlines EWR Co's responsibilities, as determined by the DfT on a variety of themes, including: output delivery; wider benefits realisation; business case development; safety; passenger capacity; journey time; reliability; passenger experience; revenue; operations and maintenance; integration with network rail (and other transport modes); sustainability; minimising adverse impacts; security; compliance with standards; commercial and operational flexibility; cost; consortium funding; time; lessons learned; and stakeholder engagement and communications. | Document finalised in [September] 2018 |
| Protocol Agreement | An agreement document between Network Rail and EWR Co to establish the relationship between the two parties for the delivery of the Western Section. | Document expected to be finalised late March 2019. Discussions between EWR Co and Network Rail ongoing. |
| Project Alliancing Agreement | Document between Network Rail and the EWR Alliance that sets out the performance of the works in return for specified payments | Document in place since October 2015 |

### Board meetings

5.24. To reflect the establishment of this new governance structure, and EWR Co's formal involvement in the EWR Phase 2 programme, a number of new forums have been created:

- A Project Review Meeting every month, which will review with representatives from the EWR Co, Network Rail LNW Sponsorship and IP, the progress made by Network Rail and the EWR Alliance on the delivery of the programme.
- The Western Section Oversight, meeting every two months, whose responsibilities include the review of business cases, review management of dependencies, risks, issues and review the integrated schedule and cost forecasts.
- The quarterly East West Rail Programme Board for the EWR Phase 2 programme (and EWR-3 in the future) brings together a range of stakeholders to provide strategic input, oversight and independent challenge to the programmes as a whole. It is chaired by

the DfT SRO, with other permanent attendees from the new company Chief Executive, representatives from the Local Authorities, Network Rail, Department for Communities and Local Government, HM Treasury and the Infrastructure and Project's Authority.
- The Shareholder Board, meeting every two months, where the Department's Shareholder function holds EWR Co Board to account for its corporate performance.
- The EWR Co Management Board is the forum where the EWR Co Directors will meet to discuss the day-to-day management of the Company, and delivery of the EWR Scheme within the powers delegated by the EWR Co Board. This forum meets on a monthly basis.
- The EWR Co Board are responsible for establishing appropriate corporate policies; making major decisions for around the management of the Company, and delivery of the scheme; and holding the EWR Co Directors to account. This forum meets every two months.

5.25. All Governance forums outlined in Figure 5-1 have supporting Terms of References, which have been developed as necessary to reflect the role of EWR CO in the delivery of the EWR Scheme. Similarly with the broader governance structure and arrangements, these Terms of References are subject to change, including attendance, frequency and decision-making authority.

5.26. Consideration has been given to how the various governance meetings interact, both in terms of authority, timing and performance reporting. This has led to a revised cadence, to effectively sequence the meetings from top to bottom, including the delivery meetings e.g. with Network Rail, oversight boards, programme board and the EWR and Shareholder Boards. Quarterly reviews will be undertaken to ensure effectiveness.

5.27. The governance arrangements for the delivery of the EWR Phase 2 programme are anticipated to differ from the start of CP6 (more details on these changes, expected to occur on 1st April 19 are addressed in the section on interim funding arrangements below), with further changes associated with the submission and approval of FBC by BICC, anticipated to be by end of September 2019.

**Interim funding arrangements**

5.28. It was previously assumed that the programme would have reached sufficient maturity to move to a target cost basis, supported by an approved FBC at the start of CP6 (1st April 19). EWR Co envisaged that delegations would have been sought from the DfT in line with that FBC to act as Client to Network Rail for delivering the Western Section infrastructure under target cost arrangements. However, in the absence of a target cost, it is necessary to put in place an Interim Funding Arrangement, until the target cost can be calculated and approved.

5.29. In conjunction with DfT and Network Rail, EWR Co has considered a number of funding model options. Based on this options analysis it is expected that the budget to complete agreed work sits with Network Rail and that the Department releases the grant funding (cash). It is also expected that contingency budget sits with the Department

### Network Rail governance

5.30. Network Rail's internal governance is anticipated to remain unchanged in the main for the remainder of CP5, until April 2019.

5.31. The Network Portfolio Board provides governance and oversight of Network Rail enhancements portfolio, which includes the EWR Phase 2. The board ensures the enhancement portfolio aligns with UK Government Strategy and the programme objectives, optimising benefits within affordability and deliverability constraints.

5.32. The Network Rail London North-Western (LNW) Route holds the Network Rail sponsorship role and is the budget holder for the project within Network Rail. The LNW Sponsorship Team reports into the EWR Programme Board on a quarterly basis and is present at the Western Section Oversight Board on a bi-monthly (every two months) basis. The LNW Sponsorship Team have asked Network Rail Infrastructure Projects (NRIP) to deliver the project for them. NRIP have entered into a contract with (and is therefore the contract counter-party to) a delivery partner, the EWR Alliance.

5.33. The Alliance Leadership Team meetings also take place every four weeks. This is attended by senior leadership from the Alliance partners (Laing O'Rourke, Atkins and VolkerRail), Network Rail Projects and Network Rail Sponsorship. The management information used for this meeting is then reported up the Route Sponsorship and Project arms within Network Rail. Information from the Projects arm is reported on by Network Rail at the joint Project Portfolio Board with DfT. EWR Co attend the meeting but as an observer only.

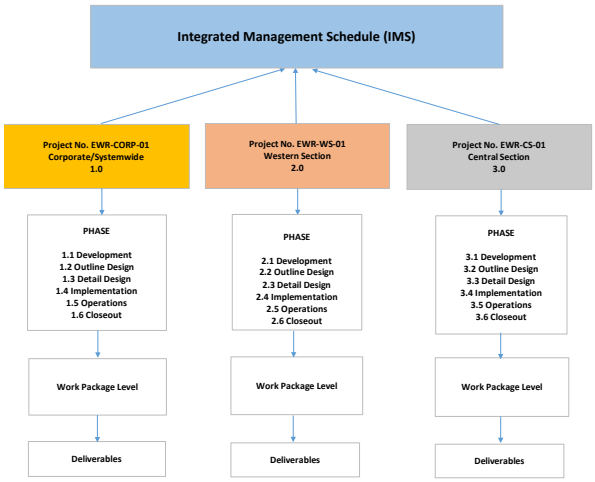
## Programme plan and dependencies

### EWR Co Integrated Management Schedule

5.34. The Integrated Management Schedule procedure defines the Work Breakdown Structure (WBS), global EPS coding and the process to achieve an Integrated Management Schedule (IMS). There are three projects which form the basis of the IMS, Western Section, Central Section and Systemwide which roll-up to produce the EWR Co IMS.

5.35. There are interface activities which link the projects together to produce a logic linked programme that enable an integrated approach to schedule management. The high level WBS is set out in Figure 5-2.

**Figure 5-2**
High level Work Breakdown Structure




5.36. The procedure also sets out the requirement for Level 1 and Level 2 milestones as a method to measure and report IMS performance and management of inter dependencies.

5.37. EWR Co has established an IMS baseline on the 21st December 2018 including the identification of Level 1 and Level 2 milestones. These milestones will be used to manage and report on schedule baseline performance and will form part of the agenda for all future period end and Oversight Board reporting. The schedule is now subject to change control (see para 5.55).

5.38. Included in the Level 1 and Level 2 milestones are the key 'critical path' dependencies, however other none critical dependencies, both inter project and 3rd party, are identified in the overall IMS.

5.39. EWR Co have also established internal mechanisms to manager inter dependencies and enable reporting. Management of these interfaces is to be via Network Rail, who are responsible for conducting the work, however, EWR Co will manage any change and instruct Network Rail accordingly via the Project Review Meetings.

5.40. The Western Section Delivery Team will utilise the periodic project review meeting with Network Rail to review status and manage performance. Interface issues may be raised at this forum for resolution, however changes in cost, schedule or requirements that arise from 3rd party interfaces shall be subject to the change control process for top down change. These will be considered at the joint EWR Co and Network Rail Change Panel meeting.

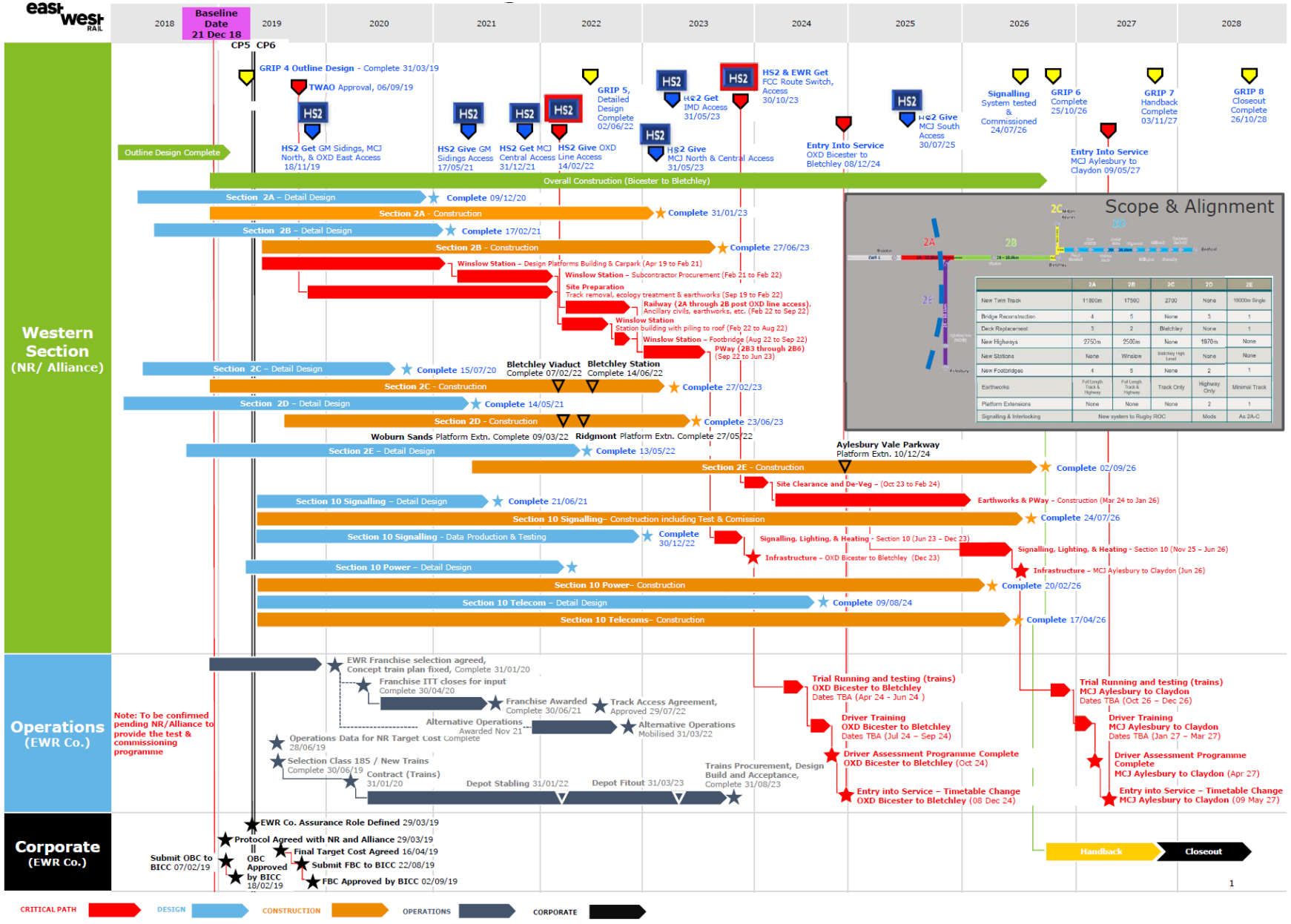
**Key milestones and EWR Co Configuration Plan**

5.41. Key milestones for the programme include:

- 2019: Target price submitted (April), Rolling stock option selection (June), western section phase 2 TWAO planning consent (Feb to Sept), FBC approved (by Sept), major work commences (by Oct)
- 2020 Rail operations option selected, franchise or alternative option (Jan)
- 2021 Franchise awarded, if that option is progressed (June) or alternative option progressed / awarded (Nov)
- 2023 Train procurement complete, trains accepted (Aug)
- 2023 / 2024 Rail services commence (Dec 2023 for Oxford to Bedford and Oxford to Milton Keynes followed by Milton Keynes to Aylesbury in 2024)

5.42. To communicate the Western Section programme plan at a management level, EWR Co has developed a Configuration Plan diagram based on the baseline IMS, which will be used during period end reports to both the Oversight Boards and EWR Co Board. The Plan will be updated on a periodic basis in line with the EWR Co Change Control procedure and can be seen in Figure 5-3. Work is ongoing to bring this back in line with the objective of commencing services from December 2023.

**Figure 5-3** EWR Co Configuration Plan – Western Section



**Key dependencies**

HS2

5.43. The most significant 3rd party interface on the Western Section is with the High Speed 2 programme in the Calvert Area. This interface is managed at a detailed level between Network Rail and HS2 Ltd using interface control documents and milestone dependency schedules. Strategic oversight of this interface is managed through a regular meeting known as the Calvert Integration Forum, which has director level involvement from HS2 Ltd and EWR Co and Sponsorship attendance from Network Rail. Senior level engagement is established between the EWR Co and HS2 Ltd CEOs for escalation of issues as required.

5.44. The EWR Co and Network Rail have not included schedule contingency in the form of time risk allowance in the East West Rail delivery programme. This means that changes to the HS2 Ltd interface milestones will have a direct consequential impact on the performance of the East West Rail works.

Timetable development

5.45. Despite the planned investment in infrastructure, constraints will remain post completion of the scheme. These will include platform capacity at Oxford station and availability of paths onto the West Coast Mainline for the proposed Milton Keynes services. Network Rail is collaborating with its industry partners to ensure the delivery of a robust working timetable by looking at operational and timetabling solutions in addition to the proposed infrastructure improvements.

East West Rail – Phase 3 (Central Section)

5.46. The Department for Transport is considering a Phase 3 programme (Central Section) for East West Rail, with an SOBC - summer 2019 likely to inform whether to proceed with the development phase. The EWR Phase 2 Project and Network Rail are aware of this and will take account of any potential issues arising. Work is ongoing to align objectives and ensure that the train service specification is compatible with EWR Phase 2.

Franchising and rolling stock

5.47. EWR Co working with NR and DfT has made considerable progress on the identification of a workable timetable (covered under Economic Case, Train Service Specification deliverability).

5.48. In 2018 EWR Co developed an initial rail operations / franchising strategy, work on which is reported to and overseen by the Western Section Oversight Board (Chaired by the DfT SRO and also comprising EWR Co and NR). This will continue to be developed and take account of the ongoing Williams Review into organisational and commercial frameworks of the rail industry, including recommendations on rail franchising.

5.49. EWR Co and DfT need to decide how it will procure an operator of passenger services for the Western and Central sections of EWR. The purpose of the work being undertaken is to provide structure for the evaluation of the options available to EWR, to:

- Clarify the passenger service-related objectives which should be supported by the choice of operator; and
- Identify any specific constraints or must haves, relating to preparing to operate and the operating environment which might influence from where EWR sources the operator.

5.50. The plan to complete this work consists of a number of stages consisting of the following activities:

- Agree the Critical Success factors
- Define and understand the constraints
- Develop summary document and long list of options to engage with stakeholders
- Evaluate long list to short list
- Agree evaluation criteria for short list and evaluate options
- Produce summary report with defined options

5.51. As part of this evaluation the following working assumptions have been or will be agreed with the DfT:

- EWR Co has identified the rolling stock and depot selection and therefore all potential options are agnostic to the selection, albeit operators are consulted on the specification of both the rolling stock and depots;
- Major stations such as; Cambridge, Oxford, Milton Keynes and Bedford will not fall within Western Section operations remit;
- Up to 36 month lead time post award (i.e. contracts may have to be let by the end of 2019) of franchise to; recruit and set up operational organisation, recruit and train drivers, meet all safety requirements and tests and early operator on-boarding to facilitate smooth transition to fare paying passenger services; and
- DfT lets any proposed franchises, and negotiates direct awards and/or franchise 'changes'.

5.52. The Williams review into the organisational and commercial frameworks of the rail industry is currently ongoing and is intended to publish its findings in autumn 2019. The franchise evaluation work that is currently being undertaken by EWR Co is to assess the options for the Western section franchise/operation. The programme for this is driven by DfT timeframes for franchise renewals or direct award if this is the chosen option. Findings and recommendations that arise from the Williams review will be considered and incorporated in the operator procurement where possible and appropriate.

5.53. There has been a significant level of work undertaken to date culminating in a long list of options. Work is now focused on the next stages of evaluation (including but not limited to

inclusion in existing franchises such as Chiltern and a new separate franchise). This work will be completed and the strategy to be taken forward is intended to be included in the submission of the FBC in 2019.

5.54. EWR Co have produced a rolling stock strategy which has recommended two potential options to be considered in a parallel: a legacy fleet solution (class 185) and new trains. A decision on which options to select is required in summer 2019, this decision and next steps will be included in the FBC in 2019.

# Change control

5.55. Change control procedures are currently being implemented across all parties of the EWR Phase 2 programme by EWR Co The Company's existing Change Control Procedure primarily addresses changes related:

- Scope Changes: The output specification for the Western Section was defined by the DfT as Strategic Sponsor. EWR Co, in the role of programme client, is responsible for the management of Output specification and associated control of Requirements. EWR Co will manage any changes associated with the Programme Output Specification, including reporting of Early Warning Notices and Changes to DfT.
- Schedule Changes: Following the baseline agreement Level 1 and Level 2 milestones will be subject to formal change control. The EWR Co Change Control procedure was approved by the EWR Co Management Board on the 16th January 2019 with Change Panels to take place in the third reporting week of every period starting from 21st January 2019.

5.56. Change control procedures are likely to evolve as the programme progresses, particularly as EWR Co receives greater delegations of authority from the DfT.

5.57. Specific change thresholds are currently being developed by EWR Co, Network Rail and the DfT. These are expected to be finalised by 1st April 19 for the EWR Phase 2 programme. However, currently governance mechanisms outlined from para 5.19 onwards are being utilised to ensure that the Department, via the Oversight Boards, is involved in major changes to the existing programme plan.

# Programme reporting

**Reporting between Network Rail and EWR Co**

5.58. The purpose of the East West Rail client's required reporting architecture is to enable positive challenge of data represented within the Network Rail and Alliance reports. It is intended to instil rail industry culture changing behaviours to drive towards a collaborative, insightful and accountable environment using timely, accurate, realistic project progress and performance data and projections across cost and programme.

5.59. Network Rail's latest Period reports (Period 8 2018/19) now reflect much greater alignment with EWR Co expectations, as well as 'early warning' transparency of Cost, Programme and Performance issues. Further required reporting improvements mapped out by EWR Co have been instructed to the Network Rail supply chain and are planned to be implemented incrementally during Q1 2019. The reporting requirements between Network Rail and EWR Co are to be formalised in the Protocol agreement.

5.60. The envisioned final reporting architecture will include the following:

- Health, safety and environment scorecard reporting
- Change Control and Early Warning Reporting
- Risk and Opportunity reporting including mitigating actions and ownership
- Utilisation and management of budget contingency and schedule float
- Progress reporting of commodities, costs and schedule at the activity level of detail
- Earned value cost and schedule performance at the activity level of detail
- Schedule and Programme Performance
- Financial Performance

**Reporting between EWR Co and the Department for Transport**

5.61. As part of the designated (strategic) Sponsor's Requirements of EWR Co, the Company is required to provide upward reporting on the programme to outline ongoing performance and progress updates. This reporting will include a mix of programmatic information from EWR Co, as well as a distillation of content provided to the Company by Network Rail and the Alliance. It is also likely that reporting requirements will adapt and be refined as the programme evolves and progresses.

5.62. Upward reporting is primarily structured around five key areas, and will be issued as part of a formal reporting process to the EWR Co Oversight Board every two months. The four areas are as follows:

1. <u>Narrative (commentary)</u>
   Narrative will be provided outlining the high level status of the programme, with a specific focus on activity that has occurred during the period. This will be broken down into: successes; challenges; opportunities; and threats. Narrative reporting should provide the DfT with a clear and concise picture of programme status across different areas.

2. <u>Schedule</u>
   EWR Co will provide sufficient level of schedule information to allow DfT to determine whether the programme is running to expected timeframes. This will be in the form of Level 1 and 2 milestones, identified in the EWR Co Integrated Management Schedule (IMS). This provides a high-level framework to monitor critical deliverables and outputs against

the agreed baseline, identifying schedule variance, float erosion and commentary where appropriate.

A level 1 milestone is defined as a key output or deliverable with a Level 2 milestone being critical path supporting drivers to achieve a key output or deliverable.

3. Cost

EWR Co is expected to provide cost reporting to the DfT periodically, outlining a summary breakdown of the Anticipated Final Cost (AFC) and performance against baseline budget. The programme is continuing to work towards finalisation of a target cost, which is likely to be complete by September 2019.

4. Risk

Risk reporting is outlined in greater detail in para 5.69.

Additionally, the Company are working with the Department to satisfy GMPP reporting requirements, expected quarterly.

5 Forward Look

In addition to performance reporting, an indicative view is provided (for discussion) of upcoming decisions associated with the scheme, and where appropriate, in relation to the company.

**EWR Co Business Reporting**

5.63. EWR Co also has an obligation to provide more typical Arm's Length Body reporting to the DfT on a periodic basis. This information includes, but is not limited to reporting on:

- Company finances, including periodic burn rate and budgets;
- Company strategy and priority milestones;
- Company headcount and recruitment; and
- Company delegations and obligations.

5.64. It is expected that the Company will provide this information to the DfT via the EWR Co Shareholder Board every two months.

# Risk management

5.65. The Western Section team engages in risk management activities to ensure risks are being identified and efficiently managed. Risk Workshops are carried out at critical phases of the Programme to ensure the Risk Portfolio is a true reflection of the Programme's Exposure. The Risk Management Plan, currently being developed, will give detailed guidelines on how the team will implement the risk management framework in managing its exposure.

5.66. A collaborative way of working will be adopted in the management of risk with Network Rail and the Alliance as the Delivery Partner. Joint Risk Reviews will be held to determine mitigation action strategy and who is best placed to manage them.

**Schedule risk**

5.67. All Schedule risks will be managed as detailed under the approved Risk Management Plan for the Western Section. Software tools to be used for Schedule Risk Analysis will include Active Risk Manager (ARM), PRA (Primavera Risk Analysis). The Quantitative Schedule Risk Analysis (QSRA) will be carried out to support Programme Requirements.

**Cost risk**

5.68. Cost risks and exposure will be identified as part of the Anticipated Final Cost (AFC). This will partly inform the Contingency allowance value at the Approval Stage. Other cost related risks will also be reviewed as part of the risk review sessions on a monthly basis. ARM will be the software tool to support all cost risk analysis exercise for the western section.

**Risk reporting**

5.69. The Monte Carlos Simulation as configured in the Active Risk Manager Software tool will be used to carry out a Quantitative Cost Risk Analysis on a month by month basis. This will identify movement of baseline risk figures. A summary report on the cost risk analysis will also be produced to support the justification for the movement each period. The report will contain details of the Mitigation Action Strategy being implemented to reduce potential exposure. The iteration of the Quantitative Risk Analysis process will commence once interim funding has been approved and overall report on the interim funding phase commences.

5.70. The Quantitative Schedule Risk Analysis report will be produced as detailed in Risk Management Plan to provide information on the team's level of confidence in achieving pre-agreed completion date of various milestones. This will be produced every 6 months.

**Risk integration**

5.71. The risk management system for the Western Section will be integrated with the rest of the Programme Control function and delivery. The Change Management System will support the drawdown process for realised risks. The following registers will be reviewed be the delivery team based on a frequency as defined in the Western Section Risk Management Plan:

- EWR Co Western Section Risk Register;
- Network Rail Western Section Risk Register;
- EWR Alliance Western Section Risk Register; and
- Department for Transport Western Section Risk Register.

5.72. Discussion are ongoing regarding Calvert including the potential us of a shared risk register.

**Risk Register Review**

5.73. The Risk and Issues Register Review will be held on a periodic basis and within the team across the relevant functions or Business Sub Unit.

**Assumption Register Review**

5.74. The Assumptions Register will be stored and maintained in ARM. This register will be reviewed, updated and reported every quarter.

**Joint Risk Register Review**

5.75. The joint risk register review will form part of the risk management activities that will be carried out collaboratively between EWR CO, Network Rail and the Alliance. The activity will be implemented as prescribed in the Protocol Agreement to be agreed with Network Rail.

5.76. The joint risk register review will support the Western Section to maintain full transparency on Risk Movement within NR and the Alliance's Risk Register and reported by the latter.

**GMPP Reporting**

5.77. The Programme will comply with the GMPP reporting requirements based on baseline contingency against the Programme's exposure.

5.78. Other Risk Management activities will be carried out as stated in the Western Section Risk Management Plan.

5.79. The principal strategic programme level risks are set out in Table 5-6. In EWR Co these are mainly owned by Geoff Leffek (Western Section Delivery Director).

**Table 5-6**

Principal strategic programme level risks

| Risk title / owner | Risk Detail | Mitigating Actions | Timing |
|---|---|---|---|
| Delay to TWAO Approval (Geoff Leffek) | **Cause:** An accelerated timeframe of 13 months for TWAO approval is assumed in the schedule to conclude September 2019. It may not be possible to resolve all of the objections during the public inquiry. **Impact:** Delay to commencement of environmental mitigation works, enabling and permanent construction works, resulting in overall programme prolongation causing delay to EiS date and additional indirect costs. | NR led on the TWAO process, EWR Co (along with DfT) are providing oversight and ensuring: | |
| | | 1. Early and active stakeholder engagement to ensure approval is as timely as possible and resolution of objections prior to public enquiry. | March 2019 |
| | | 2. Progression of separately consented enabling works under permitted development rights. | Ongoing |
| | | 3. Delay to establishment of final project budget until TWAO approval is better understood | March 2019 |
| Delay to HS2 Interface Milestones (Geoff Leffek) | **Cause:** HS2 Ltd programme prolongation as a result of ground conditions, design development or other internal HS2 issues. **Impact:** Delay to handover of OXD and MCJ civil works from HS2 Ltd to Network Rail and EWR Alliance resulting in overall programme prolongation causing delay to EiS date and additional indirect costs. | 1. Delay to establishment of final project budget until HS2 Ltd programme is stabilised. | February 2019 |
| | | 2. Re-assessment of proposed engineering solutions and scope split between HS2 and EWR to protect EWR programme. | February 2019 |
| | | 3. Escalation to DFT for priority decision. | February 2019 |
| Cost risk (Geoff Leffek) | NR work on design has led to a list of risks and issues which could increase GRIP 4 capex cost significantly (covered in financial case). In addition, operating costs are to be reviewed in more detail prior to FBC (including depot and train maintenance). | EWR Co engaged with NR to scrutinise and resolve the Target Cost for the full duration of the programme as early on as possible. An operating cost assumption review is ongoing, integrated with rolling stock and franchise strategies. | March 2019 |
| Franchising Strategy (Geoff Leffek) | In early stages of definition and could miss key decision points for rolling stock and depot/stabling. | EWR Co have now developed initial rail operations and rolling stock strategies which are being integrated into the configuration plan and are being oversee by the Western Section Oversight Board. | June 2019 |
| Timetable (Geoff Leffek) | That the full EWR western section train service specification is not viable without additional cost or significant changes to other services and / or EWR CO do not secure the require train paths. | Recent work by the Concept Train Plan Working Group has provided a high-level assessment that the full timetable is viable without significant disruption to other services. More detailed work is ongoing and performance testing is expected to commence in summer 2019. | Next phase of CTPWG work complete April 2019 |
| Cross government integration (Will Gallagher) | Failure of integrated cross Whitehall programme – misalignment could reduce benefits for the corridor, particularly alignment with housing policy | Cross Whitehall meetings are ongoing involving EWR Co who are presenting plans and ensuring they are aligned to the integrated government approach. | Ongoing |

# Contingency plan

5.80. Budget contingency and schedule float shall be managed jointly and in a transparent manner between the Alliance, Network Rail and EWR Co The overriding principle of the approach is that risks and opportunities are allocated to the organisation best placed to mitigate and control them.

5.81. In line with this principle the budget for contingency is divided between the 3 organisations in the following manner. Each organisation shall hold a risk register for the risks for which it is responsible. A QCRA (Quantitative Cost Risk Analysis) shall be run using each risk register to calculate the exposure of each organisation. Using the risk exposure profiles generated the contingency budget shall be divided between the organisations as set out in Table 5-7.

**Table 5-7**
Contingency budget risk exposure

| | **Contingency Budget Holder** | | | |
|---|---|---|---|---|
| | **Alliance** | **NR Owner** | **EWR Co** | **DFT** |
| **Risk Register & QCRA** | | | | |
| Alliance Risk Exposure | [Up to P50] | [P50 to P80] | [P80 to P90] | [Above P90] |
| NR Owner Risk Exposure | | [Up to P80] | [P80 to P90] | [Above P90] |
| EWR Co Risk Exposure | | | [Up to P90] | [Above P90] |

5.82. Access to owned contingency budget shall be governed by the internal change control process of each organisation. Where an organisation requests access to continency above its allocated budget, or where a risk is realised that is held by EWR Co or DFT then the EWR Co authorisation shall be required and the EWR Co change control and governance process shall be followed.

5.83. Discussions during January have confirmed the proposed contingency allocation between NR and EWR Co, however this, and the further allocation held by DfT is yet to be agreed. We expect that this will be considered as part of this business case, specifically in relation to the commercial model. It is expected however, that this contingency allocation will be most relevant following target cost and following FBC approval.

5.84. Network Rail also run a QCRA. EWR Co take the output from this into account in their own analysis.

# Assurance and approvals

5.85. A core DfT principle is that of proportionality, in that the level of confidence and assurance associated with any product(s) should be proportionate to the financial, reputational and legal risks associated with the decision being taken, how much weight is being put on the particular analysis in question and the extent of the commitment being made.

5.86. As set out in EWR Co's draft Integrated Assurance and Approvals plan (IAAP), a "3 lines of defence" (3LOD) model has been applied for the EWR scheme. This is intended to acknowledge that there is progressive assurance as outputs of work flow between

organisations and comprehensive assurance across the scheme is the result of aggregated layers of activities.

5.87. EWR Co will be both delivering activities and assuring those of others. This is in line with the ambition of a lean organisation, and an intent to avoid person-marking and unnecessary duplication of "checking the checkers".

5.88. An Integrated Assurance and Approvals Plan was originally in place drafted by the DfT sponsor team. An update was performed for the scheme in late 2018 at the time of EWR Co go-live. This built on the previous IAAP and set out the anticipated key approval and review points.

**Stage gating and approvals**

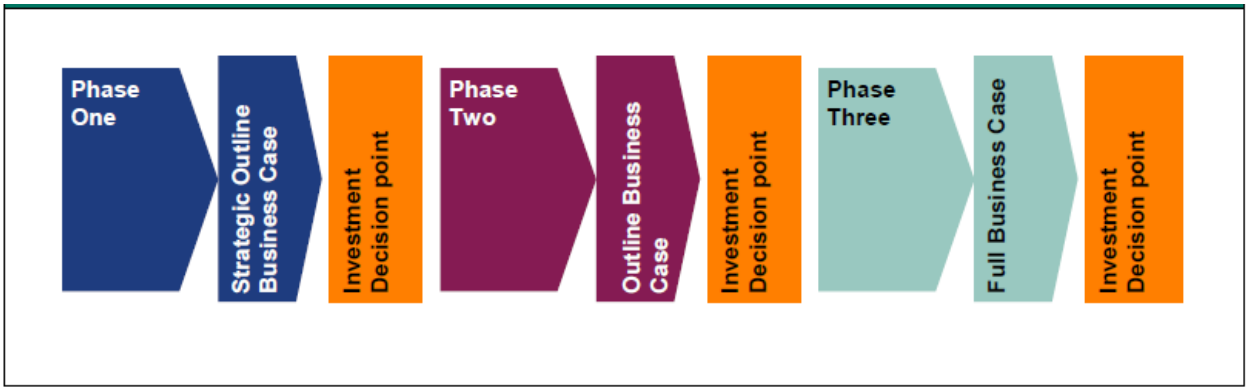
5.89. The Western Section (EWR Phase 2) programme is being delivered in line with multiple stage gating frameworks, which are consistent and reflect the bespoke governance arrangements for the programme:

- DfT's Transport Business case model (in line with HMT 5 case guidance)
- Network Rail's Governance of Rail Investment Projects (GRIP) process
- EWR Co's bespoke stage gate and approval process (currently being developed)

<u>DfT</u>

5.90. This document forms the submission of the Outline Business Case in line with the decision-making process set out below in Figure 5-4. Investment decisions are made by the DfT's Board Investment and Commercial Committee (BICC), with prior peer reviews conducted by the Department's Centres of Expertise.

**Figure 5-4**
The three phases of decision-making process




Source: DfT transport business case guidance

5.91. Additionally, as part of the Government's Major Projects Portfolio (GMPP), EWR Phase 2 is subject to Project Assurance Reviews (PARs). This relationship is handled directly by the DfT.

<u>Network Rail</u>

5.92. As the works are being delivered through Network Rail, EWR Phase 2 is subject to NR's GRIP process, which is a well-established framework, with review points, expected

maturity defined at each stage and has formal governance associated with major investment decisions, required to move between stages. Due to the ongoing nature of the Western Section programme, it is anticipated the governance will remain principally driven by GRIP with some amendments.

5.93. As part of the negotiations with Network Rail, EWR Co is securing a set of arrangements whereby EWR Co has access to documentation developed by Network Rail and the Alliance. EWR Co will also be participants in key approvals and assurance activities delivered by Network Rail, including the GRIP4 stage gate review. This is intended to smooth the approvals process by incorporating EWR Co's input early to reduce the likelihood of a late no-go decision once NR processes have been fully completed.

EWR Co

5.94. EWR Co is in the process of developing its own stage gate process which will be used for both Central Section and for Western Section FBC, including target cost. This framework will be endorsed and will lead to an updated IAAP by June 19. Upcoming review points associated with these activities are set out in the Table 5-8 below.

**Table 5-8**

Target cost and FBC upcoming review points

| Subject | Activity / Approval | Stage gate process(es) applicable | Timing | Reviewers and approvers |
|---|---|---|---|---|
| Target cost | Initial submission from NR to EWR Co | EWR Co | 26/03/19 | EWR Co |
| | EWR Co provide review and comments | EWR Co | 16/04/19 | - |
| | NR approve Target Cost with GRIP 4 AFC and Authority (entry into contracts) | GRIP | July 19 | - NR internal QA:LNW Panel (21/06/19)<br>- IP Panel (05/07/19)<br>- ELT (15/07/19) |
| Full Business Case | EWR Co internal approval | EWR Co | June 19 | EWR Co |
| | BICC | DfT | By end of September 19 | DfT CoEs<br>BICC |

5.95. The role of EWR Co requires assurance activities in the following areas:

- Engineering Assurance
- Cost assurance
- Benefits management and realisation

**Engineering Assurance**

5.96. Full access to Network Rail and Alliance project engineering and design data is a prerequisite of the Engineering Assurance regime to be implemented by EWR Co on

Western Section. This is intended to be achieved through shared access to the Alliance electronic document management system (EDMS) and common data environment (CDE) and attendance at design integration and engineering assurance meetings. This requirement has been set out by EWR Co in the Protocol agreement but has not yet been achieved.

5.97. It is recognised that established internal engineering assurance regimes exist within Network Rail and the Alliance, and that the legal responsibility for assuring the designs generated lies with the designing organisation. Moreover, it is recognised that the Western Section design has reached a GRIP 4 level of maturity, therefore option selection and approval in principle have already taken place. The assurance undertaken by Network Rail is focussed around safety assurance and safe integration of the changes into the operational infrastructure.

5.98. It is considered disadvantageous to introduce additional challenge and change during GRIP 5 detailed design process as this could adversely affect cost and schedule delivery. Also, there is perceived to be limited benefit in EWR Co duplicating Network Rail's role in providing safety engineering assurance for the scheme.

5.99. Therefore, EWR Co's engineering review and assurance shall be targeted at specific areas that are thought to add most benefit for the passenger and most benefit for the taxpayer in cost and schedule improvements. EWR Co shall prioritise their review on packages where GRIP 4 design has not yet been concluded in an effort to minimise change introduced during GRIP 5. EWR Co shall, in alignment with agreed delegations and ways of working, instruct any change where design review has concluded that there are significant improvements in cost, schedule or customer experience to be gained.

| Areas of Priority for EWR Co Engineering Assurance on Western Section |
|---|
| Customer Experience |
| Operations including Performance Reliability Availability Maintainability (PRAM) |
| System Integration between project, system operator, rolling stock, central section & 3rd Parties |
| Value for Money and affordability |
| Delivery Programme Assurance |
| Stations, signalling and systems design |
| CSM Hazard management, transfers and residual risks |

This set of engineering assurance arrangements will be documented into agreed ways of working which is enabled by the Protocol Agreement.

**Cost assurance**

5.100. A significant proportion of the costs associated with Western Section delivery will be driven by the Alliance. As NR has the direct relationship with the Alliance, there is a bespoke set of arrangements to increase the whole programme view of costs:

- EWR Co will provide cost verification re: NR management costs
- EWR Co will perform assurance to NR's methodology of verifying project delivery costs (i.e. the Alliance)

- Assure end to end Programme costs, including those associated with the Alliance and Network Rail.

5.101. On this basis, EWR Co will be able to meet the requirement of reporting on end to end Programme costs (including AFC and budget), including those associated with Alliance, Network Rail and non-infrastructure related costs (e.g. Operations).

5.102. The specific activities and controls delivering cost verification and assurance will be defined and codified within the Protocol Agreement and/or in junior ways of working documents.

**Benefits assurance**

5.103. EWR Co owns the Strategic and Economic Cases which outline and estimate the expected key benefits of the project. In producing and using analysis to inform these case EWR Co applies the IAAP 3 lines of defence approach to assurance. For example, we require that those producing analysis provide quality assurance in line with the *DfT Strength In Numbers* (analytical assurance framework). This also includes the production of Analytical Assurance Statements to support decisions based on analysis of benefits (and other analysis). Where proportionate EWR Co will commission or engage in level 3 assurance (external peer review and audit). This is underway on the transport model used to estimate transport benefits for the project. EWR Co also has a key integration role in benefits definition, ownership, tracking and realisation. EWR Co will use the same approach to assurance in these areas and intend to engage with the DfT's benefits subject matter experts to align on the approach to be taken forward. The current Benefits Realisation Plan is set out in Annex G.

# Communications and stakeholder management

5.104. Network Rail Sponsorship currently lead on the communications and stakeholder management with a dedicated communications team attached to the Alliance. They are responsible for communication with all stakeholders including Local Authorities, Residents, statutory stakeholders, train and freight operators. They communicate through a range of channels including informal & informal briefings, participation in appropriate local and transport forums and direct marketing-style communication. In addition, they maintain relationships and brief local media.

5.105. EWR Co is in the process of becoming more visible on the route and the communications and stakeholder management function will move over time from the Alliance to EWR Co. This transition will be planned to avoid confusion among stakeholders or the public and will maintain a consistent and integrated approach with communications activity on the Central Section.

5.106. Over the first six months of FY19/20 it is anticipated that the structure of stakeholder management and communications will be defined for the full route including channels, approach, tools and resourcing. This will be implemented initially for Central Section. A plan for migrating existing communication work on Western Section into the consolidated

approach will be devised and agreed with Network Rail over this period, and with engagement from DfT.

5.107. EWR Co has its own dedicated External Affairs capability, which is creating an integrated communications and stakeholder management approach for the entire East West Rail route. The website www.eastwestrail.co.uk was launched in 2018, with pages dedicated to Western Section, designed with capacity to expand and deepen as needed. Other online & physical channels have been secured for future use.

5.108. Both the East West Rail Consortium and Network Rail have their own programme websites.

5.109. The DfT Major Rail Projects Development Communications Manager will continue to liaise with Network Rail, the Alliance and EWR Co on communications activity and where appropriate will facilitate grid clearance. They will support the project team on briefings and updates to ministers and other government departments.

**Consultation strategy**

5.110. Network Rail made a submission for a TWAO to gain the necessary consents and permissions to deliver the project.

5.111. Network Rail undertook a first round of public consultation between September and October 2015, with a second round held in August 2017. The responses from these consultation exercises have helped to inform the development of the programme's design. Network Rail opened a third round of public consultation in January / February 2018, which focused on the changes arising from a review of the scope and construction methodology. and Network Rail is also working collaboratively with the Local Authorities that form the East West Rail Consortium to ensure that their views and concerns are considered when compiling the TWAO submission and the Environmental Impact Assessment.

5.112. A public inquiry will be held in February 2019 into the TWAO application, which will address expressions of both support and objection to the scheme. Network Rail are actively engaging to resolve objections where possible.

5.113. Following the successful conclusion of the TWAO process, there is no anticipated need for further consultation.

# Benefits realisation plan

5.114. The realisation of programme benefits is managed in accordance with the IPA guidance for effective benefits management in Major Projects.

5.115. In 2018 DfT developed a benefits realisation plan. This included a full list of benefits and dis-benefits for the programme, along with benefit inter-dependencies and enablers, can be found in the Benefits Management and Realisation Plan at Annex G.

5.116. DfT EWR Phase 2 Strategic Client team worked with the DfT Commercial Management team to prepare for tracking and realisation of the benefits over the life of the scheme. EWR Co have now taken ownership of the Benefits Management and Evaluation Plan and will provide regular updates to the DfT on the plan and realisation of the benefits over time. EWR Co will shared an updated Plan by the end of March 2019. The plan will then be reviewed and agreed with oversight from Western Section Oversight Board prior to FBC.

5.117. The revised BM&E plan will take account of recent comments from the DfT Evaluation CoE who have highlighted that the plan should recognise, and attempt to deal with, the complexity of benefits realisation and evaluation of benefits from the rail scheme which are so interlinked with other potential interventions (the Expressway and potential agreements with local authorities and others on house building). The challenge and complexity is especially apparent in establishing ownership and monitoring and evaluation of wider / secondary benefits including 'unlocking housing potential', 'increased/better access to jobs' and 'agglomeration'. We will also seek to incorporate the other CoE comments including: learning lessons from HS2 and others; referring to spatial dimensions of expected benefits (including location of housing and jobs); mode shift measurement challenge; timing of baselining; extending the scope of the evaluation plan.

5.118. Following agreement of the Benefits Map and Benefits Register, each benefit will be assigned an owner that is responsible for managing the benefit through to measurement and realisation. Some of the programme's indirect benefits, particularly those relating to housing and economic growth, will be owned by other government departments including the Ministry of Housing, Communities and Local Government. This activity includes monitoring the delivery of the necessary enablers, intermediate benefits, dis-benefits and ensuring that measures are taken both prior to and after the improvements have been introduced.

5.119. A benefit owner is expected to:

- Participate in defining the benefit and agree its benefit profile;
- Work with the Programme Client and other members of the programme team to optimise the timing of projects/activities to align them with benefits realisation;
- Ensure that the changes to be introduced will be operationally effective and will enable achievement of the benefit;
- Manage benefit realisation and ensure that the changes being introduced to enable the benefit do not cause any side-effects that could damage the integrity of business operations.

## Summary

5.120. A robust governance structure has been put in place to deliver the Western Section programme of work. There is a principle of earned autonomy to enable the EWR Co to have the necessary powers to fully perform the Client role, with a number of review points set out at which the EWR Co's capability will be re-assessed and additional delegations confirmed.

5.121. There is a clear set of roles and responsibilities amongst different parties with DfT as the Strategic Sponsor, EWR Co as the Client and NR as the deliver (including their supply chain and the Alliance). There are established programme delivery oversight boards (governance) and broader stakeholder engagement through the programme board (advisory). All key governance meetings have documented and agreed terms of reference. This structure reflects the bespoke arrangements, while keeping consistency and integration between Western Section and Central Section as part of the broader EWR Scheme.

5.122. There is a clear process for delivering timely and reliable management information, which is critical to EWR Co and other parties being able to monitor and control the programme effectively. This ensures that risks are identified in a timely manner and mitigations can be effectively implemented.

# 6. Commercial Case

## Purpose

6.1. The purpose of the commercial case is to provide evidence on the commercial viability and the procurement strategy that will be used for East West Rail Phase 2 Section (EWR Phase 2).

6.2. This case sets out how the outputs have been specified to achieve the benefits assumed in the strategic case, and the controls in place through project delivery and the supply chain to ensure the outputs are achieved, are delivered on time and provide value for money.

6.3. The programme is to be delivered by Network Rail under an alliancing arrangement. In 2015 Network Rail announced that it had selected Atkins, Laing O'Rourke and VolkerRail as its partners to design and build EWR Phase 2. Together these four organisations form the East West Rail Alliance.

6.4. East West Rail Company (EWR Co) was created in 2017 and will assume the role of Client from the beginning of Control Period 6 (CP6) in April 2019. EWR Co will be responsible for holding Network Rail accountable for delivering the outputs to cost and schedule and for developing an integrated infrastructure, rolling stock and operations strategy for the whole railway.

6.5. Prior to the creation of EWR Co the client and industry integrator role was divided between the Network Rail route sponsorship team, the Network Rail system operator and the Department for Transport. This role involves bringing together an integrated programme and coordination of all activities required to deliver an operational timetable; infrastructure, train operations and rolling stock, timetabling and system or route operations. The consolidation of this role is intended to bring greater cooperation between the parties with a combined focus on delivering an operational timetable for the benefit of the passenger.

6.6. Network Rail and the Alliance have developed a detailed programme to completion for the works and are in the process of developing a detailed Cost Estimate for the whole scheme. This shall be incorporated in the FBC to demonstrate the programme's commercial viability.

6.7. Under the new delivery model for the programme, the Network Rail sponsorship team will retain responsibility for holding the Delivery Contractor (Network Rail Infrastructure Projects and the EWR Alliance) to account, in line with the agreed Project Alliance Agreement (PAA). The PAA has not been changed as a result of the addition of the EWR Co to the programme's delivery model, outlined in the Management Case. The management case set outs the authorities, controls and reporting EWR Co has put in place with Network rail to support the sponsor in their responsibility to hold the Alliance to account.

6.8. This Outline Business Case (OBC) is based on a GRIP 3 pricing estimate as set out in the Table 4-1 (Financial Case). Known areas of change that have occurred since the GRIP 3 estimate was developed have been set out in the Financial Case Para 4.42. These changes shall be incorporated in the GRIP 4 estimate and FBC.

**Table 6-1**

Key dates for next steps

| | |
|---|---|
| 1. February 2019 | NR GRIP 4 estimate to be published |
| 2. March 2019 | NR submission of Interim Authority to Board |
| 3. March 2019 | Completion of GRIP 4 |
| 4. April 2019 | Alliance submit Target Price based on agreed Give/Get dates for works in the Calvert Area. |
| 5. By September 2019 | FBC submitted to BICC to authorise CP6 delivery funding. |
| 6. June 2019 | NR IP and Ex Com panel approvals |
| 7. September 2019 | TWAO Approval |
| 8. September 2019 | NR sign Target Price contract with the Alliance |
| 9. June 2022 | Completion of GRIP5 |

6.9. The following approvals are being sought from BICC:

- OBC (February 2019) – Interim funding of £185m to cover costs and commitments for the first 6 months of CP6 is requested with this outline business case. This includes £114m of forecast costs in the first 6 months for TWAO, detailed design, environmental mitigations and enabling works. The £185m also includes £71m of procurement commitments required to support the delivery schedule, expected from September 2019.
- FBC (by September 2019) – EWR Co plan to seek BICC approval of the FBC between May-September 2019 (timing to be confirmed) alongside a request for funds to deliver the scheme. The FBC will include updated capital cost estimates based on latest GRIP 4 designs, construction methodology, detailed programme to completion, agreed HS2 interface milestones, contingency provision based on updated QSRA and QCRA.

# Strategic Objectives

6.10. Successful procurement and delivery of the project will deliver the benefits and help meet the project's strategic objectives (paragraph 2.35) such as;

*Contribute to improved inter-regional passenger connectivity and journey times*

6.11. The lines to be upgraded by EWR Phase 2 will connect to the Great Western network at Oxford, the Chiltern Mainline at Bicester, the London to Aylesbury line at Aylesbury, the West Coast Main Line at Bletchley and the Midland Mainline at Bedford.

6.12. By virtue of connecting these key lines, the new rail services to operate on East West Rail, whilst consisting of an initial primarily local service, will facilitate interchange between each route which will significantly shorten the journey times between a number of destinations;

6.13. The Alliancing procurement model has supported early engagement of the design and construction contractors in the operational design to provide ongoing input as the scope

has evolved over time to ensure an efficient design that is deliverable and meets both the initial and future capacity needs.

*Consider and plan for future demand and economic growth*

6.14. Given the potential for housing growth along the line upon the commencement of the initial train service, there is a strong need to consider and plan for future demand. Network Rail has worked with the DfT and EWR Co to develop Phase 2 in a way that the right balance is taken between the initial capital costs and appropriate provision being made for future growth. The signalling is being designed to accommodate future service levels post 2027. New stations are being designed for future growth and existing stations are being assessed to ensure capacity is sufficient for future growth.

6.15. Once the link between Oxford and Cambridge is completed, additional services will be added further enhancing rail connectivity on the corridor. This is planned to include through services between Oxford and Cambridge as well as additional services between Bletchley and Cambridge and train lengthening.

6.16. The Alliance agreement provides the Client the flexibility to complete the development work using the Alliance, then instruct detailed design and delivery scope to the deliverers in discrete sections. There is no obligation on the client to instruct all of the sections to the Alliance. Should there be scope change in future due to increased future demand or performance issues with the supply chain, specific sections may be redesigned or remitted to other suppliers if required. The full EWR2 is currently intended to be instructed to the Alliance.

# Output based specification

6.17. The Department for Transport (DfT) has previously instructed Network Rail on the outputs of the East West Rail programme, included in the High Level Output Specification (HLOS) for Control Period 5 & 6, through the “Output Specification” document. Network Rail in turn instructs the East West Rail Alliance in a separate “Sponsor’s Instruction” document. The ownership of the "Output Specification" document now sits with the EWR Co, with DfT setting government's requirements through a new "Project Development Agreement".

6.18. The Output Specification describes at a high-level the key infrastructure items being developed to enable delivery of the preferred train service specification. This helps provide a clear baseline as to what the infrastructure scope is, which can form the basis of future change control through the Programme Board. The latest version of the Output Specification v3.3 can be found at Annex F.

6.19. The East West Rail Alliance will be responsible for delivering the EWR Phase 2 infrastructure project. The executed contract in place is the ‘Project Alliance Agreement’ (PAA) and includes as its purpose ‘The delivery of the Project and performance of the Works in return for specified payments’.

6.20. The strategic outputs of the scheme are specified at a sufficiently high level to leverage the expertise of the supply chain to provide efficient and innovate solutions that meet the intended outputs and do not restrict the suppliers to a pre-determined design.

6.21. EWR Phase 2 is a component of Network Rail's Enhancement Delivery Plan where the scope of works is defined as:

- Upgrading the existing Bicester Village to Bletchley freight line as a double track 100mph multi-functional railway capable of accommodating three passenger services each way per hour and existing freight paths and two additional paths per hour for freight and inter-regional services.
- Upgrading the existing Aylesbury to Claydon Junction freight line so it can accommodate one passenger service each way per hour and existing freight paths.
- Minor upgrading of the existing Bletchley to Bedford passenger railway to accommodate one additional fast passenger service each way per hour
- New station at Winslow.
- New high-level platforms and track remodelling at Bletchley
- New and enhanced overline structures to be constructed to W10 or W12 + electrification loading gauge

6.22. New train services on EWR Western Section are intended to be phased with come services coming in to operation from the end of 2023 and some to follow in 2024.

# Procurement Strategy and Sourcing Options

## Infrastructure Enhancements

6.23. An Alliance of Atkins, Volkerrail and Laing O'Rourke has been selected to undertake the delivery of the infrastructure works as described in the June 2018 OBC submission. The work package structure was broken down into 4 disciplines and Alliance Members, also known as Non-Owner Participants (NOP's) were selected on a best for project basis and for their individual expertise in executing the packages as follows:

i) Structures, Property and Civils – Laing O'Rourke

ii) Permanent Way (Track) – VolkerRail

iii) Overhead Line Equipment (OLE) and Distribution – VolkerRail

iv) Signalling and Telecoms – Atkins

6.24. Together with Network Rail these suppliers constitute the four Participants of the PAA with responsibility for delivering the EWR Phase 2. Under the PAA, Network Rail has a dual role as a Participant and as Owner acting as the contractual counter party to the Alliance. These roles are performed by 2 separate entities within Network Rail. The 'Owner' team are separated from the Alliance and perform the role of Client. The delivery team within the Alliance who are employed by Network Rail act as part of the supply chain with separate teams, systems and governance.

Since award, the DFT has de-scoped the electrification works and there is no longer a requirement for further work in this package (the Strategic Case covers the de-scoping of electrification infrastructure).

## Rail services operating model

6.25. In 2018 EWR Co developed an initial rail operations / franchising strategy, work on which is reported to and overseen by the Western Section Oversight Board (Chaired by the DfT SRO and also comprising EWR Co and NR). This will continue to be developed and take account of the ongoing Williams Review of rail franchising.

6.26. EWR Co and DfT need to decide how it will procure an operator of passenger services for the Western and Central sections of EWR. The purpose of the work being undertaken is to provide structure for the evaluation of the franchise options available to EWR, to:

- Clarify the passenger service-related objectives which should be supported by the choice of operator; and
- Identify any specific constraints or must haves, relating to preparing to operate and the operating environment which might influence from where EWR sources the operator.

6.27. The plan to complete this work consists of a number of stages consisting of the following activities:

- Agree the Critical Success factors
- Define and understand the constraints
- Develop summary document and long list of options to engage with stakeholders
- Evaluate long list to short list
- Agree evaluation criteria for short list and evaluate options
- Produce summary report with defined options

The intended outcome of this work will inform a decision on the options that are to be taken forward with DfT to deliver the franchise most suitable to the operational model required. The key driver for early delivery of this work is to establish if the Chiltern franchise (up for renewal) is the most appropriate vehicle for inclusion of EWR2 services.

6.28. The Williams review into the organisational and commercial frameworks of the rail industry is currently ongoing and is intended to publish its findings in autumn 2019. The franchise evaluation work that is currently being undertaken by EWR Co is to assess the options for the Western section franchise/operation against a set of agreed critical success factors for the project designed to identify the ‘best’ option ‘franchise’ model to recommend to the DfT, based on what is known today. The programme for this current work is driven by DfT timeframes for franchise renewals or direct award (if a Chiltern DA or renewal is the identified option) if this is the chosen option. Findings and recommendations that arise from the Williams review will be considered and incorporated in the operator procurement where possible and appropriate.

6.29. There has been a significant level of work undertaken to date culminating in a long list of options. Work is now focused on the next stages of evaluation (including but not limited to inclusion in existing franchises such as Chiltern and a new separate franchise). This work will be completed and the strategy to be taken forward is intended to be included in the submission of the FBC in 2019. Further milestones are:

- 2019 Rolling stock option selection (June)
- 2020 Rail operations option selected, franchise or alternative option (Jan)
- 2021 Franchise awarded, if that option is progressed (June) or alternative option progressed / awarded (Nov)
- 2023 Train procurement complete, trains accepted (Aug)

# Payment

6.30. Broadly speaking the payment mechanisms for different sections fall into two categories:

- Reimbursable costs – for project mobilisation, preliminary design and consents, typically GRIP stages 2-3. Some or all of GRIP 4, single option development and design may also be under reimbursable costs. Under reimbursable costs Network Rail bears the full risk of any under or over spend.
- Target Price – for detailed design and construction (GRIP 5-8) of the geographically defined physical sections of work. Under the Target Price mechanism, the parties agree a 'Target Price' for the works. Within certain parameters any over or underspend against Target Price is shared amongst the Alliance Participants including Network Rail. Under the Target Cost mechanism, the design development, construction productivity and programme prolongation risk is partially transferred to the supply chain. Some of this risk is retained by Network Rail under the pain/gain regime, acknowledging the client's role in controlling scope creep, preferential engineering, statutory permissions and access to site.

6.31. The process for agreeing the Target Price is set out in the PAA and is independently assessed before agreement by the Participants and Network Rail as owner. This will also be subject to scrutiny at the normal Network Rail authority processes as well as funding approvals from DFT at the Programme Board. If the Actual Cost of the project exceeds the agreed Target Price then the difference ('Painshare') is shared by Network Rail and the remaining three participants in the ratio of 50/50. The non-Network Rail participants are jointly and severally liable for any loss, but this is capped to the extent of the fee that they would expect to earn on the project.

6.32. If the Actual Cost for the project is less than Target Price ('Gainshare') then this is shared between Network Rail and the Participants on a sliding scale basis to a maximum ratio of 25 Network Rail to 75 non-Network Rail Participants. This point is reached when Actual Cost is less than 92.5% of Target Price.

6.33. The agreed Target Price will include an element of project contingency which will be based upon a quantified risk assessment of the risks facing the project. The risk pot will be allocated and held against each risk line item and its release and use is governed jointly by

the Alliance including Network Rail. A proportion of the contingency pot will be controlled directly by Network Rail and thus falls outside of the Target Price. This will be for risks that the Alliance cannot directly influence or control. A separate contingency allocation is to be controlled by EWR Co for strategic and industry integration risks.

## Pricing Framework

6.34. Underpinning the PAA are certain key principles and commitments. Importantly, all parties acknowledge that the key purpose of the agreement is to achieve a value for money outcome in respect of the project. The PAA includes a 'VfM Statement', effectively a detailed project scope that the parties commit to deliver, and an Alliance Charter which sets out the behaviours expected by the parties to facilitate the delivery of the VFM Statement. All parties commit to a 'Best for Project' approach, the contract is open book, has audit arrangements and a 'no-blame' culture.

6.35. The PAA allows Network Rail to call off different sections of work from the Alliance. These sections of work can relate to either a generic phase of work, such as design, or a physical geographically bound piece of work, such as construction on the Bedford to Bletchley line.

6.36. Although all the expected sections of work are included in the PAA, Network Rail has flexibility as to how it calls off the work and does not have to call all the sections or, in the event that Network Rail is not content with an Alliance member proposal, reserves the right to use alternative suppliers to deliver the works if it believes that will result in better value for money. This flexibility helps Network Rail ensure that it secures the desired outcome. A separate procurement would be required should Network Rail elect to use alternative suppliers.

6.37. If Network Rail wishes to proceed with a section, it issues a Section Development Notice to the Alliance. The Alliance responds with a Section Development Proposal that Network Rail reviews in detail as Owner and can then decide whether to instruct or reject. The Section Development Proposal includes dates, price information and a gap analysis with the VFM statement which are all examined as part of the Network Rail review process. As part of the estimating process Network Rail and the Alliance are required to benchmark their pricing against other similar schemes to verify that efficient commodity unit rates are achieved. The estimate is subject to independent cost assurance by a 3rd party consultant procured by Network Rail for this purpose. The estimate and programme that form the basis of the section proposal and the independent estimate assurance report are subject to further review and challenge by EWR Co prior to any funding recommendation being made.

6.38. The PAA also allows for contract adjustment events and scope variations which fall outside the Target Price. In such a scenario, the scope variation or adjustment event is subject to a change process. The Alliance Leadership Team, which always must be unanimous and includes Network Rail as participant, has to determine the effect of such a variation and notify Network Rail as Owner. The ALT will work with the Alliance auditor to determine the impact. This could include a change to Target Price. Sponsor's Instruction and Scope Variation Instructions shall also require the approval of EWR Co

6.39. The Alliance participants acknowledge, as part of the PAA, that it is the fundamental obligation of the participants to demonstrate, ensure and deliver value for money in performing the works. To demonstrate that value for money outcomes are achieved, the participants have agreed that Network Rail may benchmark the performance of each participant against the performance of other works or projects similar to the project. This applies both to both reimbursable costs and the Target Price payment mechanisms.

6.40. EWR Co shall participate in the review and challenge of Network Rail and Alliance cost estimates and delivery schedules to further assure economical delivery.

6.41. Performance against Target Price is measured every four-week period. This includes the financial performance for the 4-week period under review as well as the latest AFC. Any resultant gainshare or painshare is further modified by an incentive regime included in the PAA.

6.42. The incentive regime is based upon 'Key Results Areas' (KRAs). These KRAs are measured and reported against every period. For Stretch Performance against KRAs, Gainshare is increased or Painshare is decreased. For Poor Performance against KRAs, Gainshare is decreased or Painshare in increased.

6.43. The KRAs and their weighting are set out below:

- 16% Health & Safety
- 10% Design Management
- 8% Commercial
- 8% Programme Management
- 8% Quality
- 9% Continuous Improvement and Innovation
- 12% Collaboration and Behaviour
- 12% Sustainability
- 7% Engagement
- 10% Alliance defined

6.44. If performance in every KRA is maximised in every area, then the gainshare is augmented by +50% and painshare by -40%. If the KRA is failed in every area, then the gainshare is augmented by -58% and painshare by +50%. In practice, a mixture of KRA scores is likely and the painshare / gainshare modifier is likely to fall between these ranges.

# Charging Mechanisms

6.45. The mechanism for recovery of costs for operators using the Western section of EWR2 will be based on the current access arrangements that are in place through the ORR regulatory track access arrangements at the time.

# Risk Allocation and transfer

6.46. During the development phase Network Rail bears the cost risk under a cost reimbursable arrangement with the Alliance for the development scope items. The Target Cost is agreed at the start of the delivery phase such that risk is shared and all parties have aligned interests to complete the delivery phase of the project as efficiently as possible. The

agreement of the Target Cost for the whole scheme is intended to align with the FBC approval.

6.47. Under the PAA Target Cost arrangement the risk of efficient and economical delivery is shared between the client and the suppliers. The Alliance acts as a single organisation with regard to risk allocation and ownership. This means under the contract a risk is either held by the Alliance or it is held by the Network Rail as Infrastructure Owner.

6.48. Risks that are owned by the Alliance are shared between the 3 non-owner participants and the owner participant, Network Rail. This reflects the client's role in controlling change as set out in 1.24 above.

6.49. Within the Contract document is a risk register which assigns the risk ownership for risks arising from certain circumstances. This broadly transfers all design development, construction and prolongation risk to the Alliance, and retains externally driven scope change risk with Network Rail as Owner.

6.50. The Alliance agreement does not include any liquidated damages for delay on key programme milestones. The impact of programme prolongation on the actual cost combined with the weighting factors from the KRAs incentivises the Alliance to deliver the programme in a manner that balances schedule achievement with economical delivery.

6.51. The main commercial risks that arise as a result of the Alliance arrangement reside during the cost reimbursable and target cost setting stages. During this phase of the project it is in the suppliers' interest to develop the scheme and Target Price estimate to maximise the opportunity for gainshare. Then after the target is set, the supply chain is incentivised to drive down actual costs, thus maximising gainshare and mitigating downside risk. For these reasons it is essential that a thorough assessment of the Target Price is undertaken, including the underlying design, scope and quantities on which it is based, and this is established as the project baseline from which future change will be measured. The Target Price shall be subject to verification and assurance by an independent assessor. The estimate shall be subject to the Network Rail estimating governance. The overall process for developing and assuring the estimate shall be validated by EWR Co

6.52. One of the biggest uncertainties in the project is the time taken to secure the TWAO required to construct the EWR Phase 2. Typically, it is 18 months from submission to issuance of order, but the process can often take longer than this. Given this uncertainty, which will affect the ability of the Alliance to form a view of risk around project commencement and duration and thus Target Price, Network Rail has deferred Target Price agreement until Q3 2019, when there will be more clarity over the TWAO process. In the interim, a package of enabling works will need to be agreed under reimbursable costs with the Alliance. This approach has been agreed because Network Rail believes that it will result in a better value for money solution, benchmarked against other similar projects. The limits of cost reimbursable and target cost elements of scope shall be clearly defined in the Section Development Notice.

6.53. The HS2/EWR Co interface area at Calvert presents an interface risk relating to two rail systems running in parallel in a joint corridor (pre and post construction). This risk is being mitigated by close working with the HS2 project but also by having HS2 undertake civil

engineering earthworks for EWR in the interface areas. As this interface matures, programmatic issues are being identified and both parties are investigating mitigation measures to bring both delivery schedules forward. Additionally, EWR Alliance is holding joint Interdisciplinary Reviews (IDRs) and Interdisciplinary Checks (IDCs) working with High Speed 2 On Network Works to monitor progress and resolve challenges on the development of an aligned programme.

6.54. The formation of EWR Co also provides an opportunity to manage Network Rail more closely and to provide additional expert challenge and scrutiny to the scheme over and above that provided by DfT.

6.55. The principal strategic programme level risks are set out in Table 6-2 below. In EWR Co these are mainly owned by Geoff Leffek (Western Section Delivery Director):

**Table 6-2**

Principal strategic programme level risks

| Risk title / owner | Risk Detail | Mitigating Actions | Timing |
|---|---|---|---|
| Delay to TWAO Approval (Geoff Leffek) | **Cause:** An accelerated timeframe of 13 months for TWAO approval is assumed in the schedule to conclude September 2019. It may not be possible to resolve all of the objections during the public inquiry. **Impact:** Delay to commencement of environmental mitigation works, enabling and permanent construction works, resulting in overall programme prolongation causing delay to EiS date and additional indirect costs. | NR led on the TWAO process, EWR Co (along with DfT) are providing oversight and ensuring: | |
| | | 1. Early and active stakeholder engagement to ensure approval is as timely as possible and resolution of objections prior to public enquiry. | March 2019 |
| | | 2. Progression of separately consented enabling works under permitted development rights. | Ongoing |
| | | 3. Delay to establishment of final project budget until TWAO approval is better understood | March 2019 |
| Delay to HS2 Interface Milestones (Geoff Leffek) | **Cause:** HS2 Ltd programme prolongation as a result of ground conditions, design development or other internal HS2 issues. **Impact:** Delay to handover of OXD and MCJ civil works from HS2 Ltd to Network Rail and EWR Alliance resulting in overall programme prolongation causing delay to EiS date and additional indirect costs. | 1. Delay to establishment of final project budget until HS2 Ltd programme is stabilised. | February 2019 |
| | | 2. Re-assessment of proposed engineering solutions and scope split between HS2 and EWR to protect EWR programme. | February 2019 |
| | | 3. Escalation to DFT for priority decision. | February 2019 |
| Cost risk (Geoff Leffek) | NR work on design has led to a list of risks and issues which could increase GRIP 4 capex cost significantly (covered in financial case). In addition, operating costs are to be reviewed in more detail prior to FBC (including depot and train maintenance). | EWR Co engaged with NR to scrutinise and resolve the Target Cost for the full duration of the programme as early on as possible. An operating cost assumption review is ongoing, integrated with rolling stock and franchise strategies. | March 2019 |
| Franchising Strategy (Geoff Leffek) | In early stages of definition and could miss key decision points for rolling stock and depot/stabling. | EWR Co have now developed initial rail operations and rolling stock strategies which are being integrated into the configuration plan and are being oversee by the Western Section Oversight Board. | June 2019 |
| Timetable (Geoff Leffek) | That the full EWR western section train service specification is not viable without additional cost or significant changes to other services and / or EWR CO do not secure the require train paths. | Recent work by the Concept Train Plan Working Group has provided a high-level assessment that the full timetable is viable without significant disruption to other services. More detailed work is ongoing and performance testing is expected to commence in summer 2019. | Next phase of CTPWG work complete April 2019 |
| Cross government integration (Will Gallagher) | Failure of integrated cross Whitehall programme – misalignment could reduce benefits for the corridor, particularly alignment with housing policy | Cross Whitehall meetings are ongoing involving EWR Co who are presenting plans and ensuring they are aligned to the integrated government approach. | Ongoing |

## Contract Length

6.56. The PAA does not define a completion date nor sectional completion dates. The contract remains in place until 12 months after the date of certificate of substantial completion of the final section to effectively deal with defects. Network Rail may terminate the contract at any time but is liable for any reasonable costs of termination incurred by the Participants.

## Human Resource Issues

6.57. The PAA does not envisage that TUPE applies to the project since the Alliance itself does not constitute a legal entity, and personnel working on the project remain paid for and on the books of their parent Participant. There are certain obligations on all Participants to name certain senior individuals and their deputies for key roles within the Alliance such as Alliance Manager (effectively the Project Director), and the Participants and Owner Representatives.

## Contract Management

6.58. The Alliance project team is already in situ and the project office is based in Birmingham. The team is currently recruiting to increase its capability as it moves through the design and consents stage and towards the construction phase.

6.59. The construction enabling works commenced in November 2018. Permanent Works will commence from September 2019 after award of the TWAO. Construction work is expected to continue until as late as 2024.

6.60. Contract management processes are set out in the PAA. The Alliance, including Network Rail, formerly monitors and evaluates the programme at periodic (every four weeks) Alliance Leadership Meeting. A periodic report is issued in advance of the meeting by the Alliance to the attendees. The contents of the report are largely dictated by the PAA and include as a minimum:

- Work status reports
- Key results areas performance reports (contractual KPIs)
- Health and Safety Report
- Earned value report including:
- Reconciliation of reimbursable cost v target price
- Innovations of break throughs
- Risk Management performance
- Cash flow

6.61. Summary of Key Principles under the PAA

- Network Rail plays a dual role, as owner of the Project and separately as an Alliance Participant jointly responsible for the delivering EWR- 2 with the Non Owner Partners (Supply Chain Contractors);

- Most project risks are shared Alliance Risks, jointly held between Network Rail and the NOPs;
- Time, cost and quality failures relating to the Works are generally shared Alliance risks, meaning that Network Rail cannot make claims against the NOPs for time, cost or quality failures and vice versa;
- Commercial risk is shared through a joint Alliance target cost and pain/gain share model;
- Most decisions relating to Project matters are generally jointly made between Network Rail and the NOPs

# Client Programme Management

6.62. The relationship between Network Rail and EWR Co is set out in a Memorandum of Understanding between the two organisations, known as the Protocol Agreement. This document details the controls and commercial levers that are available to EWR Co to monitor and influence efficient and economical delivery of the scheme.

6.63. EWR Co shall be responsible for scrutiny and acceptance of the baseline project budget and delivery schedule which make up the Section Development Proposal.

6.64. Risk exposure and programme contingency shall be divided between the organisations, with risk ownership assigned to the organisation that is best placed to manage it. The Alliance shall manage their risk exposure and shall have control of their own contingency budget up to a limit included in the target cost.

6.65. Network Rail shall hold NR Sponsor and Owner Contingency up to a limit included in the Protocol Agreement.

6.66. Contingency and risk exposure for client and strategic risk shall be held by EWR Co

6.67. Schedule contingency shall be reflected in the programme in the form of time risk allowance. This shall also apply to interface milestones between EWR2 and HS2. The use of time risk allowance on key milestones shall be governed by the change control process, which shall require different levels of approval depending on the milestone.

6.68. Change Control – Should a change arise that requires drawdown of Network Rail or EWR Co contingency, then a formal change control process shall be followed where EWR Co may authorise or reject use of programme continency.

6.69. EWR Co authorisation shall be required for all top down change (Sponsor's Instructions, Scope Variation Instructions) to be instructed to Network Rail or the Alliance. This shall be governed by a formal change control process.

6.70. Each period a Progress Report is issued by Network Rail and a progress meeting is convened between Network Rail and EWR Co EWR Co use these forums support the deliverers with client and strategic interface issues and to hold them accountable for delivery.

6.71. As the relationship develops between the organisations further client management controls shall be established including engineering review and joint risk and opportunity management.

# Annex A: What's changed

## Changes from June 2018 and December 2018

6.72. Changes from the June '18 OBC, and for strategic and economic cases from the published December '18 version. Overall change is rated minimal / modest / significant:

- **Strategic case** – significant change (from December '18 published version). DfT requested sections from the June '18 OBC were added back and updated:
  - Preferred route and train service and consideration of alternative discounted options (para 2.57)
  - Infrastructure enhancements and changes to previous specification (para 2.60)
  - Constraints and impacts to other services (para 2.70)
  - Inter-dependencies (para 2.80)
  - Franchising and rolling stock strategies (para 2.83)
  - Oxford to Cambridge Expressway (para 2.92)
  - Risks to benefits and cost (2.95)
- **Economic case** - modest change (from Dec '18 published version). Core content remains the same, but the following has been added:
  - BCR sensitivity results (para 3.12)
  - Changes in BCR from June '18 (para 3.13)
  - Train service specification deliverability (para 3.22): the current assessment is the full EWR Phase 2 TSS is viable (with further work on going)
  - Expressway (para 3.27): current evidence suggests it has a limited impact on our benefits

- Capex (para 3.33): added in some evidence from DfT on reference class forecasting, indicating our contingency (51%) currently appears reasonable.
- Opex (para 3.39): added BCR sensitivities of 3 and 4 car trains and on development and refinement of cost assumptions going forward.
- Modelling assurance and limitations added (within Annex C)
- Record of all modelling and appraisal assumptions added (Annex E)

- **Financial case** – modest change (from June ’18)
  - Inclusion of summary of interim funding request (para 4.2)
  - Plans to progress to GRIP4 target price (para 4.6)
  - Updated operating costs section (para 4.15)
  - CP6 funding flows arrangements (para 4.29)
  - Changes since GRIP3 cost estimate (4.42)
- **Management case** - significant updating and change (from June ’18)
  - Significant updates on: governance / programme plan / programme reporting / risk management / assurance and approvals / communications and stakeholder management
  - Modest update of benefits realisation plan (Annex G)
- **Commercial case** – minor/modest change (from June ’18)
  - Updates throughout including rail services operating model (franchising strategy) section (para 6.25)
  - Development of section on Commercial risk (para 6.51)
  - New client programme management section (para 6.62)

## Response to previous comments

6.73. EWR Phase 2 OBC was considered by CoEs and BICC in June 2018. The strategic and economic cases were updated and review by CoEs and BICC in December 2018 and were also published in the same month[50].

6.74. The following table summarises key comments from DfT CoEs (from June and December 2018) and additional feedback from BICC. It also summarises the response.

| Comment | From | Response | |
|---|---|---|---|
| **Strategic Case** | | | |
| 1. Not a clear metric of success on housing e.g. how much more housing will this scheme unlock? How far will the scheme address the overall strategic objective of delivering c.15,000 additional houses each year? | CoE<br>June '18 and Dec '18 | Analysis on 'intermediate' and 'higher' growth scenarios (with additional housing) have been added to the economic case, along with resulting level 1 and 2 benefits. However, there is no specific objective or estimate for additional homes dependant on / unlocked by EWR Phase 2. In part this will be dependent on factors including future housing deals, local policy and completing EWR central section. Whilst land-use modelling has been undertaken since June '18 it does not currently provide a sufficiently robust estimate on the specific number of homes that result directly from the scheme. The potential benefits of additional housing resulting from the scheme will continue to be an area of further work for FBC and SOBC of central section. | |
| 2. 'Pinch points' relating to the existing rail network (including Oxford station) are noted and led to descoping a Oxford-Didcot-Reading service. Does the scheme still deliver the strategic vision? Could the OBC set out the extent to which the preferred option address the problems identified. | CoE<br>June '18 | Train Service deliverability work has been under active review and is reported in the Economic Case (TSS deliverability, from para 3.22)<br>How EWR Phase 2 meets strategic objectives section added (Para 2.39) | |
| 3. Explain the process for option selection | CoE<br>Dec '18 | Added back 'preferred route' and 'discounted options' sections from June '18 OBC (from para 2.57) | |
| 4. Include interaction with Ox-Cam Expressway | CoE<br>Dec '18 | Section added (from Econ Case) on Expressway, common to the economic case (from para 2.92 and 3.27) | |
| 5. Interaction with completing EWR (central section to Cambridge) | BICC<br>Dec '18 | The strategic case talks about completing EWR to Cambridge and the strategic narrative is broadly common to the whole scheme. However, the OBC remains focused on EWR Phase 2. | |

[50] https://www.gov.uk/government/publications/the-case-for-east-west-rail-western-section-phase-2

| | | | |
|---|---|---|---|
| | | The economic case notes work, ongoing, to integrate modelling of western and central sections (para 3.16). | |
| **Economic Case** | | | |
| 6. Lack of dynamic land-use change modelling / dependant housing | CoE<br>June '18 and Dec '18 | See answer to 1. | |
| 7. Wider set of sensitivity tests | June '18<br>CoE | A wider set of sensitivities was undertaken in November 2018 prior to publication of the economic case and has been added at para 3.12 | |
| 8. BICC comment on whether 18% OB was appropriate | Dec '18<br>BICC | QCRA plus 18% at level (GRIP) 3 is standard webTAG recommendation which has been applied. This gives a current contingency of 51% in the economic case cost. DfT subsequently shared results of independent analysis conducted by Oxford Global Projects (OGP) using 'Reference Class Forecasting' (RCF) indicating the P-mean for the reference class at OBC was 39% (well below the 51% currently applied). | |
| **Financial Case** | | | |
| 9. Continue to challenge costs | CoE<br>June '18 | Para 4.29 outlines EWR Co's responsibilities for approving the budget, reviewing and authorising payments to Network Rail and controlling access to contingency funds. | |
| **Management Case** | | | |
| 10. Clarify EWR Co roles in delivering the project | CoE<br>June '18 | The management case is being significantly updated including governance / programme plan / programme reporting / risk management / assurance and approvals / communications and stakeholder management | |
| **Commercial Case** | | | |
| 11. Lack of detail on the process of evaluating Section Development Proposals | CoE<br>June '18 | Para 1.44 has been updated to include more detail on the Network Rail and EWR Co processes to evaluate Section Development Proposals.<br>From para 1.69 sets out the responsibility for EWR Co to approve the project baseline and authorise future instructed top down change. | |

| | | | |
|---|---|---|---|
| 12. Provide further details on the commercial risks that may exist through the alliancing arrangement. | CoE<br>June '1 | Para 1.53 explains the contract commercial risk that exists through the alliance arrangement and the necessary prioritisation of client activities to assess the baseline Target Cost.<br>Control of contingency and change set out from Para 1.69. | |
| 13. It would be helpful to understand what assessment has been carried out into alternative station designs at Bedford and whether greater investment could deliver greater capacity and, thus, higher BCR. | CoE<br>June '18 | The use of the bay platform at Bedford is an interim solution that is not used in the final operational arrangement. Additional works to extend the platform at Bedford for 4 car service would involve significant stations and structural works to enable the overhead line system to be raised to achieve compliant clearances to the public on the platform. There is insufficient forecast passenger growth during the interim period to justify the additional investment to extend the platform. | |
| 14. What contingency for the HS2 programme has been built into the delivery timescales and what tolerance to delay exists? | CoE<br>June '18 | Para 6.67 has been expanded to highlight the ongoing engagement and activities of both parties to mitigate schedule risks arising as a result of this interface. It also sets out the programme strategy for management of float or time risk allowance.<br>Time risk allowance has not been added to milestones where EWR2 is the receiving organisation because the expectation is that HS2 will deliver by the dates to which they and DFT commit. This risk is best understood by the organisation undertaking the works, therefore it is normal practice for this organisation to reflect time risk allowance in their programme. | |

# Annex B: Local policy in support of EWR Phase 2

This table is taken from Network Rail's Statement of Case for EWR Phase 2 Transport and Works Act Order application[51].

| Document | Policy |
|---|---|
| Buckingham Thames Valley Strategic Economic Plan Refresh (2016-2031) | This plan forecasts Buckinghamshire's population will grow by 14.8% between 2013-2033 ranking the LEP area as the 12th fastest growing in the country and workplace-based employment will grow by an average annual rate of 1.1% a year. The plan recognises the importance of East West Rail and that it is 'delivered without unnecessary delay'. |
| Cherwell Local Plan 2011 – 2031 Part 1: adopted 2016 | Policy SLE4: supports key transport proposals, including projects associated with East West Rail. Appendix 8 contains the Infrastructure Delivery Plan and identifies East West Rail Phase 2 as a necessary project to 'support economic growth and new homes with better access to the national rail network'[52]. |
| Connecting Oxfordshire: Local Transport Plan 2015-2031 | The LTP sets out strategic rail priorities, including support to the EWR consortium and Network Rail in the design and delivery of EWR Phase 2. The LTP highlights that the scheme will improve connectivity between Oxfordshire and the east, in particular high-value growth areas around Milton Keynes and Cambridge and will improve opportunities for jobs and economic growth in the county. |
| Aylesbury Vale District Local Plan 2004 (Saved Policies) | Policy GP25 (Re-opening of rail routes) that states development will be resisted if it prejudices the use of the rail route running through the district between Bicester and Bletchley, as well as the northward link from Aylesbury. |
| Vale of Aylesbury Local Plan: Submission Draft | Policy S6 (Protected Transport Schemes) highlights EWR as a strategically important infrastructure scheme that directly impacts on the district; which identifies EWR as a Protected Transport Scheme. Development will not be granted if it would prejudice the implementation of EWR, including new stations. |
| Buckinghamshire County Council Local Transport Plan 4 - 2016 | The LTP highlights the economic benefits that EWR Phase 2 will deliver. It states that the scheme will help to stimulate sustainable economic growth not only in Buckinghamshire but also in Oxfordshire and Bedfordshire. It highlights that the delivery of EWR Phase 2 will support the England's Heartland alliance and the Buckinghamshire Thames Valley Local Economic Partnership's Strategic Economic Plan. It also states that the scheme could boost the regional economy by £72.7 million a year with a £33.2 million boost to UK tax receipts (based on the findings of an assessment of the economic impact of the Western Section undertaken by Arup).<br>Policies 4 and 5 state that BCC will work in partnership with key stakeholders to develop a reliable rail transport network that: provides |

[51] https://www.networkrail.co.uk/our-railway-upgrade-plan/key-projects/east-west-rail/western-section/

[52] Item 3 of the Appendix 8:Infrastructure Delivery Plan of the Cherwell Local Plan 2011-2031 (adopted July 2015)

| | |
|---|---|
| | effective access within the county; links us to the rest of the country; and is integrated with other modes of transport, including airports.<br>BCC will work to ensure that HS2 is built with minimal disruption to residents and that it brings benefits to Buckinghamshire: including a new East West Rail station in the north of the county and high-quality restoration of construction sites.<br>The LTP states that BCC will continue to work as an active member of the East West Rail Consortium, supporting the earliest possible delivery of East West Rail services. East West Rail will support economic growth, new housing and jobs. It connects Aylesbury to Milton Keynes, provides a new station at Winslow, and improves service capacity between Aylesbury and Princes Risborough. |
| Milton Keynes Core Strategy 2013 | Policy CS11 (A Well-Connected Milton Keynes) seeks to implement a number of measures to improve public transportation to meet the demand of the borough; including 'to engage with Network Rail and relevant stakeholders along the EWR line to identify operational benefits which thereby provide additional support for a more sustainable transport strategy and/or economic growth of the city'. |
| Plan: MK Submission Version | Policy CT4 (Public Transport) seeks to develop the quality and capacity in public transport through a number of measures, including supporting the development of EWR Phase 2. |
| A Transport Vision and Strategy for Milton Keynes: Local Transport Plan 3 (2011 to 2031) | The LTP emphasises that EWR Phase 2 will: "support economic growth and investment in new jobs and homes; provide for faster journeys between towns and cities to the north and west of London, avoiding the need to travel via the capital; provide an alternative to travel by road, reducing congestion and carbon emissions; and create increased capacity elsewhere on the rail network in the longer term".<br>The LTP also highlights that EWR Phase 2 will link the knowledge economies of Cambridge and Oxford with Milton Keynes providing additional economic benefits. It also expresses support for the direct connectivity to Reading, Oxford and Bedford that will be achieved through the scheme. |
| Local Transport Plan 3: The Central Bedfordshire Council Transport Strategy | The LTP highlights the intention of Central Bedfordshire Council to continue to support the EWR Consortium in delivering EWR Phase 2. |
| Bedford Local Plan 2035 | Policy 94S (Transport Infrastructure and Network Improvements) states that the Council will work with its partners, agencies and developers to deliver reduced congestion around the town centre and key strategic routes while promoting sustainable transport modes, through the consideration and the early provision of a number of strategic improvements, including the East West Rail Scheme. |
| Bedford Local Transport Plan 2011-2021 | The LTP highlights that the development of EWR Phase 2 will deliver improvements to rail infrastructure within the Borough. A key strategy is to "support the work of the EWR Consortium for the reinstatement of rail services between Oxford / Milton Keynes / Bedford / Cambridge". |

# Annex C: Further detail on demand modelling

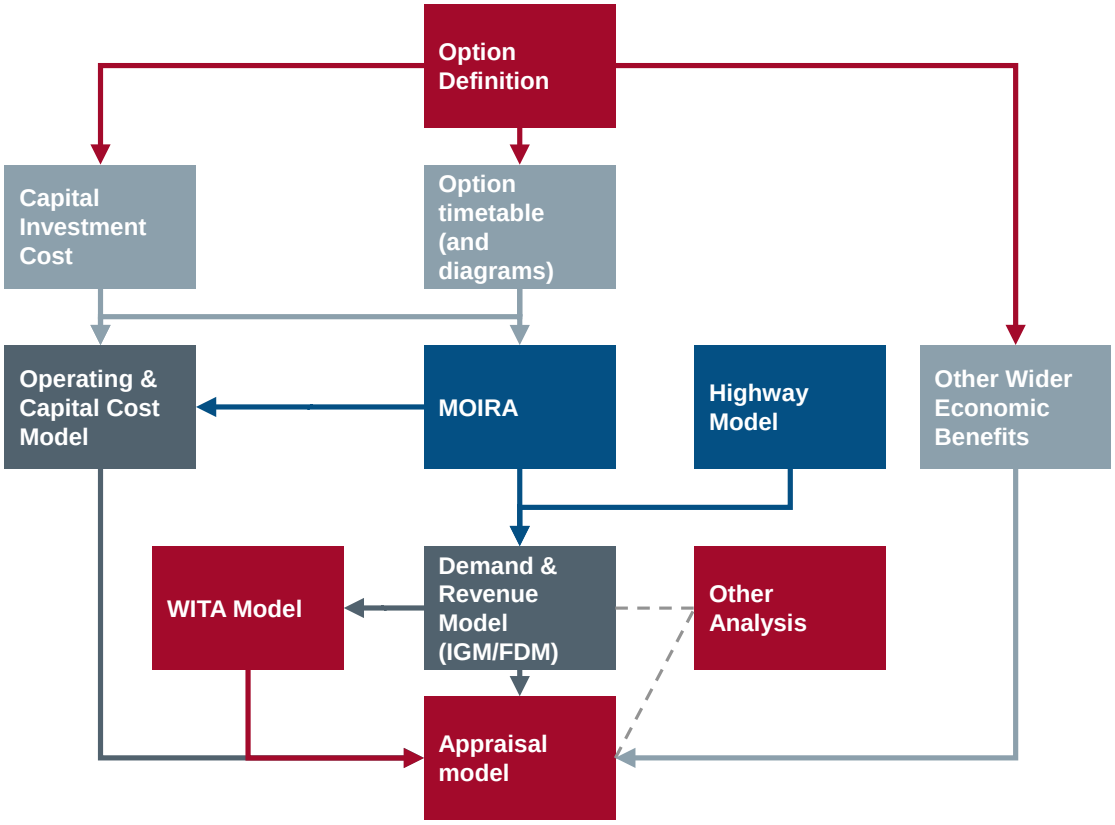
## Modelling rail passenger demand

DfT and EWR Co commissioned LeighFisher[53] consultants to assess the potential passenger demand and transport benefits from rail services enabled by EWR Phase 2.

LeighFisher developed a forecasting framework to undertake the economic appraisal and to produce the BCRs included in this economic appraisal. A diagram of the model suite created is given below.

**Figure C1**

EWR Modelling Framework




*Source: LeighFisher*

The model is primarily a rail-only model and forecasts demand between stations only. Generalised journey times are produced using the rail industry MOIRA software which takes into account journey time, frequency and interchange penalties. Within this model suite, a

[53] http://www.leighfisher.com/

gravity model specific to the scheme is used to forecast demand where changes in generalised journey time (GJT)[54] are significant (where they fall by 20% or more). This threshold is noted in PDFH as a threshold at which reliance on GJT elasticities may become inappropriate. In these cases, a standard GJT elasticity approach[55] would tend to underestimate demand. For example, the number of rail passengers between Oxford to Milton Keynes is currently very low, since there is no direct link and current GJT is high. Modelling the impact of EWR based on incrementally growing these low levels of rail passengers is not likely to produce a good estimate of demand.

The gravity model forecasts demand in the do something scenario (with EWR Phase 2) are modelled with reference to the attraction between origin-destination pairs based on factors including population, employment and GJT.

The gravity model was calibrated using data for 17,000 station to station flows across full, reduced and season ticket type categories for the 2016 rail year. Regression analysis was performed on the combinations of predictor variables, including population, employment and GJT.

The aim of the gravity model is to estimate what level of rail demand can reasonably be expected between places (Oxford to Milton Keynes for example) based on observations of what flows exist between places of similar gravity, or attraction, in terms of population, employment and other factors.

The gravity model elasticities are set out in Figure C2. The model is split into ten segments, with six sets of parameters for forecasting non-seasons demand and four for seasons demand[56]. The segments are based on flows either inside or outside the South East and above or below GJT thresholds set out in Figure C3 (once GJTs have been updated to reflect EWR central section services).

Figure C3 further defines the segments included in the gravity model and in Figure C2. The 'GJT criteria' in Figure C3 provides the 'GJT Threshold' referred to in Figure C2.

**Figure C2**

Gravity model elasticities for estimating demand for EWR

| | | **Non-Seasons** | | | | | | **Seasons** | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Region | SE-SE | SE-SE | Non-SE | SE-SE | Non-SE | Non-SE | SE-SE | SE-SE | Non-SE | Non-SE |
| | GJT Threshold | Low | High | High | Med | Med | Low | Low | High | High | Low |
| | GJT | -2.07 | -1.91 | -2.35 | -2.48 | -1.35 | -1.75 | -2.04 | -2.88 | -1.74 | -2.72 |
| | Average Fare/Mile | -0.70 | -1.47 | -1.51 | -1.12 | -0.87 | -1.03 | -0.71 | -1.28 | -1.34 | -1.19 |

[54] Generalised Journey Time (GJT) is a measure incorporating the total station-to-station journey time plus time penalties based on the frequency of service and the number of interchanges required. It is expressed in minutes of journey time.
[55] Paragraph 2.3.1 page 2 WebTAG Unit A5.3
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/715482/tag-unit-a5-3-rail-appraisal-may-2018.pdf
[56] Season tickets is all weekly or longer products such as weekly seasons, monthly seasons and annual seasons. Non-season includes all full and reduced tickets.

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Distance | 0.00 | 0.00 | 0.00 | 0.00 | -0.36 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Origin | Car Ownership | -2.42 | 0.04 | 0.00 | 0.00 | -1.47 | 0.04 | 0.00 | 1.98 | 0.00 | 0.00 |
| | Population | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.27 | 0.22 |
| | Employment | 0.37 | 0.51 | 0.50 | 0.57 | 0.37 | 0.54 | 0.40 | 0.31 | 0.00 | 0.00 |
| | GVA Per Capita | 0.00 | 0.28 | 0.00 | 0.00 | 0.00 | 0.44 | 0.00 | 0.09 | 0.00 | 0.00 |
| | Occupation: Class 1-4 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Destination | Car Ownership | 0.00 | 0.00 | 0.00 | 0.00 | -1.60 | 0.00 | 0.00 | -0.80 | 0.00 | 0.00 |
| | Population | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Employment | 0.69 | 0.74 | 0.68 | 0.69 | 0.41 | 0.58 | 0.48 | 0.40 | 0.33 | 0.41 |
| | GVA Per Capita | 0.49 | 1.13 | 0.00 | 0.00 | 0.00 | 0.52 | 0.00 | 1.16 | 0.00 | 0.00 |

**Figure C3**

Further definition of segments in the gravity model

| Ticket Type | PDFH Segment | Distance Criteria | Demand Criteria | GJT Criteria |
|---|---|---|---|---|
| Non-Seasons | South East | >10 | >5,000 | <60 (low) |
| Non-Seasons | Non-South East | >20 | >2,500 | <80 (low) |
| Non-Seasons | South East | >10 | >2,500 | 60-100 (med) |
| Non-Seasons | Non-South East | >20 | >2,500 | 80-120 (med) |
| Non-Seasons | South East | >10 | >1,000 | >100 (high) |
| Non-Seasons | Non-South East | >20 | >1,000 | >120 (high) |
| Seasons | South East | >10 | >2,500 | <60 (low) |
| Seasons | Non-South East | >20 | >2,500 | <60 (low) |
| Seasons | South East | >10 | >1,000 | >60 (high) |
| Seasons | Non-South East | >20 | >1,000 | >60 (high) |

From the demand forecast for the do minimum and do-something scenarios, transport user benefits are estimated. Due to the large changed in GJT reliance on the rule of half (i.e. assumption of linear demand curve) is inappropriate and therefore numerical integration has been used to assess the transport user benefits. The incremental demand generated also drives a gain in net national rail revenue which is netted form the costs in the BCR calculation.

In addition to GJT benefits EWR would also provide a fare saving to passengers, since it would provide a more direct route with lower mileage which is assumed to lead to a lower fare. This appears in the appraisal results as a "user charge" saving.

Some passengers making trips already between origins and destinations served by EWR would therefore see a fare reduction – this revenue loss is included in the overall revenue figure.

The modelling does not take into account any benefits from reduced crowding.

# Growth in rail passenger demand

A growth indexation model has been developed, to account for exogenous growth during the course of the appraisal period. The standard Passenger Demand Forecasting Handbook (PDFH) methodology, given in PDFH v5.1 Chapter B1 is used. Elasticities are from PDFH v5.1, except for: car operating costs (sourced from PDFH v5.0) and; fares elasticities (sourced from PDFH v4.0). This is in line with the extant WebTAG guidance in unit M4, table 1[57] at the time the model was developed.

Demand Driver Generator (DDG) growth forecasts from December 2017 were used to produce an index for the various drivers considered including forecasts of population and employment by MSOA as well as forecasts of GDP per capita, car ownership and the cost of travel via other modes. The values in the DDG forecasts for each of the drivers are converted into a cumulative index for each zone. A weighted average index is then calculated with the location of station demand across the UK and weighting being by demand across flows that benefit from EWR Western Section.

For intermediate and higher growth scenarios two further sets of demand growth inputs were produced by Network Rail and provided to LeighFisher for implementation in their modelling suite. These alternative population and employment forecasts were created based on the assumption discussed in paragraph 3.7. Starting from a consistent baseline growth forecast, increases in population are modelled in line with assumptions on additional dwellings outlined at paragraph 3.7. Employment is assumed to increase in line with increases in population.

Forecast demand growth for EWR Phase 2 is 2.1% in the base scenario and 3.4% in the high growth scenario (over the next 20 years).

# Model assurance

Leigh Fisher, working to DfT and EWR Co, have developed the modelling and appraisal underpinning the benefit cost ratio analysis in this economic appraisal in line with webTAG[58] and HMT Green Book[59] and have put considerable time and effort in to quality assuring their model and analysis.

Leigh Fisher followed a two-stage process, firstly the modelling leads implemented a series of checks and reviews as the models were built. Secondly, each model received a semi-independent review, by another Leigh Fisher analyst not involved in the model's construction. The structured quality assurance process included:

- Challenge and review of assumptions and methodology
- Formula and calculation review
- Sense-checking of outputs
- Model best practice and efficiency review
- Checking consistency between models and between different model runs

[57] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/712788/tag-unit-m4-forecasting-and-uncertainty-may-2018.pdf
[58] WebTAG https://www.gov.uk/guidance/transport-analysis-guidance-webtag Relevant WebTAG units include Rail Appraisal Unit A1.3 and Wider Economic Impacts Unit A2.1.
[59] https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-governent

DfT and EWR Co analysts agreed model inputs and scenarios to be run. Leigh Fisher presented emerging model run results to DfT and EWR Co which involved scrutiny of results, and testing the logic of results for example comparing different model runs.

DfT and EWR Co also asked a third party to review recent model developments and scenarios modelled in this economic case.

## Limitations and uncertainties

Despite the adherence to appraisal guidance and approach to quality assurance, as with all modelling and appraisal, some limitations and uncertainties remain. It is difficult to state with full certainty whether these are expected to materially bias estimates of demand and benefits one way or another, though efforts to deliver robust modelling that is proportionate to the size and scale of the project have been taken.

- There is a larger amount of inherent uncertainty than usual with the EWR scheme, as it connects large population centres that have not been connected for over 50 years. This means that there is no base data to underpin 'sense checks' of results, and it is hard to find identical comparator flows with similar population sizes, distances and GJTs that could be used as the basis for those checks. Neither have there been new inter-urban rail schemes that could be used as an example to use as a foundation for our expectations about how demand could change as a result of EWR, as this scheme is the first genuinely new rail link of its kind in decades.
- EWR is a transformative project connecting large population centres that have not been connected for over 50 years. It is hard to find identical comparator flows with similar population sizes, distances and generalised journey times to use the basis for sense checking the model. That said the model is calibrated on thousands of observations of rail flows between places to estimate the likely scale of demand for rail between EWR stations.
- To enhance the robustness of the Economic Case, we have developed both a Full Demand Model (FDM) with a Highway element, and can be used to estimate WEIs and take of account of the Expressway as required sensitivity. It has a detailed zoning structure built from the bottom up, and also a second Initial Gravity Model (IGM) to be used as a comparator for the demand modelling. This second model has been developed with less detail and at a higher level, and has served as a sense check for our appraisal.
- The Full Demand Model does not cover the full geography of all trips that could reasonable involve EWR. Some journeys neither start nor end within the fully modelled area, but still may benefit from EWR (Bristol-Nottingham). The IGM is used to estimate the additional trips and benefits from external-external journeys, addressing the FDM coverage issue. The FDM benefits have been scaled up by a factor to account for the lack of external-external trips.
- The base year data does not include the introduction of the full service from Oxford Parkway to Oxford which started service in December 2016.

- A standard hour approach, based on an off-peak hour, has been used to provide an initial timetable for this appraisal. Once Network Rail has developed and tested a final timetable, further analysis is likely to be completed to refine the economic results.
- Some wider economic impacts and other benefits are not quantified in this economic appraisal.

# Annex D: Projections of dwelling

| Geography | MHCLG Dwelling Stock in 2011 | Short Run Historic Delivery Rates | Long Run Historic Delivery Rates | National Trip End Model version 7.2 - Household projections | MHCLG data on local assessment of housing need, based on publicly available data sources | MHCLG Indicative assessment of housing need based on proposed formula |
|---|---|---|---|---|---|---|
| | 2011 | Average dwellings p.a. 2011- 2016 | Average dwellings p.a. 2001- 2016 | Avg. p.a. 2017 to 2039 | Average dwellings p.a., 2017 to 2026 | Average dwellings p.a., 2017 to 2026 |
| Oxford | 57,150 | 250 | 400 | 500 | 1,400 | 750 |
| Cherwell | 59,050 | 850 | 600 | 1,350 | 1,150 | 750 |
| Aylesbury Vale | 72,300 | 1,150 | 900 | 1,500 | 950 | 1,500 |
| Milton Keynes | 102,350 | 1,300 | 1,650 | 1,950 | 1,750 | 1,850 |
| Central Bedfordshire | 108,700 | 1,450 | 1,400 | 1,500 | 1,600 | 2,550 |
| Bedford | 67,500 | 950 | 800 | 1,200 | 950 | 1,300 |
| Total EWR Phase 2 LAs | 467,000 | 5,900 | 5,750 | 8,000 | 7,800 | 8,650 |
| Total NIC Arc | 1,346,200 | 14,500 | 14,850 | 19,800 | 20,050 | 21,050 |
| East Midlands | 1,694,350 | 12,550 | 14,900 | 14,100 | 14,750 | 16,350 |
| East of England | 2,530,900 | 20,050 | 23,100 | 31,250 | 30,400 | 34,700 |
| London | 3,363,350 | 28,300 | 29,500 | 38,850 | 40,400 | 72,400 |
| South East | 3,692,800 | 28,750 | 31,650 | 39,400 | 44,550 | 47,950 |
| England | 22,983,350 | 167,900 | 185,400 | 208,200 | 231,900 | 265,950 |

**Notes:**

- All columns refer to dwellings data, with the exception of NTEM as these represent household projections used as a proxy for the number of dwellings
- Figures rounded to the nearest 50 dwellings
- Dwellings data based on publicly available data sources including MHCLG Table 125: dwelling stock estimates by local authority district: 2001 to 2016, MHCLG Table 122: housing supply; net additional dwellings, by local authority district, England 2001-02 to 2017-18; Housing Needs Assessment and Local Plans from MHCLG Dataset published on Sept. 2017; DfT's National Trip End Model version 7.2 Household growth projections

# Annex E: Record of modelling and appraisal assumptions

(see separate PDF document)

# Annex F: Output specification v3.3

(see separate PDF document)

# Annex G: Benefits management and evaluation plan

**1. Introduction / Purpose**

As part of the strategic vision for the Oxford-Milton Keynes-Cambridge Corridor, there are two main transport programmes to help unlock economic growth, housing and employment in the area; these are the East West Rail programme and the Expressway. The East West Rail Western Section Phase 2 programme which will upgrade or reinstate the railway lines between Bicester Village / Aylesbury, and Milton Keynes / Bedford; allowing for the introduction of new passenger services and providing enhanced capability for future freight services. Phase 2 is part of the wider East West Rail programme which includes the already operational railway line between Oxford and Bicester Village, and is planned to develop further, including a new line between Bedford and Cambridge.

The purpose of this Benefits Management and Evaluation Plan is to describe the approach to the management of benefits and their realisation. The focus of this plan is solely on the new or enhanced infrastructure outputs of Phase 2 and its benefits, showing how they align with both its core strategic objectives outlined in the Strategic Case. Certain benefits will only be partially realised until completion of the whole East West Rail programme or wider corridor aspirations. These will also be managed in their programme's individual business cases and possibly part of a future joined up business case, ensuring they aren't double counted.

The Business Case which this plan aligns to is the Outline Business Case for Phase 2 to be approved by BICC in February 2019. The Full Business Case is anticipated to be completed upon the production of the target price by the East West Rail Alliance before September 2019. If the business case is subject to any change, including the possibility of a joined up economic appraisal for the corridor, the plan will be reviewed and realigned.

The approach used is aligned with the Rail Benefits Management and Evaluation Framework, while the measurement information and reporting arrangements are aligned with the Rail Group Benefits and Measurement Dictionary. The realisation of programme benefits is managed in accordance with the IPA guidance for effective benefits management in Major Projects.

**2. Identified Benefits**

To identify the benefits and dis-benefits arising from Phase 2, the outputs and enabling changes were recorded alongside the core strategic objectives and the Department for Transport's core priorities (DfT Objectives) outlined in the Single Departmental Plan. Benefits were then discussed

and linked between the two sides, in turn these were split between primary and secondary benefits. In this case, secondary benefits being those which are a result or due to the potential of the primary benefits. Primary benefits are those which result directly from the new or enhanced infrastructure, whereas the secondary benefits are realised over time and are driven by the initial primary benefits, including economic growth, housing and employment.

The benefits and dis-benefits and their inter-dependencies with outputs, enabling changes and objectives have been captured in the benefits map (Figure G1).

The benefits can be split into two main groups, Service Improvements and Wider socio-economic; within these groups, the two main groups that then emerge are Passenger Service Improvements and Economic growth, Housing and Employment.

The prioritisation of benefits has been based on four aspects; contribution to project objective, stakeholder perception, reach of realisation and scale of realisation. The top benefits being taken forward have been identified in this process, split into 'primary' and 'secondary' benefits and their rationale linked to the strategic case. This can be found below in table 1.

**Table 1: Benefits Priority List**

| **Priority** | Primary / Secondary | Benefit / Dis-benefit Name | Rationale |
|---|---|---|---|
| **1** | Primary | Improved connectivity | Main driver for programme. Aligns with NIC recommendations to aid realisation of economic and housing opportunities. |
| **2** | Primary | Reduced journey times | Aligns with NIC recommendations to aid realisation of economic and housing opportunities. |
| **3** | Secondary | Increased/better access to jobs | Supports broader corridor's objectives relating to economic growth and jobs. |
| **4** | Secondary | Unlocked housing potential | Supports broader corridor's objectives relating to economic growth and housing. |
| **5** | Secondary | Agglomeration | Supports broader corridor's objectives relating to economic growth, housing and jobs. |
| **6** | Primary | Increased and new passenger capacity | Aligns with NIC recommendations to aid realisation of economic and housing opportunities. |
| **7** | Primary | Increased service frequency for some origin destinations | Aligns with NIC recommendations to aid realisation of economic and housing opportunities. |
| **8** | Secondary | Mode shift to rail travel | Supports broader corridor's objectives relating to a sustainable transport solution. |

| | | | |
|---|---|---|---|
| **9** | Primary | Enhanced freight capabilities | Supports broader corridor's objectives relating to freight. |

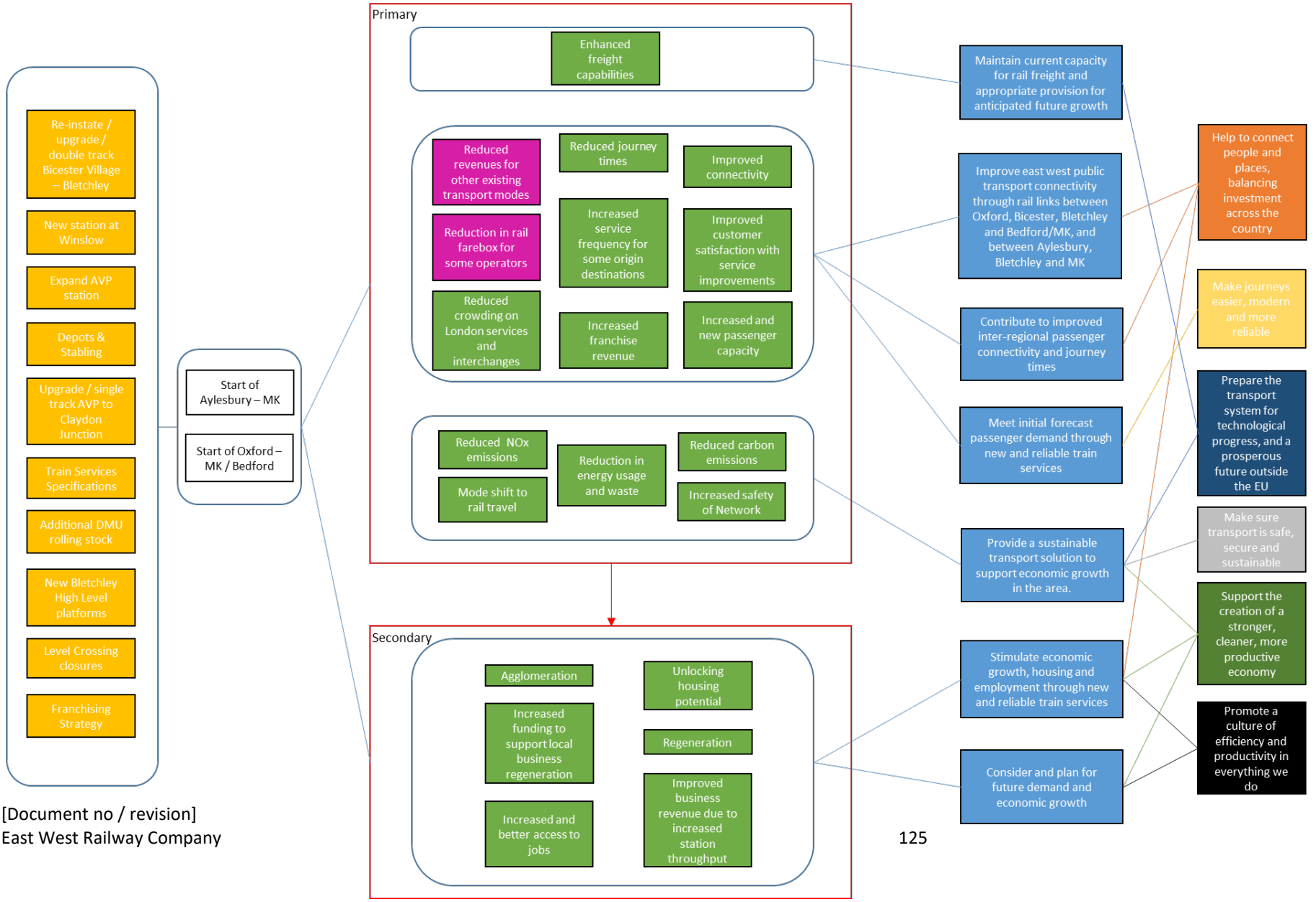
Other benefits include:

- Reduced crowding on London services and interchanges
- Improved customer satisfaction with service improvements (Oxford-Bicester/Bletchley-Bedford)
- Increased franchise revenue
- Reduced NOx emissions
- Reduction in energy usage and waste
- Reduced carbon emissions
- Increased funding to support local business regeneration
- Regeneration
- Improved business revenue due to increased station throughput
- Increased safety of network
- To support the Benefits Map and Benefits Priority list, a Benefits Profiles sheet which includes detailed information regarding measurement and ownership, has been attached at the end of this.

# East West Rail Western Section Phase 2 - Benefits Map

v2

Output | Enabling change | Benefits and dis-benefits | Strategic Objectives | DfT Objectives



## 3. Outline of appraisal approach

The approach to appraisal and assessment of benefits for the scheme is set out in the economic case along with the current monetised benefits in line with webTAG.

## 4. Timeline of Realisation

Due to the nature of the programme, the realisation of benefits is expected to be split. The benefits surrounding economic growth, housing and jobs are expected to exponentially increase from the government's commitment to the programme through until completion of Phase 2 and beyond. The benefits relating to improved passenger services will be seen in two stages, when the first part of Phase 2 is delivered between Bicester and Bletchley followed by the second stage on completion of Phase 2 by the end of CP6, where the majority of the benefits will be realised.

A set of baseline measures will begin to be taken and collated to represent the performance of the systems prior to the new or enhanced infrastructure. In terms of baselining, for Economic growth, Housing and Employment, these will be made prior to entry into service but also retrospectively to 2012 using secondary data. For Passenger Services Improvements, these will be done shortly before expected realisation (shortly before entry into service). To ensure realisation of the benefits, a pre-defined period of measurement and evaluation will be required to demonstrate that the benefits have been realised.

Benefits milestones:

- 2012 – Government commitment to programme in response to HLOS – Benefit realisation plan begins relating to economic growth, housing and jobs
- 2019 – updated Plan agreed with DfT (which could amend subsequent milestones on timing of baselining benefits)
- 2021 – Benefit baseline measurements work stream to begin for economic growth, housing and employment
- 2022 – Benefit baseline measurements work stream to begin for Passenger Services Improvements
- 2023-2024 – Into service between Oxford/Milton Keynes, Oxford/Bedford, Milton Keynes/ Aylesbury – Phased benefit realisation begins relating to passenger service improvements
- 2024 onwards – Measurement and evaluation work stream for realisation of benefits

## 5. Risks to Benefits

There are a number of risks that are likely to affect the realisation of the programme benefits each of which could delay realisation of the benefit and/or diminish the value of the benefit.

The risks to the programme and to the realisation of the programme benefits are captured, monitored and mitigated by both DfT, DCLG, EWR Co and NR. These are communicated

through a series of team and board meetings. Internally at EWR Co  all risks to the programme are recorded in a risk register and the main risks are escalated to senior staff for resolution support.

A overview of western section Phase 2 programme risks are set out in the risks section of the main paper (Management Case).

**6. Arrangements for monitoring, reporting and review of benefits**

The roles and responsibilities of the team managing the programme's benefits can be found in Table 3, while all programme benefits to be taken forward will be assigned to an owner; this can be seen in the attached 'Benefits Profiles'.

Reporting processes will be set up upon development of the benefits and reviewed on a periodic basis. As a tier 1 project, there is the possibility that the programme will report its benefits to the Rail Board and/or BICC.

Benefits will also be reviewed as part of a Post Implementation Review. As the programme is part of the Government Major Projects Portfolio (GMPP) and monitored by the Infrastructure and Projects Authority (IPA), a Gate 5 Benefits Realisation assurance review will also take place once sufficient time has passed for benefits to be realised.

**7. Evaluation approach**

An evaluation plan will be developed to assess realisation of some of the prioritised benefits that are more difficult to measure and attribute to the programme. It is expected that these will be the benefits relating to wider socio-economic benefits such as economic growth, housing and employment.

**8. Costs for Benefits Management and Evaluation Activities**

The evaluation and realisation activities that will be undertaken for the Phase 2 programme will require a budget as additional resource will be required, including external consultancy. EWR Co have budgeted for around £150,000 over the end of 2018/19 and into 2019/20.

**9. Roles and responsibilities**

The roles and responsibilities of the team managing the benefits for Phase 2 are set out in the table below.

| **Table 2: Roles and Responsibilities** | | |
|---|---|---|
| **Role** | Named Individual | Responsibilities |
| **SRO (Major Projects)** | Cavendish Elithorn, DfT | Accountable for delivery of BC and benefits being realised. |

| | | |
|---|---|---|
| | | Ensuring Benefits Management and Evaluation is developed. |
| **Programme Director** | Nigel Nuttal, DfT | Ensuring resources are in place<br>Demonstrating that the business case benefits have been realised<br>Authorising the Benefits Management and Evaluation Plan. |
| **Benefits Manager** | [text redacted under FOI section 40] | Developing the Benefits Management and Evaluation Plan.<br>Producing the Benefits Map and Benefits Register.<br>Developing the Benefit Profiles.<br>Identifying the benefit dependencies.<br>Developing the Benefits Timeline, benefit measures and the evaluation strategy.<br>Collecting the information required to demonstrate that the programme benefits have been realised.<br>Liaising with the Benefit Owners from other teams. |
| **Portfolio Office** | [text redacted under FOI section 40] | Help develop and review the Benefits Management and Evaluation approach for the programme. |
| **Benefit Owner** | Passenger Services, DfT | Responsible for the realisation of an individual benefit.<br>Actively plans for benefit realisation.<br>Responsible for reviewing benefit measure/monitoring data to understand whether the benefit is on track to be realised.<br>Continuously searching for new or emerging benefits.<br>Identifies likely causes for benefit forecasts not being met or unlikely to be met. |
| **Benefit Owner** | [text redacted under FOI section 40] | As above |
| **Rail Benefits Team** | [text redacted under FOI section 40] | Provide advice on development of all aspects of Benefits Management and Evaluation.<br>Act as a critical friend in reviewing evaluation documentation.<br>Provide advice on appraisal approaches to supplement benefits management. |
| **Economists/Analysts** | [text redacted under FOI section 40] | Provide advice on additional evaluation approaches to supplement benefits management.<br>Lead on the economic case with consultants.<br>Act as a critical friend in reviewing evaluation documentation. |
| **Operations Strategy** | Geoff Leffeck, EWR Co | Definition of the operations strategy including franchising, rolling stock and depots consideration. |
| **Infrastructure** | [text redacted under FOI section 40] | Design and delivery of infrastructure that facilitates planned TSS. |
| **Rail Board Secretariat/ BICC Secretariat** | [text redacted under FOI section 40] | Set the expectation that benefits management and evaluation is key to delivering projects better, providing greater accountability and a strong evidence base for future decision making. |

| | | |
|---|---|---|
| | | Hold SROs to account for implementing this framework.<br>Undertake regular review of portfolio benefits reporting, addressing any issues escalated by the Rail Corporate Centre and using this to inform decision making.<br>Receives the conclusions and recommendations from post implementation benefit reviews or evaluation reports, defining actions where required.<br>Ensures that arrangements for monitoring and reporting of benefits continues beyond delivery |
| **Evaluation Centre of Excellence team** | [text redacted under FOI section 40] | Provide strategic leadership and support to enhance the delivery of monitoring and evaluation activity across the Department.<br>Act as a critical friend in reviewing business case including benefits management. |

**Benefits Profiles**

Information regarding each specific benefit has been outlined in the benefit profile template attached below.

EWR Benefits Profiles V1.xlsx

# List of tables

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# Glossary

| Commonly used acronym | Main term | Description |
|---|---|---|
| | Oxford-Cambridge Arc (the Arc) and Cambridge-Milton Keynes-Oxford Corridor (the corridor) | Local authorities covering the countries of Northamptonshire, Cambridgeshire, Hertfordshire, Buckinghamshire and Oxfordshire and the unitary authorities of Bedford, Central Bedfordshire, Luton, Swindon and Milton Keynes. |
| EWR | East West Rail | Strategic railway connecting East Anglia with Central, Southern and Western England. |
| EWR Phase 2 | East West Rail Western Section Phase 2 | Railway to run between Oxford and Milton Keynes, between Oxford and Bedford and between Milton Keynes and Aylesbury. |
| EWR Co | East West Rail Company | Company set up by the Transport Secretary to oversee the East West Rail project. |
| DfT | Department for Transport | Government department responsible for UK transport. |
| | Network Rail | Railway company owning and operating most of Great Britain's railway infrastructure. |
| | Oxford to Cambridge Expressway | New road expected to improve connectivity between Oxford, Milton Keynes and Cambridge. |
| | Highways England | Government company charged with operating, maintaining and improving England's motorways and major A roads. |
| RIS | Roads Investment Strategy | Collection of documents by the DfT and Highways Agency setting approach to improve England's motorways and major roads. |
| | East West Rail Consortium | Group of local authorities and businesses working closely with Government, East West Rail Company and Network Rail. |
| BCR | Benefit Cost Ratio | Ratio of benefits to costs indicating how much benefit is obtained for each unit of cost. |
| NTEM | National Trip End Model | Forecasts the growth in trip origin-destinations (or productions-attractions) up to 2051 for use in transport modelling. |
| WebTAG | Web based Transport Appraisal Guidance | DfT's online suite providing information on the role of transport modelling and appraisal. |
| NIC | National Infrastructure Commission | Commission providing the government with advice on major long-term infrastructure challenges. |
| | East West Rail Alliance | Responsible for designing and building the Western Section. |
| | Transport Investment Strategy | Sets out the DfT's priorities and approach for future transport investment decisions. |
| | Industrial Strategy White Paper | Sets out a long-term plan to boost the productivity and earning power of people throughout the UK. |

| Commonly used acronym | Main term | Description |
|---|---|---|
| | NIC Partnering for Prosperity | Report containing recommendations for securing the Arc's long-term economic success. |
| GVA | Gross Value Added | Measure of the value of goods and services produced in an economy. |
| | National Rail | Rail Delivery Group's brand to promote passenger railway services. |
| | Economic growth | Long-term expansion of the economy's productive potential. |
| LEPs | Local Enterprise Partnerships | Private sector led partnerships between businesses and local public sector bodies. |
| EEHSA | England's Economic Heartlands Strategic Authority | Authority working with the government and partners to deliver East West Rail and the Oxford-Cambridge expressway. |
| | HM Treasury Green Book | Guidance on how to appraise and evaluate policies, projects and programmes. |
| MHCLG | Ministry of Housing, Communities and Local Government | Government department responsible for housing, community and local government matters in the UK. |
| | Capital costs | Costs of acquiring and maintaining an asset. |
| | Whole life costs | Total costs of ownership over the life of an asset. |
| | Operating costs | Ongoing costs of running a business or system. |