

East West Rail

Bedford to Cambridge

Preferred Route Option Report



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01.

Executive summary



This report outlines East West Rail's Preferred Route Option between Bedford and Cambridge, and the reason for that selection. This Preferred Route Option has been selected following EWR Company's consultation on the five route option areas between January and March 2019. Those route option areas were selected following earlier consultation on the route corridor via Sandy.

The Preferred Route Option

Linking existing stations in Bedford and Cambridge with communities in Cambourne and the Tempsford/Sandy area, this route was the favourite among people who responded to our non-statutory public consultation on route options held in early 2019.

This route was labelled Route Option E in the consultation.



Why is this the preferred route option?

- People who responded to our 2019 consultation gave it the highest score on four of our five key criteria: benefits for transport users, environmental considerations, supporting economic growth and supporting new homes
- By taking a route via Cambourne we have the greatest opportunity to avoid the most environmentally challenging areas and potential direct impacts on irreplaceable or sensitive environmental features, including heritage assets, with good opportunities to achieve biodiversity net gain
- New links to Thameslink and Midland Mainline at Bedford the East Coast Mainline at Sandy/St Neots and the West Anglia Mainline in Cambridge will provide convenient additional inter-regional connectivity for people, making it easier to get to towns like Kettering, Leeds, Norwich and Nottingham.
- By serving Bedford Midland Station it provides easy connectivity into Bedford town centre and supports plans to regenerate Bedford
- It also connects the growing population of Cambourne with environmentally sustainable transport and could integrate with proposed improvements to the local transport network in south Cambridgeshire such as the busway extension and Cambridgeshire Autonomous Metro
- The route could support much needed development of more affordable housing in areas including Bedford, between Sandy and St Neots and at Cambourne
- Most responses from local authorities in the Bedford to Cambridge area supported this route

Overview of East West Rail

- 1.1** East West Rail (EWR) is a proposed new direct rail link between Oxford and Cambridge and would join up key towns and cities across the region. It would help to spread prosperity beyond London, build on the area's existing economic success, and enhance the UK's ability to compete globally.
- 1.2** For local residents, the railway would make it quicker and cheaper to get around by opening up new direct connections and make the area a more attractive place to live. The railway would also provide opportunities for new housing development that makes housing more affordable for local people and enables businesses to get access to the workforce they need to continue growing and become more productive.
- 1.3** The section of EWR between Oxford and Bedford is proposed to reinstate and upgrade existing railway lines that have been largely out of use since the early 1990s, while Bedford and Cambridge would be connected by a new railway line with new stations. With both sections complete, direct services would run between Oxford and Cambridge.

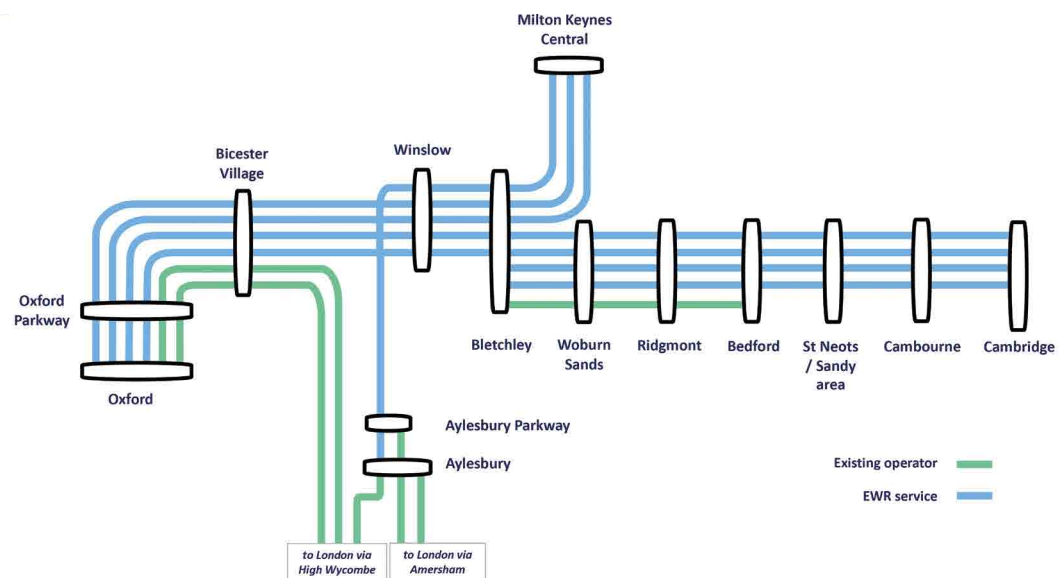



Figure 1.1: potential EWR services with a new railway line between Bedford and Cambridge¹

¹ The stations that will be served by EWR on the Marston Vale Line between Bletchley and Bedford are subject to ongoing consideration. The stations shown in this diagram reflect existing assumptions based on previous engagement with local stakeholders. Each service represents one passenger train per hour.

1.4 The progress of EWR to date includes:

- 
- Completing the upgrade of the section between Oxford and Bicester in 2016
 - Submitting a Transport and Works Act Order (TWAO) application for works to reinstate and upgrade existing railway lines between Oxford and Bedford in July 2018
 - Undertaking an initial non-statutory public consultation on route options between Bedford and Cambridge in early 2019, the responses to which are outlined in the Bedford to Cambridge Route Option Consultation Public Feedback Report
 - The government declared the the section of EWR between Bedford and Cambridge as a Nationally Significant Infrastructure Project (NSIP) in September 2019, enabling East West Railway Company (EWR Co) to apply for a Development Consent Order (DCO) to authorise construction of the project
 - Identifying a preferred route for the section between Bedford and Cambridge as described within this Preferred Route Option Report and informed by the non-statutory consultation that took place last year. ²

² For the purposes of the new railway between Bedford and Cambridge, 'route option' refers to the broad area, in places up to several kilometres wide, through which the new railway line would be located.

- 1.5** Services east of Cambridge through to East Anglia and east coast ports have previously been referred to as the EWR Eastern Section. This section of EWR has been the subject of a separate Network Rail study but currently sits outside EWR Co's formal remit from the Department for Transport (DfT).

East West Railway Company

- 1.6** The DfT established EWR Co in December 2017 to:

- Drive forward the work being led by Network Rail to reinstate and upgrade existing railway lines between Bicester, Aylesbury, Milton Keynes and Bedford
- Take responsibility for developing the case for the section of new railway between Bedford and Cambridge

- 1.7** Having now identified a preferred route between Bedford and Cambridge, EWR Co is preparing the DCO application for the project. It is anticipated that the work to prepare the DCO application will include:

- Identifying potential railway alignments and station locations³
- Consulting on alignment options and station locations
- Developing the 'concept' design for the preferred railway alignment and station locations
- Undertaking more detailed environmental analysis and surveys
- Engaging with local authorities and other stakeholders to ensure that the railway supports aspirations for the Oxford–Cambridge Arc

- 1.8** In addition to the activities directly related to preparing the DCO application, EWR Co will continue to explore new ways to fund and finance the infrastructure and improved ways of working across the rail industry. This includes designing and integrating the infrastructure and train services so passengers get a better experience and the new railway meets the needs of local communities.

³ The railway alignment is the exact route on which the new railway line will run.

- 1.9** Subject to further government approvals and further progress with the project, EWR Co's role could then expand to include delivering the infrastructure safely, and as quickly and as cost-effectively as possible, and overseeing the new train services.

Purpose of report

- 1.10** This Preferred Route Option Report sets out:

- The process by which EWR Co has sought to narrow down route options for the new section of railway between Bedford and Cambridge
- The reasons for identifying a route via Bedford Midland, a new station on the East Coast Main Line between the existing Sandy and St Neots stations, and a new station at Cambourne as the preferred route option

- 1.11** The report is part of a set of documents that EWR Co are publishing to respond to the previous consultation on route options and to support the announcement of the preferred route option.⁴ The set of documents includes:

- **Connecting Communities: The Preferred Route Option between Bedford & Cambridge Executive Summary**

The document provides a high-level summary of the documents being published and the reasons for identifying Route E as the preferred route option

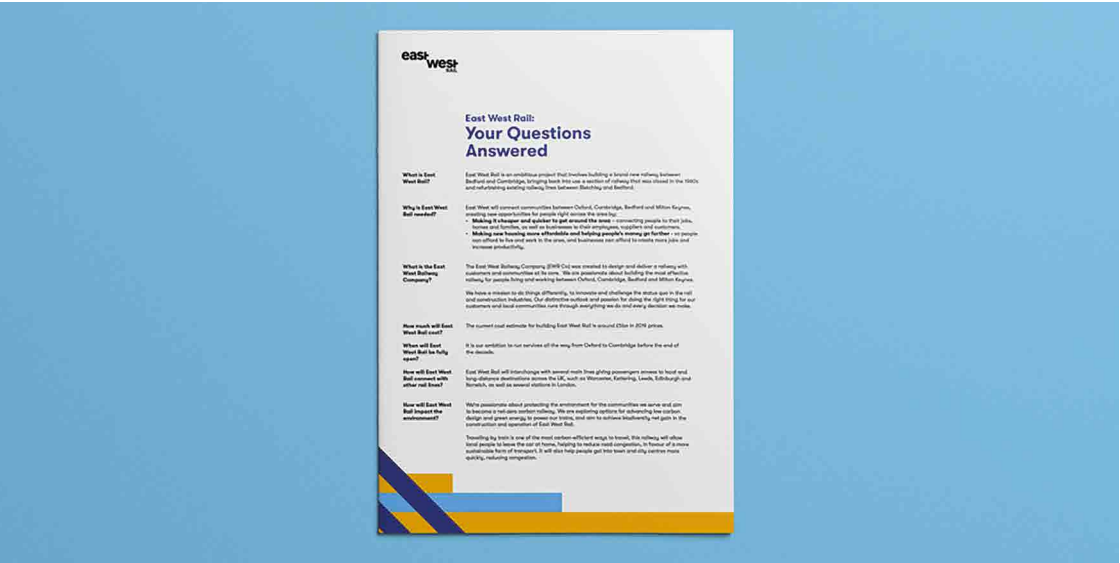
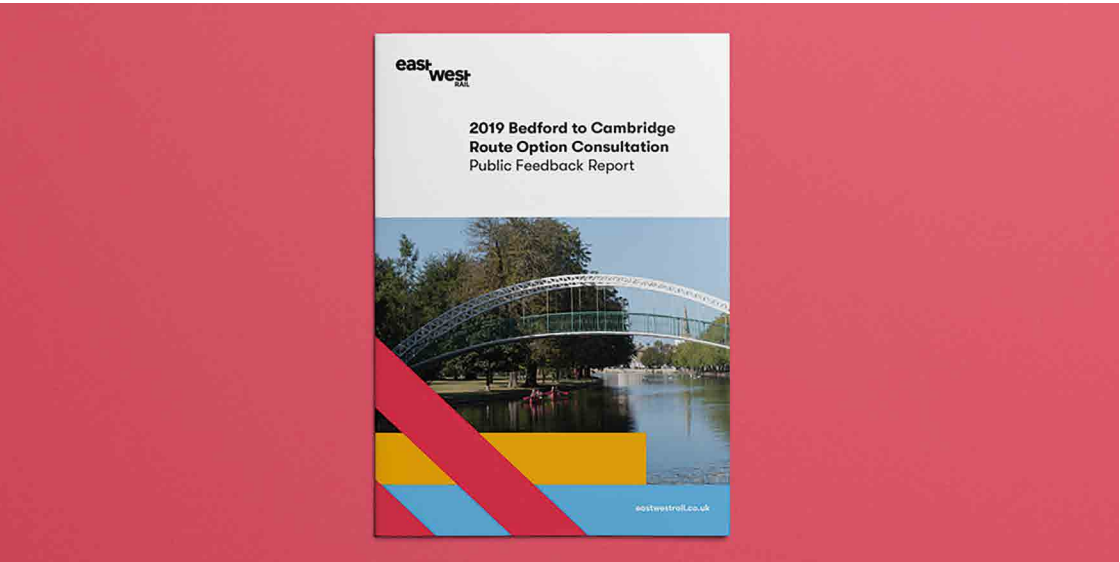
- **2019 Bedford to Cambridge Route Option Consultation Public Feedback Report.**

The report sets out the process taken to record and consider consultation responses, a summary of consultation feedback, and full details of matters raised during the consultation

- **East West Rail: Your Questions Answered.**

The document sets out EWR Co's position on key issues that are likely to be of interest now that a preferred route has been identified, including issues such as land and property acquisition, the environment, and EWR Co's approach to working with other stakeholders to consider how the potential housing benefits of the project can be realised

⁴ All published materials relating to the outcome of the Bedford to Cambridge route option consultation and the preferred route option announcement can be accessed on EWR Co's website. www.eastwestrail.co.uk



Process for selecting a preferred route option

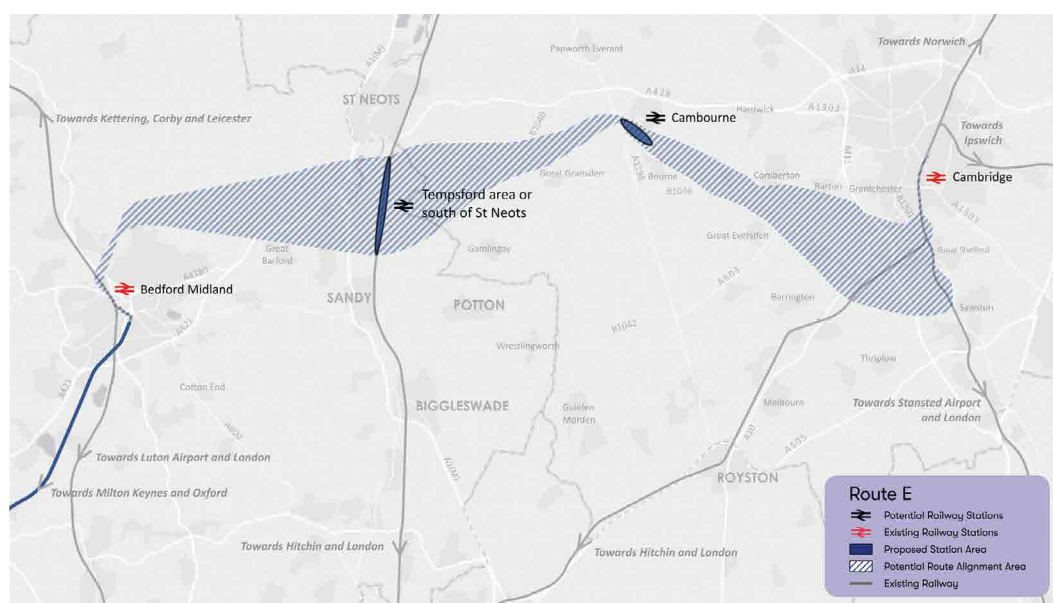
- 1.12** A structured and sequential approach has been adopted to identify a preferred route option for the railway between Bedford and Cambridge.
- 1.13** Network Rail initially identified 20 potential broad route corridors between Bletchley and Cambridge, spanning the broad area from between St Albans and Harlow to Peterborough. After appraising the potential corridors against the initial strategic objectives and conditional outputs, five corridors were taken forward for further work. A quantitative assessment of the potential costs and benefits of these five corridors was undertaken before the corridor via the broad area around Sandy was selected as the preferred route corridor in 2016.⁵
- 1.14** Using the strategic objectives for EWR and a set of route selection criteria agreed with the DfT and local stakeholders, eleven potential route options within the preferred route corridor were identified. Six of these eleven route options were then ruled out on the basis that they performed less favourably than the other five route options against the route selection criteria.
- 1.15** The five remaining route options were included in EWR Co's initial non-statutory consultation in early 2019. Following consultation feedback and further analysis of each option, EWR Co identified one of these five route options (Route E) as its preferred route option for the new section of railway between Bedford and Cambridge. EWR Co's recommendation has been endorsed by the DfT.

1.16 Route E is presented in Figure 1.2. Under current plans, EWR would serve:

- Bedford Midland station, providing interchange with Thameslink and Midland Main Line services
- A new station between the existing Sandy and St Neots stations, providing interchange with the East Coast Main Line
- A new station at Cambourne
- Cambridge station, after connecting to the West Anglia Main Line to the south of Cambridge⁶

1.17 The precise location of the railway line and stations within the broad area shown in Figure 1.2 will now be considered through more detailed technical assessments and informed by further public consultation and engagement with local stakeholders.

Figure 1.2: broad area for the preferred route for EWR between Bedford and Cambridge



⁵ The preferred route corridor covered a broad area (up to 15 kilometres wide) through which the railway would run.

⁶ At least some EWR services would also be expected to serve the proposed new Cambridge South station that is being promoted separately by Network Rail.

- 1.18** EWR Co's public consultation and further analysis focused on how each of the five shortlisted route options and an alternative route that approaches Cambridge from the north performed against the five route selection criteria that were identified as being most likely to differentiate between route options:



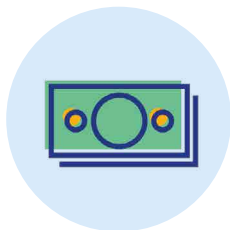
Benefits for transport users – the potential benefits from improved journey times, lower fares and less road congestion



Supporting economic growth – the potential wider employment and productivity benefits of improved east-west connectivity



Supporting the delivery of new housing – the opportunity for stations served by EWR to support housing growth within their catchment areas



Costs and overall affordability – the expected upfront capital costs, whole life and operating costs, and revenue streams associated with EWR



Environmental impacts and opportunities – the key environmental features which fall within the boundaries of each route option and associated challenges and opportunities

- 1.19** EWR Co's analysis has concluded that when looking across these five key criteria Route E is most likely to deliver against the strategic objectives for EWR and provide the best overall value for money from government's investment in the railway.

Reasons for identifying Route E as the preferred route option

- 1.20** Since consultation, further analysis has been undertaken to assess the performance of each route option against the route selection criteria. The following sections summarise the reasons for identifying Route E as the preferred route option, with more detail provided throughout this report.

Benefits to transport users

- 1.21** The detailed economic modelling of potential transport user benefits indicates that Route E would provide the greatest benefits for transport users because:
- Route E serves the most households when taking account of the catchment area around Bedford Midland station and the growing population at Cambourne
 - Route E can facilitate better onward connectivity than routes via a new station to the south of Bedford, based on existing and planned train services, by providing for a single interchange with services to and from destinations in the East Midlands (e.g. Kettering and Corby)
- 1.22** The benefits of better connectivity for Bedford passengers and onward travel to East Midlands destinations provided by Route E appear to outweigh the disbenefits of slightly longer journey times for passengers travelling between Oxford and Cambridge and other places across the Arc.
- 1.23** The modelling suggests a considerable proportion of passengers that would use a new station to the south of Bedford would use it to access north-south Thameslink services to and from London, rather than east-west services. These benefits could be provided by a new north-south station to the south of Bedford at Wixams, as promoted by Bedford Borough Council and other local stakeholders.
- 1.24** Route E could complement the proposed guided busway between Cambourne and Cambridge and longer-term plans for incorporating the busway into a Cambridgeshire Autonomous Metro. EWR could provide faster connectivity to Cambridge city centre and employment opportunities to the south of Cambridge, while also enabling passengers from areas served by the busway to access EWR services more easily.

Supporting wider economic growth

- 1.25** The strategic case for a new railway between Bedford and Cambridge is based on the importance of new direct public transport connectivity between the towns and cities across the Oxford-Cambridge Arc.
- 1.26** Better connectivity can play a transformative role in supporting growth by enabling businesses to be more productive and providing better access to labour markets. This can be achieved by opening up new commuting opportunities and by supporting opportunities for new housing that can have a positive impact on housing affordability.
- 1.27** While improved road networks go some way to providing better connectivity across the Arc, rail plays an important role in providing connectivity to town and city centres and the economic and employment activity that they support.
- 1.28** Economic modelling commissioned by EWR Co suggests that the likely Gross Value Added (GVA) productivity benefits of routes via Bedford Midland and routes via a new station to the south of Bedford would be very similar; the benefits of better Bedford town centre connectivity offset the benefits of the slightly faster journeys between other places across the Arc provided by routes via a new station to the south of Bedford.
- 1.29** Bedford Borough Council's response to EWR Co's consultation indicated a strong preference for a route via Bedford town centre (the existing Bedford Midland station). The Council believes that a route via Bedford Midland could serve as a catalyst for growth and regeneration within Bedford and support the town's role within the Oxford-Cambridge Arc.

Supporting the delivery of new homes

- 1.30** EWR Co is not in a position to provide a view on the specific number of homes that could be supported by any of the potential route options between Bedford and Cambridge as the number and location of homes will ultimately depend on:
- the preferred route alignment being selected and granted development consent
 - allocation of sites within local plans and the granting of planning permission for development of sites by the relevant local planning authorities

- 1.31** However, based on responses to the consultation, new homes in the Bassingbourn area are likely to be strongly opposed by the local community, reflecting concerns about local infrastructure, the character of the area, and the setting of Wimpole Hall.
- 1.32** The local planning authority (South Cambridgeshire District Council) identified Route E as its preferred option, and further development at Cambourne would not be inconsistent with existing local planning policies.
- 1.33** Central Bedfordshire Council has previously considered proposals for a new settlement in the Tempsford area, which could be suitable for development if EWR were to provide sustainable public transport connectivity. This is reflected in Central Bedfordshire's technical response to EWR Co's consultation, which identified a route via the broad area around Tempsford (Route C) as its preferred option. However, subsequent engagement with the Council indicated a preference for Route A, with a new station on the East Coast Main Line to the south of the existing Sandy station.
- 1.34** Alternatively, St Neots is expanding in a south-eastwards direction, and Huntingdonshire District Council identified Route E with a new station in the area to the south of St Neots as its preferred option.
- 1.35** Several large sites to the south of Bedford have already been allocated and/or received consent for housing and employment uses, in part linked to the proposed Thameslink station at Wixams. In so far as new rail connectivity could support further additional development, stopping north-south services on the Midland Mainline would likely have a significantly greater impact than the provision of direct east-west services.
- 1.36** In its consultation response, Bedford Borough Council noted that by serving Bedford Midland, EWR could support new housing as part of the regeneration of Bedford town centre and potentially opportunities to the north of Bedford, which could be considered as part of the council's early review of its local plan.

Costs and overall affordability

- 1.37** Revised indicative estimates of upfront capital costs suggest that the cost to deliver Route E (£3.7 billion) is similar to the cost for Route A (£3.6 billion) and lower than the cost for the other shortlisted route options (£3.9 billion - £4.3 billion).⁷
- 1.38** The transport user benefits modelling suggests that the operating costs and revenues would be similar for all route options. However, Route E is estimated to generate the highest net profit for the rail industry in the high demand growth scenario.

⁷ Cost estimates for routes via Bassingbourn include a provisional estimate received from the Ministry of Defence (MoD) for the cost of re-locating their activities from the Bassingbourn site to an alternative location.

Environmental impacts and opportunities

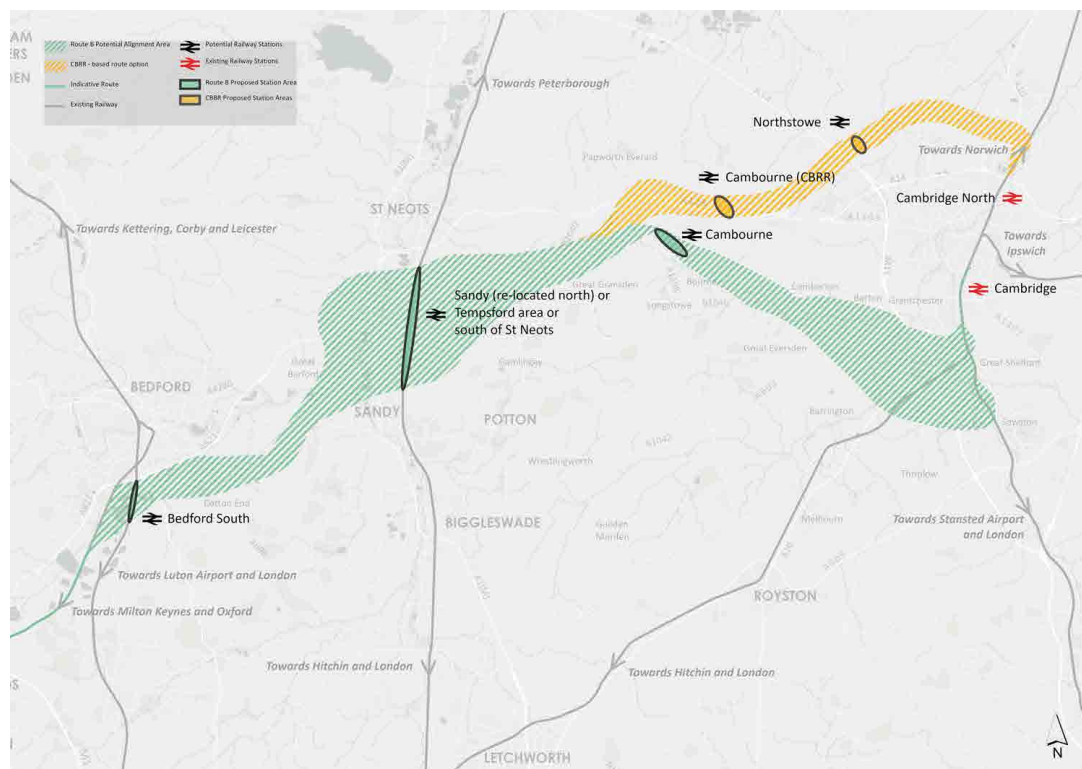
- 1.39** Based on a comparative assessment of environmental sustainability, EWR Co has concluded that routes via Cambourne have the fewest problematic areas with potential direct impacts on irreplaceable or sensitive features and the lowest likely mitigation effort.
- 1.40** However, the impact of the railway on environmental features will ultimately be determined by the specific route alignment that is chosen. In particular, EWR Co will carefully consider the potential noise, vibration and air quality impacts in the Bedford urban area in advance of applying for development consent to authorise the project.

Other criteria

- 1.41** While EWR Co's further analysis has focused on the five key route selection criteria described above, EWR Co has also reviewed the performance of each route option against the other route evaluation criteria agreed with the DfT.⁸
- 1.42** EWR Co has concluded in relation to these other criteria that:
- All route options are expected to be able to satisfy existing and potential freight demand
 - All route options could provide an acceptable level of operational performance, particularly if the EWR tracks through Bedford are fully segregated from existing infrastructure.
 - Safety risk is not considered to be a differentiating factor as EWR will be designed, constructed, operated and maintained in accordance with international and national standards and regulations

⁸ These other criteria are described in Chapter 4 of the East West Rail Bedford to Cambridge Route Option Consultation Technical Report, available at <https://eastwestrail-production.s3.eu-west-2.amazonaws.com/public/Central-Section-Consultation/db652106d4/EWR-Technical-Report.pdf>.

Figure 1.3: EWR Co's Route B plus indicative alignment used to assess CBRR-based route option that approaches Cambridge from the north



Approach into Cambridge

- 1.43** The five main route options that EWR Co consulted on between January and March 2019 would approach Cambridge from the south by connecting to the West Anglia Main Line around Great Shelford.
- 1.44** Box 1.1 summarises the further analysis that EWR Co has undertaken to assess an alternative option to approach Cambridge from the north as proposed by CamBedRailRoad (CBRR) and other respondents to EWR Co's initial non-statutory public consultation.⁹ The consultation noted that both of EWR Co's shortlisted routes via Cambourne (Routes B and E) could alternatively approach Cambridge from the north if it were deemed to be a better option.
- 1.45** Following this further analysis EWR Co has concluded that approaching Cambridge from the south should remain the preferred option.

⁹ To the west of Cambourne, the route alignment proposed by CBRR closely follows the route of the existing road networks and EWR Co has considered it to be substantively the same as EWR Co's Route B. That element of CBRR's proposal has therefore not been subject to further detailed consideration.

Box 1.1: Further analysis on the approach into Cambridge

The initial work led by Network Rail to identify a preferred broad route corridor considered several options for the approach into Cambridge.

Analysis and discussions with local stakeholders concluded that the preferred option was for EWR services to approach Cambridge from the south.

EWR Co and Network Rail reviewed this decision prior to EWR Co's initial consultation on route options and confirmed that the previous decision appeared to remain sound.

Around a third of respondents to the public consultation did not express a view on this issue, with the others being broadly evenly split between those that agreed that EWR Co were right to prioritise route options that approach Cambridge from the south and those that disagreed.

A significant number of responses in favour of approaching Cambridge from the north could have been influenced by the CBRR group. The CBRR group provided an alternative, more northerly route alignment that would serve Cambourne rather than a new station in the Bassingbourn area before then approaching Cambridge from the north as part of their consultation response.

EWR Co has undertaken further analysis of the section of the route proposed by CBRR where it would involve a new station at Cambourne to the north of the A428 and a further station serving Northstowe before connecting to the West Anglia Main Line to the north of Cambridge.

EWR Co's further analysis has continued to indicate that approaching Cambridge from the south should remain the preferred option. The reasons for preferring an approach from the south are discussed in detail in Chapter 16 and include:

- Providing the opportunity to support growth and development around the proposed Cambridge South station
- Enabling EWR services to be extended to Ipswich and east coast ports in future without requiring a reversing move at Cambridge station, which would incur a considerable journey time penalty
- Upfront capital costs of an approach from the south are estimated to be around £0.6 billion lower than if EWR were to approach Cambridge from the north (at 2019 prices)
- There are a considerable number of significant environmental features in the area that a route into Cambridge from the north would pass through. Approaching Cambridge from the north could therefore require a higher level of effort, complexity and expense to mitigate potential environmental impacts than route options that approach Cambridge from the south

Consultation responses

1.46 The 'Bedford to Cambridge Route Option 2019 Consultation Public Feedback Report' records the responses to the non-statutory consultation held between January and March 2019 and EWR Co's response to each matter raised, based on the situation at the time of the consultation.

1.47 The key themes raised in consultation responses included

- Route options via Cambourne (Routes B and E) were generally favoured more than routes via Bassingbourn (Routes A, C and D)
- Responses were broadly equally split between people supporting EWR Co's preferred option to approach Cambridge from the south and people supporting an alternative approach into Cambridge from the north
- There was a broad preference to keep Sandy station in its current location
- There was a general preference for EWR to serve the existing Bedford Midland station rather than a new station to the south of Bedford
- Southerly route options through South Cambridgeshire (Routes A, C and D) generated notable levels of concern due to potential impacts on environmental features (ancient woodland, Wimpole Hall, the Royal Society for the Protection of Birds (RSPB) nature reserve near Sandy and Biggleswade common)
- Concern was expressed about the potential for each route option to cause damage or loss to ancient woodland and ancient and veteran trees

- 1.48** The key themes raised in consultation responses informed EWR Co's further analysis and consideration of route options following the consultation.
- 1.49** Route E was generally the most favoured option among consultation respondents, scoring best against four of the key route selection criteria (transport user benefits, supporting economic growth, supporting delivery of new homes, and environmental impacts and opportunities).
- 1.50** Route E performed less well against the 'cost and overall affordability' criteria, although this likely reflects Route E being estimated to incur the highest upfront capital costs at the time of consultation.

Next steps

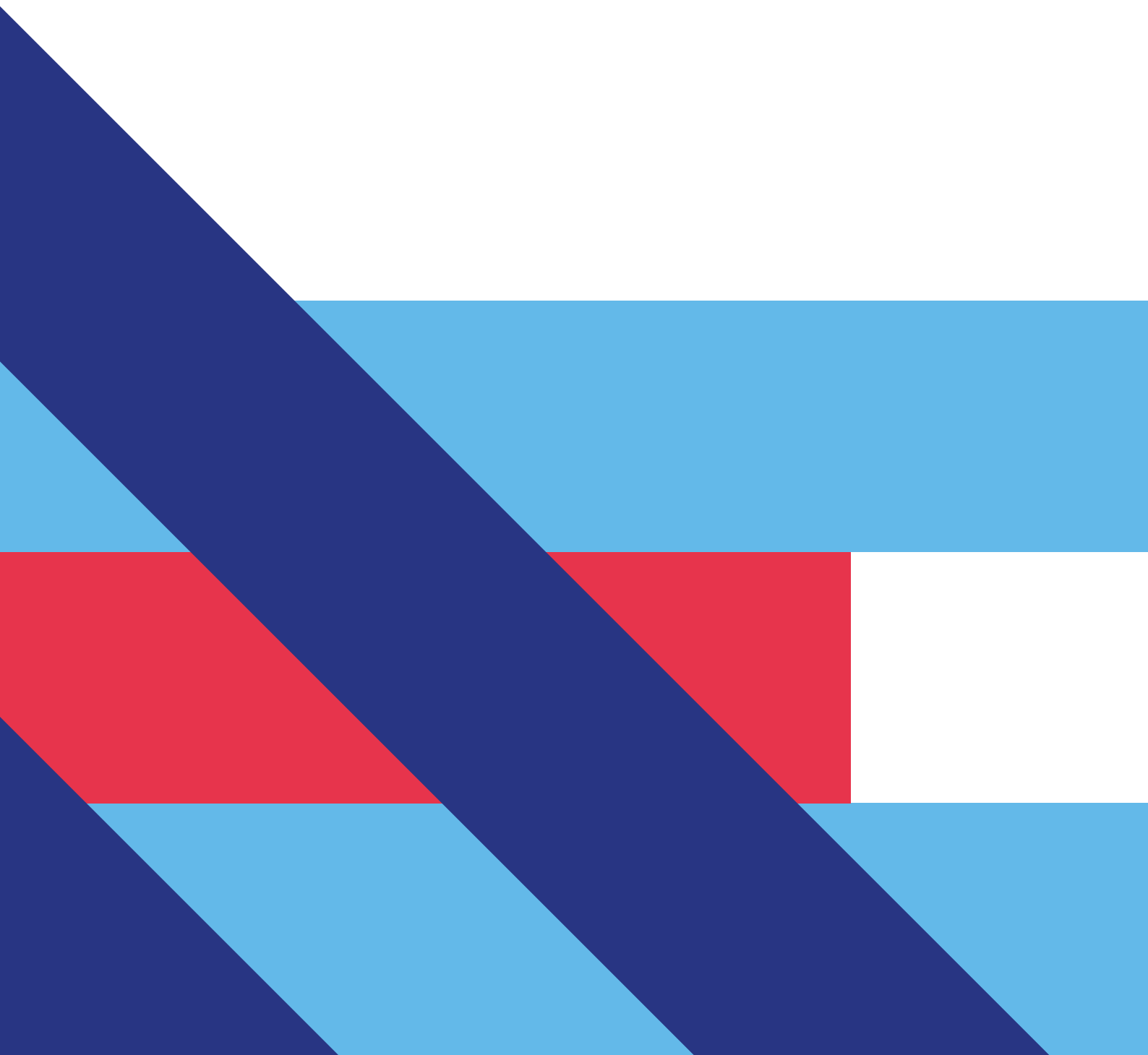
- 1.51** Now that a single preferred route option for the planned section of railway between Bedford and Cambridge has been identified, EWR Co will progress with further detailed assessments of potential railway alignment and station locations for the preferred route option (Route E).
- 1.52** EWR Co will carry out a further round of non-statutory consultation, prior to carrying out statutory consultation on the proposed alignment, in advance of finalising the DCO application.
- 1.53** EWR Co will work closely with local authorities and other local stakeholders to consider how the potential housing and growth benefits of the railway can be realised, given that they are an important part of the overall case for building the railway. This will include working with local authorities to consider local transport requirements to provide access to and from EWR stations and establish a clear policy framework to govern future development in the area around EWR stations.
- 1.54** EWR Co will provide further updates in due course on the phased introduction of EWR services. EWR Co will continue to test a variety of potential train service options to establish which combination of services and station calling patterns is likely to provide the best value for money and best meet the needs of local communities.



The Meeting sculpture by John Mills, outside the Harpur Centre, Bedford

02.

Structure of the report



- 2.1** Chapter 3 provides a brief summary of the strategic context and objectives for EWR.
- 2.2** Chapters 4 to 8 describe the process that EWR Co has followed to identify a shortlist of five route options for the new railway between Bedford and Cambridge that were the focus of EWR Co's initial non-statutory public consultation between January and March 2019. This includes the selection of the preferred route corridor, how route options were identified and the criteria against which route options were assessed.
- 2.3** Chapter 9 describes EWR Co's further analysis and assessment of route options since the initial non-statutory public consultation that has informed the final decision on the preferred route option.
- 2.4** Chapters 10 to 14 summarise how the five shortlisted route options perform against the five key route selection criteria, drawing both on EWR Co's analysis and responses to the non-statutory public consultation.
- 2.5** Chapter 15 provides a criteria-by-criteria summary of how each route option performs to enable more direct comparisons.
- 2.6** Chapter 16 sets out EWR Co's approach to assessing an alternative route option that would approach Cambridge from the north.
- 2.7** Chapter 17 summarises EWR Co's reasoning for selecting the preferred route option and the next steps in developing plans for the railway.
- 2.8** Annexes A and B provide further detail on the analytical and appraisal approaches that have underpinned the assessment of route options described throughout this report and the selection of Route E as the preferred route option.

03.

Strategic context for the railway



The overall case for East West Rail

- 3.1 The Oxford-Cambridge Arc (the Arc) is an important economic asset for the UK and makes a significant contribution to the nation’s prosperity.** The Arc contributes around £111 billion of Gross Value Added (GVA) to the national economy each year.¹¹
- 3.2** The Arc’s economic success is in part driven by highly productive industries, which cluster in towns and cities across the Arc, providing employment opportunities and strengthening the UK’s ability to compete internationally. Measured by GVA per worker, productivity across the Arc is around 11% greater than the UK average excluding London.¹²
- 3.3 The National Infrastructure Commission (NIC) has found that the Arc’s future economic prosperity is constrained by a lack of suitable housing and poor east-west connectivity.** Analysis for the NIC concluded that the Arc’s annual GVA contribution would be constrained to £176 billion by 2050 without major intervention, compared to around £254 billion under a transformational scenario.¹³
- 3.4** Existing public transport connections across the Arc are poor. The only east-west rail connection is a slow stopping service between Bletchley and Bedford, provided on a branch between the West Coast Main Line and the Midland Main Line.
- 3.5** The fastest route by rail between economic centres across the Arc is often via London. Travelling from Oxford to Cambridge via rail takes almost three hours and usually requires at least two interchanges in London, increasing the susceptibility to delay or cancellations.

Oxford to Cambridge Journey Times

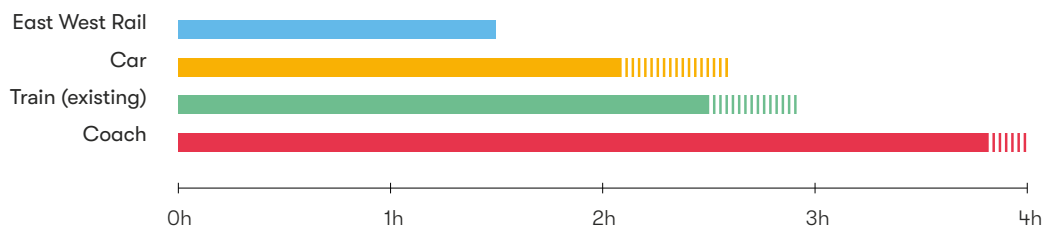


Figure 3.1:
Current journey
times between
Oxford-Cambridge

¹¹ The Oxford Cambridge Arc: Government ambition and joint declaration between Government and local partners. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/799993/OxCam_Arc_Ambition.pdf

¹² Analysis commissioned by EWR Co.

¹³ The figures are presented in discounted 2011 prices and sourced from <https://www.nic.org.uk/wp-content/uploads/Economic-analysis-Cambridge-Econometrics-SQW-report-for-NIC.pdf>.

3.6 Improving east-west connectivity can help realise the Arc's productivity potential in several ways including:



Direct cost savings for businesses from reduced travel times and being able to invest more of their time in production or industry innovation



Reduced cost pressures on firms from not needing to pay their employees higher wages purely to compensate for longer journey times and higher commuting costs



Increases in labour supply from reduced commute times, with commuters being able to choose to spend the time that is freed up either at work or for leisure, creating opportunities for higher wages if employees are more productive



Agglomeration benefits through greater density of economic activity, with firms moving closer to each other and their labour markets, and benefitting from reduced journey times.

3.7 EWR can also support the delivery of new homes in the Arc and reduce pressures on housing affordability by unlocking land for development and providing more sustainable transport connections. Through helping to make housing more affordable, EWR can reduce the need for firms to pay higher wages purely to compensate employees for their additional housing costs, enabling businesses to grow, become more competitive and create new job opportunities.

3.8 The specific benefits of providing east-west rail connectivity across the Arc rather than further improvements to the road network include:

- Providing shorter journey times into city centres, particularly for commuters at peak times when roads are increasingly congested
- Providing faster journey times over longer distances, for example for business travel between Cambridge, Oxford, Bedford, and Milton Keynes
- Enabling commuters and business passengers to spend their travel time being productive, benefitting from amenities such as internet connectivity, charging points, and tray tables
- Making the labour market more accessible for people who don't drive and spreading demand for housing outside towns and cities, particularly benefitting younger workers¹⁴

3.9 These factors are reflected in the increasing popularity of rail travel among commuters and business passengers, particularly those working in highly productive industries such as in the Arc's industry clusters.

3.10 While other public transport interventions such as the proposed Cambridgeshire Autonomous Metro could support housing growth and connectivity within the Cambridge area, only EWR fulfils the need to connect economic centres across the Arc.

Strategic objectives

3.11 The strategic objectives for EWR reflect the vision for EWR as an inter-urban commuter railway that supports the ambitions for growth and housing across the Arc.

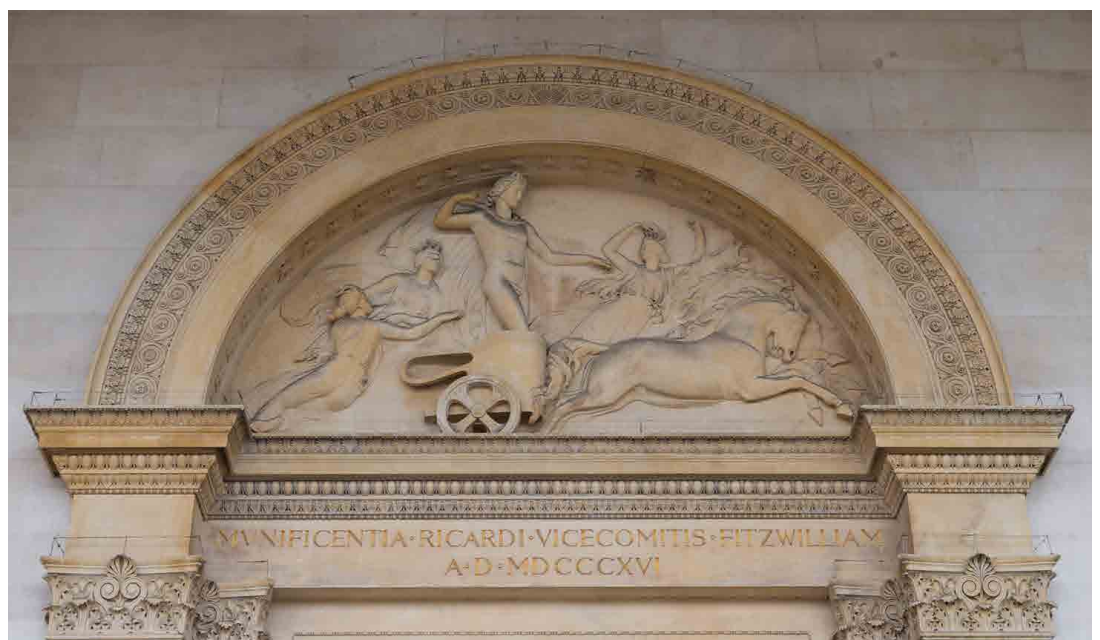
3.12 The strategic objectives for EWR that have been set by the DfT are:

- Improve east-west public transport connectivity by providing rail links between key urban areas (current and anticipated) in the Oxford-Cambridge Arc

¹⁴ In England, around a third of the population aged 21 to 29 and around a quarter aged 30 to 39 do not hold driving licences. Figures are EWR Co analysis based on National Travel Survey data, sourced from <https://www.gov.uk/government/statistical-data-sets/nts02-driving-licence-holders>.

- Stimulate economic growth, housing, and employment through the provision of new, reliable and attractive inter-urban passenger train services in the Oxford-Cambridge Arc
- Meet initial forecast passenger demand
- Consider and plan for future passenger demand, making provision where it is affordable
- Contribute to improved journey times and inter-regional passenger connectivity by connecting with north-south routes and routes beyond Oxford and Cambridge
- Maintain current capacity for rail freight and make appropriate provision for anticipated future growth
- Provide a sustainable and value for money transport solution to support economic growth in the area

3.13 The overall vision and strategic objectives for EWR are not expected to change significantly. However, final decisions on the frequency of services, station calling patterns, and journey times will depend on further consideration of operational issues and the demand for EWR services, including taking account of plans for growth across the Arc as they become clearer.



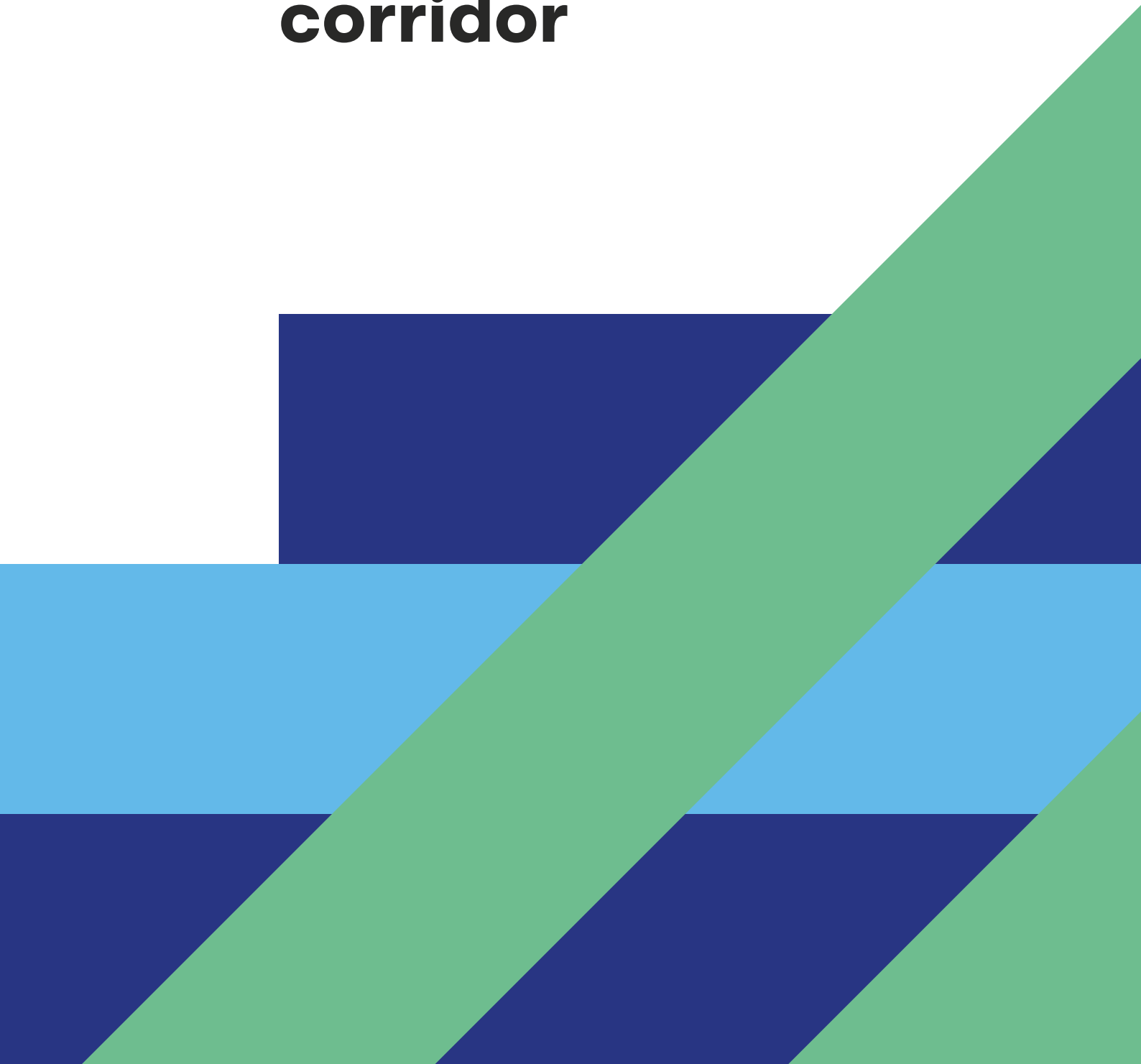
Fitzwilliam Museum,
Cambridge



Cardington Airfield,
Bedford

04.

Identifying the preferred route corridor



- 4.1** Prior to EWR Co being established, twenty potential route corridors were considered at a high level by Network Rail based on the priority journey pairs and conditional outputs developed by the EWR Consortium.¹⁵
- 4.2** These twenty corridors spanned the area from St Albans and Harlow to Peterborough and were discussed with a working group comprising representatives from DfT, the rail industry, local authorities, and the EWR Consortium.
- 4.3** Five potential route corridors were selected for further work after appraising the potential corridors against the initial strategic objectives, conditional outputs, and a range of selection criteria agreed by the working group.¹⁶ These five corridors, illustrated in Figure 4.1, were:
- Corridor C: Bletchley – Stewartby – Bedford – Sandy – Cambridge¹⁷
 - Corridor D: Bletchley – Stewartby – Bedford – Sandy – Hitchin – Cambridge
 - Corridor H2: Bletchley – Stewartby – Flitwick – Luton – Stevenage – Hitchin – Cambridge
 - Corridor M: Bletchley – Stewartby – Bedford – Hitchin – Cambridge¹⁸
 - Corridor N: Bletchley – Ridgmont – Harlington – Hitchin – Cambridge

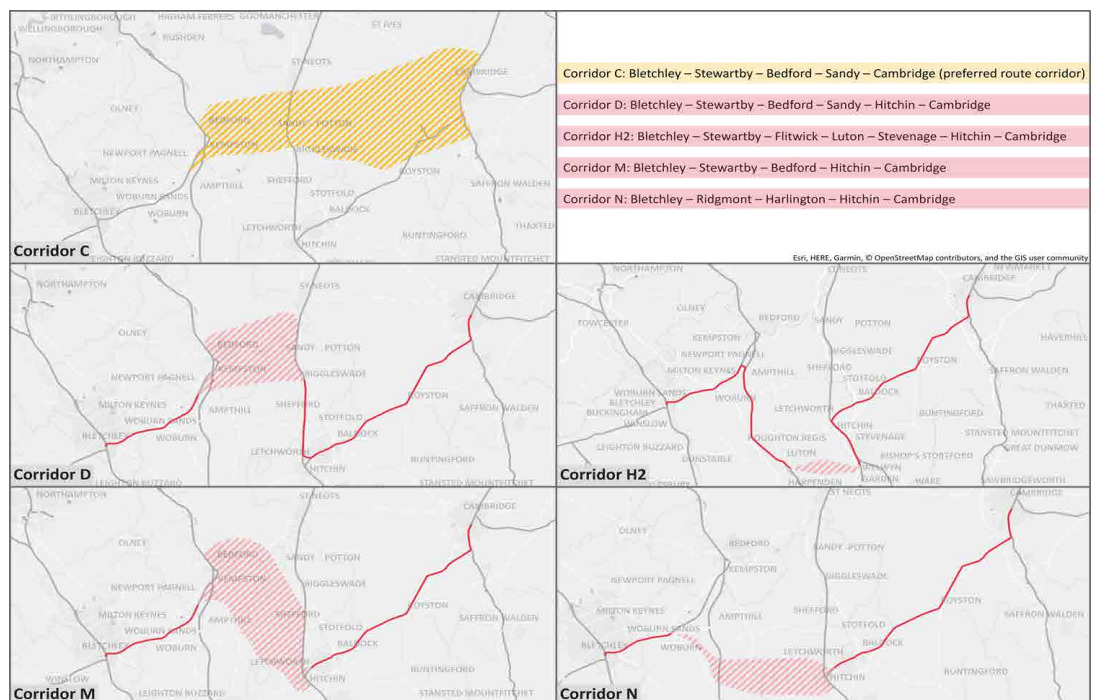


Figure 4.1: map of the five potential route corridors subject to detailed analysis

- 4.4** A quantitative assessment of the potential costs and benefits of these five corridors was undertaken. The assessment was informed by engineering studies and resulted in the potential route corridors being narrowed down to the corridor via Sandy or via Hitchin (corridors C and M).
- 4.5** Further analysis of both corridors indicated that route options within the corridor via Sandy (corridor C) would generate higher benefits than route options within the corridor via Hitchin (corridor M) while incurring similar capital costs and lower operating costs, resulting in higher indicative Benefit-Cost Ratios (BCRs).
- 4.6** The corridor via the broad area around Sandy (corridor C) was therefore selected as the preferred route corridor in 2016.
- 4.7** Although this decision reflected the previous strategic objectives for EWR, EWR Co's judgement is that the choice of route corridor remains appropriate in the context of the revised strategic objectives. This is because the initial analysis considered future housing and employment plans, and there are considerable opportunities for growth and housing within the preferred route corridor.
- 4.8** EWR Co sought views on the choice of preferred corridor through the non-statutory public consultation between January and March 2019. Some responses indicated concern that EWR did not pass through places such as Hitchin, Stevenage and Luton. Routes via these areas were previously considered but were ruled out based on generating lower overall benefits.
- 4.9** Other concerns about the route corridor raised at consultation, such as the route corridor not passing through areas to the north of Cambridge, and the route not aligning with the A428, are addressed in Section 16 of this report.

¹⁵ The EWR Consortium is a group of local authorities and businesses that initially promoted EWR. The Consortium is distinct from the EWR Co established by the DfT. More details on the Consortium are available at <https://www.eastwestrail.org.uk>. Journey-pair outputs were ranked by estimated passenger and freight value and economic priority.

¹⁶ The initial twenty corridors that were considered and the approach used to sift down to a single preferred corridor, including the full set of selection criteria, are described in more detail at <https://cdn.networkrail.co.uk/wp-content/uploads/2017/03/Engineering-Summary-Report.pdf>.

¹⁷ Two variants of this corridor were considered: a corridor through the centre of Bedford and a corridor via the south of Bedford.

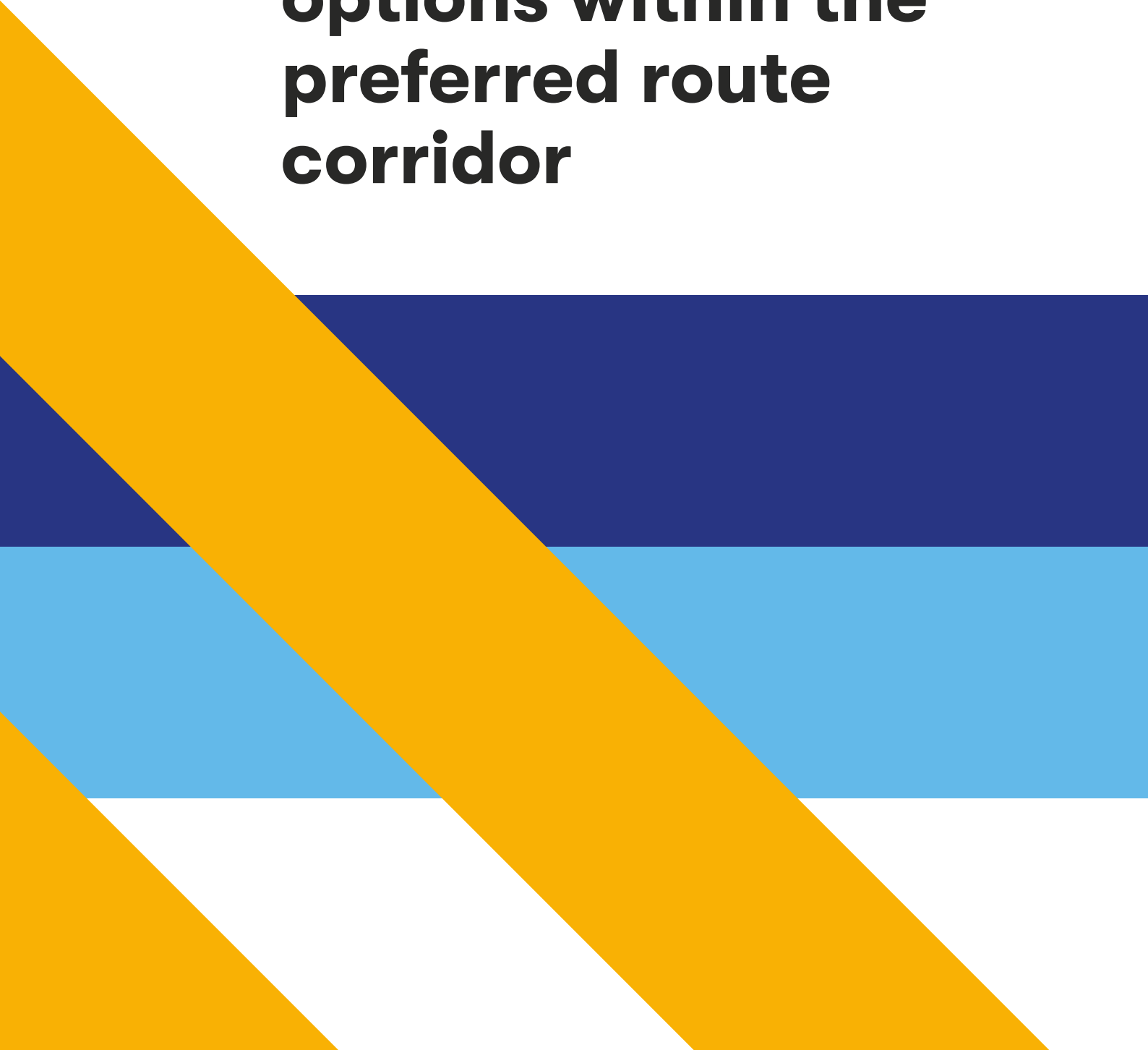
¹⁸ Two variants of this corridor were considered: a corridor through the centre of Bedford and a corridor via the south of Bedford.



Bedford Market Square

05.

Approach to evaluating route options within the preferred route corridor



- 5.1** Having identified the corridor via the broad area around Sandy as the preferred route corridor, the next stage in developing plans for the EWR section between Bedford and Cambridge was to consider route options within that corridor.
- 5.2** The route corridor considered by EWR Co had defined start and finish points around Stewartby near Bedford and in Cambridge, but increased to around 15 kilometres in width where it crosses the East Coast Main Line and through South Cambridgeshire.
- 5.3** The route options that EWR Co considered within the preferred corridor still covered a relatively broad area, in some places of up to several kilometres wide, within which the final alignments of the new railway and stations would be located.
- 5.4** A wide range of factors were considered to inform the appraisal of route options within the preferred route corridor. The first five factors described below were considered most likely to differentiate between route options and were therefore given substantial weight in decision-making. EWR Co avoided attributing formal numeric weight to each criteria to enable a balanced decision to be made based on all relevant considerations.



Bedford Park

Transport user benefits

- 5.5** The first key criteria that was considered were the potential benefits for transport users from improved journey times, lower fares, and less road congestion. These benefits were assessed using a transport model that was initially developed for the EWR section between Oxford and Bedford.
- 5.6** The scope of the transport modelling included estimating demand for EWR journeys between Oxford and Cambridge and other stations, with demand varying depending on the scale of the expected improvement in the Generalised Journey Time (GJT).¹⁹
- 5.7** A ‘gravity model’ was used to forecast demand because EWR would significantly reduce rail journey times, and there is low existing rail demand between these places and other places across the Arc that would benefit from the new railway.²⁰
- 5.8** Standard assumptions on how demand varies in response to changes in GJT were used to estimate demand for trips with smaller improvements in journey times.²¹ More detail on this analysis is set out in Annex A.

¹⁹ Generalised Journey Time (GJT) is a measure incorporating total station-to-station journey time plus time penalties based on the frequency of service and the number of interchanges required.

²⁰ The gravity model approach estimates demand based on the attraction between places reflecting factors such as population, employment levels and the new, improved journey times.

²¹ GJT elasticities are sourced from the Passenger Demand Forecasting Handbook version 6 and endorsed in the DfT transport appraisal guidance. More detail is available in Section 8 of the DfT TAG Unit M4 (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/712780/tag-unit-m4-forecasting-and-uncertainty_jul2017.pdf).

Supporting the delivery of new homes

- 5.09** The second key criteria that was considered is the ability for each potential route option between Bedford and Cambridge to support the delivery of new homes.
- 5.10** EWR Co is not in a position to have a view on the specific number of homes that could be delivered. However, in advance of the consultation EWR Co commissioned analysis of the developable land capacity around potential EWR stations. This analysis indicated how many homes might theoretically be supported by potential EWR stations but did not imply those homes would be built or were all directly dependent on the railway.
- 5.11** The analysis of land capacity was supplemented by modelling the potential net national economic benefits of additional housing in the area between Bedford and Cambridge.

Supporting economic growth

- 5.12** The third key criteria was the ability for each route option to support economic growth and the government's aspirations for the Oxford-Cambridge Arc.
- 5.13** The economic model used to estimate the potential economic benefits of new housing supported by EWR growth was also used to estimate the potential wider employment and productivity benefits of the EWR section between Bedford and Cambridge, measured through potential increases in jobs and GVA.
- 5.14** The analysis provided indicative levels of employment and productivity growth supported by each route option.

Capital and operating costs and overall affordability

- 5.15** The fourth key criteria used to assess potential route options was their estimated costs and likely overall affordability.

- 5.16** To inform EWR Co's initial consultation on route options between January and March 2019, cost estimates were developed to a sufficient level of confidence to indicate how costs might vary across route options and to understand the potential value for money implications. These initial estimates of capital and operating costs were indicative and included an appropriately high level of optimism bias.²²
- 5.17** Further updates to the cost estimates since the consultation are described in Chapter 9. The revised indicative capital cost estimates were used to inform the final decision on the preferred route and are therefore presented in this report.

Environmental impacts and opportunities

- 5.18** The fifth key criteria that was used to assess route options was the potential environmental impacts and opportunities.
- 5.19** A wide range of potential environmental features were initially mapped to inform potential route options. Route options were developed to minimise potential adverse impacts on designated and sensitive sites, as well as impacts on existing housing.
- 5.20** Transport-related environmental benefits of EWR such as air quality impacts from reduced car usage and carbon emissions were appraised in line with DfT guidance.²³



Charter Market,
Bedford

Fitzwilliam Museum,
Cambridge



Other factors

5.21 A second set of factors were also considered but appeared to be more likely to result in similar outcomes. They were therefore used to assist in differentiating between route options to a lesser degree:

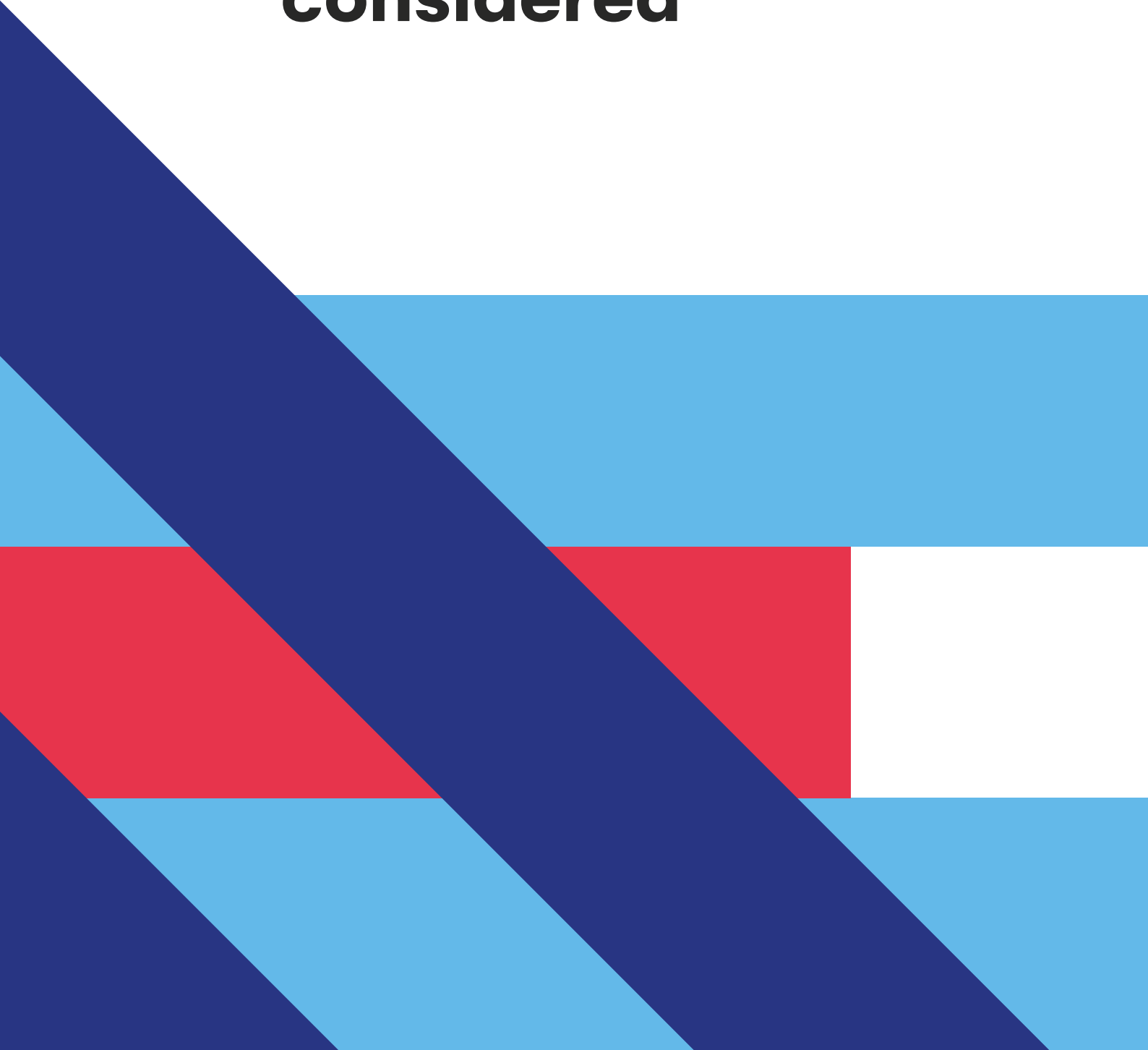
- Short-distance passenger services and connectivity to support commuting into key employment hubs (current and future)
- Rail passenger connectivity to existing mainlines
- Long distance passenger services
- Satisfying existing and future freight demand (as anticipated by the freight industry) where affordable
- Railway performance and alignment with wider railway strategy and infrastructure
- Safety risk (construction and operation)
- Consistency with plans for the location of settlements.

²² Optimism bias adjusts the cost estimates to allow for potential optimism. This uplifts capital costs by 64% and operating costs by 1.6% (sourced from DfT TAG unit A5-3). Costs are estimated over a 60 year period.

²³ DfT guidance on appraisal of environmental impacts is available at <https://www.gov.uk/government/publications/webtag-tag-unit-a3-environmental-impact-appraisal-december-2015>.

06.

Route options that were initially considered



6.1 The overall approach to identifying route options within the preferred route corridor via the broad area around Sandy was framed around three questions:

- Where could EWR provide an interchange with the Midland Main Line?
- Where could EWR provide an interchange with the East Coast Main Line?
- What route could EWR take through South Cambridgeshire, including where any potential additional stations might be located?

6.2 These questions, when combined with the strategic objectives for EWR and the route selection criteria, generated eleven route options within the preferred route corridor that are illustrated in Figures 6.1 and 6.2 and described in paragraphs 6.3 to 6.13.

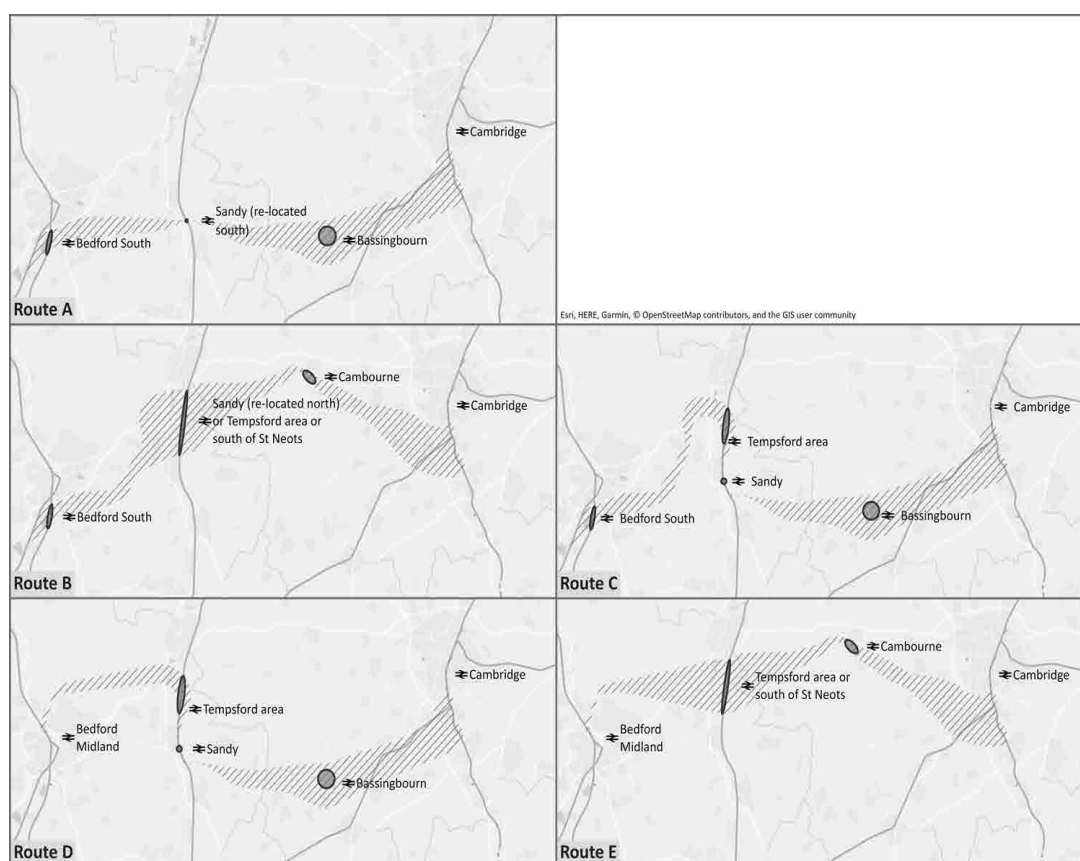


Figure 6.1: route options considered within the preferred route corridor via the broad area around Sandy (Routes A-E)

- 6.3 Route A: Bedford South – Sandy (re-located south) – Cambridge (via Bassingbourn):** EWR could serve a new station to the south of Bedford, providing an interchange with the Midland Main Line. The route could then provide an interchange with the East Coast Main Line via a new re-located Sandy station to the south of the existing station, before continuing eastwards and passing through South Cambridgeshire between Arrington and Bassingbourn. The route could then connect to the West Anglia Main Line into Cambridge around Great Shelford (possibly via first connecting to the existing Hitchin-Cambridge line).
- 6.4 Route B: Bedford South – Sandy (re-located north) / Tempsford area / south of St Neots – Cambourne – Cambridge:** EWR could serve a new station to the south of Bedford, providing an interchange with the Midland Main Line. The route could then provide an interchange with the East Coast Main Line via a new station between Sandy and St Neots. This station could be a new re-located Sandy station slightly to the north of the existing station or a new station further north. The route could then run north-eastwards to a potential new station around Cambourne, before heading south-eastwards (to the north of the Radio Astronomy Observatory) and connecting to the West Anglia Main Line into Cambridge around Great Shelford.
- 6.5 Route C: Bedford South – Tempsford area – Sandy – Cambridge (via Bassingbourn):** EWR could serve a new station to the south of Bedford, providing an interchange with the Midland Main Line. The route could then loop round to serve a new station on the East Coast Main Line in the broad area around Tempsford, before continuing on or alongside the East Coast Main Line and providing a further interchange via the existing Sandy station. EWR could then diverge from the East Coast Main Line south of the existing Sandy station and continue eastwards across South Cambridgeshire between Arrington and Bassingbourn. The route could then connect to the West Anglia Main Line into Cambridge around Great Shelford (possibly via first connecting to the existing Hitchin-Cambridge line).
- 6.6 Route D: Bedford Midland – Tempsford area – Sandy – Cambridge (via Bassingbourn):** EWR could continue along the Marston Vale Line and provide an interchange with the Midland Main Line via the existing Bedford Midland station. The route could then diverge from the Midland Main Line to the north of Bedford and loop round to serve a new station on the East Coast Main Line in the broad area around Tempsford, before continuing on or alongside the East Coast Main Line and providing a further interchange via the existing Sandy station. EWR could then diverge from the East Coast Main Line south of the existing Sandy station and continue eastwards across South Cambridgeshire between Arrington and Bassingbourn. The route could then connect to the West Anglia Main Line into Cambridge around Great Shelford (possibly via first connecting to the existing Hitchin-Cambridge line).

6.7 Route E: Bedford Midland – Tempsford area / south of St Neots – Cambourne

– **Cambridge:** EWR could continue along the Marston Vale Line and provide an interchange with the Midland Main Line via the existing Bedford Midland station. The route could then diverge from the Midland Main Line to the north of Bedford and provide an interchange with the East Coast Main Line via a new station in the broad areas around Tempsford or to the south of St Neots. The route could then run north-eastwards to a potential new station around Cambourne, before heading south-eastwards (to the north of the Radio Astronomy Observatory)²⁴ and then connecting to the West Anglia Main Line into Cambridge around Great Shelford.



Figure 6.2: route options considered within the preferred route corridor via Sandy (Routes F–L)

6.8 Route F: Bedford South – Sandy (re-located north) – Cambridge

EWR could serve a new station to the south of Bedford, providing an interchange with the Midland Main Line. The route could then provide an interchange with the East Coast Main Line via a new re-located Sandy station to the north of the existing station. From there the route could run more directly eastwards across South Cambridgeshire, north of the Wimpole Estate and south of the villages of Great Eversden, Little Eversden and Harlton, and then to the south of the Radio Astronomy Observatory. The route could then connect to the West Anglia Main Line into Cambridge around Great Shelford (possibly via first connecting to the existing Hitchin–Cambridge line).

²⁴ The Wimpole Estate is a registered park and garden owned by the National Trust.

- 6.9 Route G: Bedford Midland – Tempsford area – Cambridge:** EWR could continue along the Marston Vale Line and provide an interchange with the Midland Main Line via the existing Bedford Midland station. The route could then diverge from the Midland Main Line to the north of Bedford and provide an interchange with the East Coast Main Line via a new station in the broad area around Tempsford. From there the route could continue eastwards across South Cambridgeshire, north of the Wimpole Estate and south of the villages of Great Eversden, Little Eversden and Harlton, and then to the south of the Radio Astronomy Observatory. The route could then connect to the West Anglia Main Line into Cambridge around Great Shelford (possibly via first connecting to the existing Hitchin-Cambridge line).
- 6.10 Route H: Bedford Midland – Sandy (re-located south) – Cambridge (via Bassingbourn):** EWR could continue along the Marston Vale Line and provide an interchange with the Midland Main Line via the existing Bedford Midland station. The route could then diverge from the Midland Main Line to the north of Bedford and provide an interchange with the East Coast Main Line via a new (re-located) Sandy station to the south of the existing station. The route could then continue eastwards across South Cambridgeshire between Arrington and Bassingbourn and connect to the West Anglia Main Line into Cambridge around Great Shelford (possibly via first connecting to the existing Hitchin-Cambridge line).
- 6.11 Route J: Bedford Midland – Sandy – Cambridge (via Bassingbourn):** EWR could continue along the Marston Vale Line and provide an interchange with the Midland Main Line via the existing Bedford Midland station. The route could then diverge from the Midland Main Line to the north of Bedford and loop round to provide an interchange with the East Coast Main Line via the existing Sandy station. EWR could then diverge from the East Coast Main Line south of the existing Sandy station and continue eastwards across South Cambridgeshire between Arrington and Bassingbourn. The route could then connect to the West Anglia Main Line into Cambridge around Great Shelford (possibly via first connecting to the existing Hitchin-Cambridge line).
- 6.12 Route K: Bedford South – Sandy – Cambridge (via Bassingbourn):** EWR could serve a new station to the south of Bedford, providing an interchange with the Midland Main Line. The route could then loop round to provide an interchange with the East Coast Main Line via the existing Sandy station, before diverging from the East Coast Main Line south of the existing Sandy station and continuing eastwards across South Cambridgeshire between Arrington and Bassingbourn. The route could then connect to the West Anglia Main Line into Cambridge around Great Shelford (possibly via first connecting to the existing Hitchin-Cambridge line).

6.13 Route L: Bedford Midland – Tempsford area – Cambridge (via Bassingbourn):

EWRC could continue along the Marston Vale Line and provide an interchange with the Midland Main Line via the existing Bedford Midland station. The route could then diverge from the Midland Main Line to the north of Bedford and provide an interchange with the East Coast Main Line via a new station in the broad area around Tempsford. From there the route could run directly south-eastwards and pass between Arrington and Bassingbourn, before connecting to the West Anglia Main Line into Cambridge around Great Shelford (possibly via first connecting to the existing Hitchin-Cambridge line).



Senate House Passage,
Cambridge

07.

Route options that were ruled out ahead of consultation



7.1 Six of the eleven route options considered were ruled out following an initial sift. These route options were compared against similar routes that appeared to perform better against the key criteria described in Chapter 5. Route options that were ruled out are shown in Figure 7.1 and described in paragraphs 7.2 to 7.7.



Figure 7.1: route options ruled out in advance of consultation

7.2 Route F: Bedford South – Sandy (re-located north) – Cambridge:

- Route F was similar to Route B but unlike Route B does not serve Cambourne, which has been identified for growth in the South Cambridgeshire local plan
- Initial cost estimates indicated that Route F would incur slightly higher upfront capital costs than Route B despite the shorter route length, reflecting the more challenging environmental landscape east of the Sandy area
- Route F was estimated to generate lower transport user benefits and lower fare revenues than Route B because it would not serve Cambourne

7.3 Route G: Bedford Midland – Tempsford area – Cambridge:

- Route G was similar to Route E but unlike Route E does not serve Cambourne, which has been identified for growth in the South Cambridgeshire local plan
- Route G was estimated to incur slightly higher initial capital costs than Route E despite the shorter route length, reflecting the more challenging environmental landscape east of the Sandy area
- Route G was estimated to generate lower transport user benefits and lower fare revenues than Route E because it would not serve Cambourne

7.4 Route H: Bedford Midland – Sandy (re-located south) – Cambridge (via Bassingbourn):

- Route H was similar to Route D, although Route D includes an additional station in the broad area around Tempsford
- Initial cost estimates indicated that Route H would incur slightly higher upfront capital costs than Route D
- Route H and Route D were estimated to generate similar transport user benefits and fare revenues. This is because the additional journey time penalty for EWR services stopping at a new station in the broad area around Tempsford on Route D would be offset by the additional benefits for passengers in the wider Sandy and St Neots area

- Unlike Route D, Route H would require the existing Sandy station to be re-located, which could impact adversely on the ability of the existing Sandy population to access rail services
- Unlike Route D, Route H would also forego the opportunity to support additional growth and housing in the broad area around Tempsford

War Memorial in
Bedford by Charles
Sargeant Jagger



7.5 Route J: Bedford Midland – Sandy – Cambridge (via Bassingbourn):

- Route J was estimated to generate transport user benefits similar to Route D. However, Route J would forego the opportunity to support additional growth and new homes in the broad area around Tempsford
- Development in the immediate vicinity of Sandy is likely to be constrained by the A1 and environmental features including the Sandy Warren Site of Special Scientific Interest (SSSI) and RSPB nature reserve

7.6 Route K: Bedford South – Sandy – Cambridge (via Bassingbourn):

- Route K was similar to Route A
- Initial cost estimates indicated Route K would incur slightly higher upfront capital costs than Route A
- Route K was estimated to generate lower transport user benefits than Route A because of the slightly longer journey times
- Route K appeared to offer relatively little additional housing potential given constraints in the vicinity of Sandy, including the A1 and environmental features such as the Sandy Warren SSSI and RSPB nature reserve

7.7 Route L: Bedford Midland – Tempsford area – Cambridge (via Bassingbourn):

- Route L was similar to Route D but would not serve Sandy
- Initial cost estimates indicated that Route L would incur higher upfront capital costs than Route D
- While Route L would result in slightly faster journey times between Bedford and Cambridge than Route D, Route L would result in an additional journey time penalty for the existing population of Sandy that would need to use Thameslink services to interchange onto EWR services via new station in the broad area around Tempsford

The Fitzwilliam Museum,
Cambridge

08.

Route options shortlisted for consultation



- 8.1** Routes A, B, C, D and E were taken forward for the non-statutory public consultation between January and March 2019, based on their performance against the key criteria described in Chapter 5. These five route options are shown in Figure 8.1.

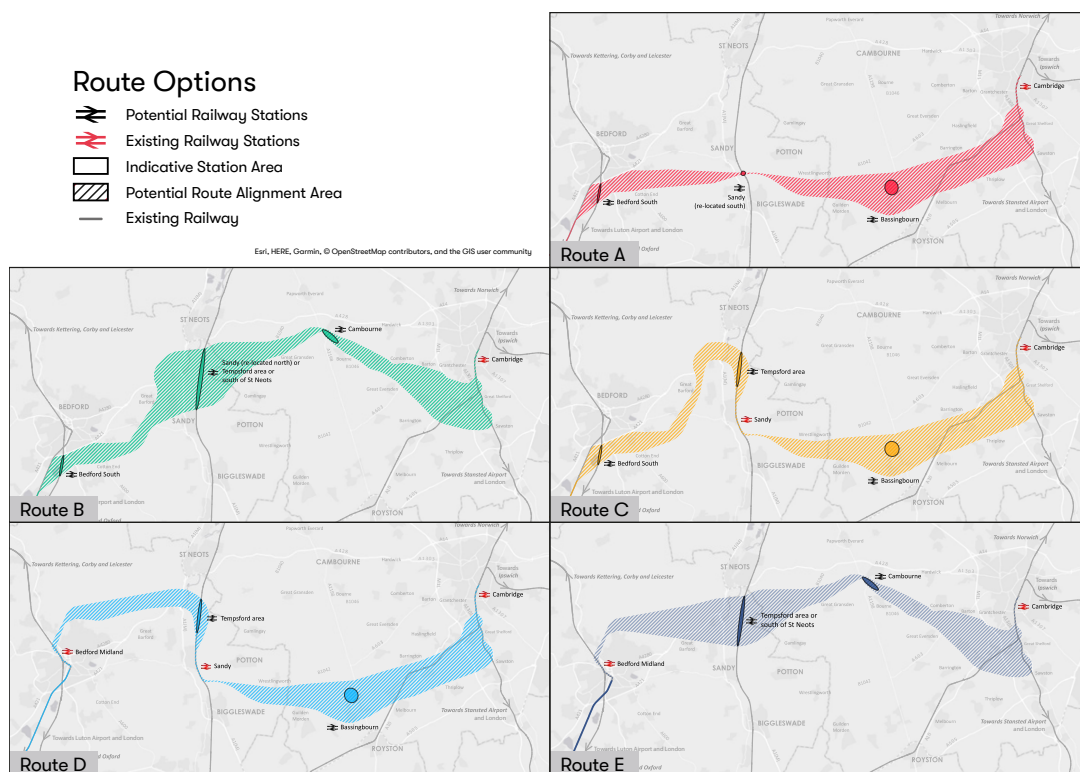


Figure 8.1: route options taken forward for an initial non-statutory consultation

- 8.2** EWR Co sought views on the approach to sifting down route options through the public consultation. Most respondents supported the approach that had been taken.
- 8.3** All five shortlisted route options were consistent with the NIC's recommendation for a multi-modal corridor between Oxford and Cambridge combining EWR and the proposed new A428 dual carriageway between Black Cat and Caxton Gibbet (commonly referred to as part of the Oxford to Cambridge Expressway).²⁵
- 8.4** A broad area was shown in some places for each route option, reflecting the need for further detailed consideration of the precise railway alignment and station locations once the preferred route had been identified. The number and location of stations were noted to be indicative.

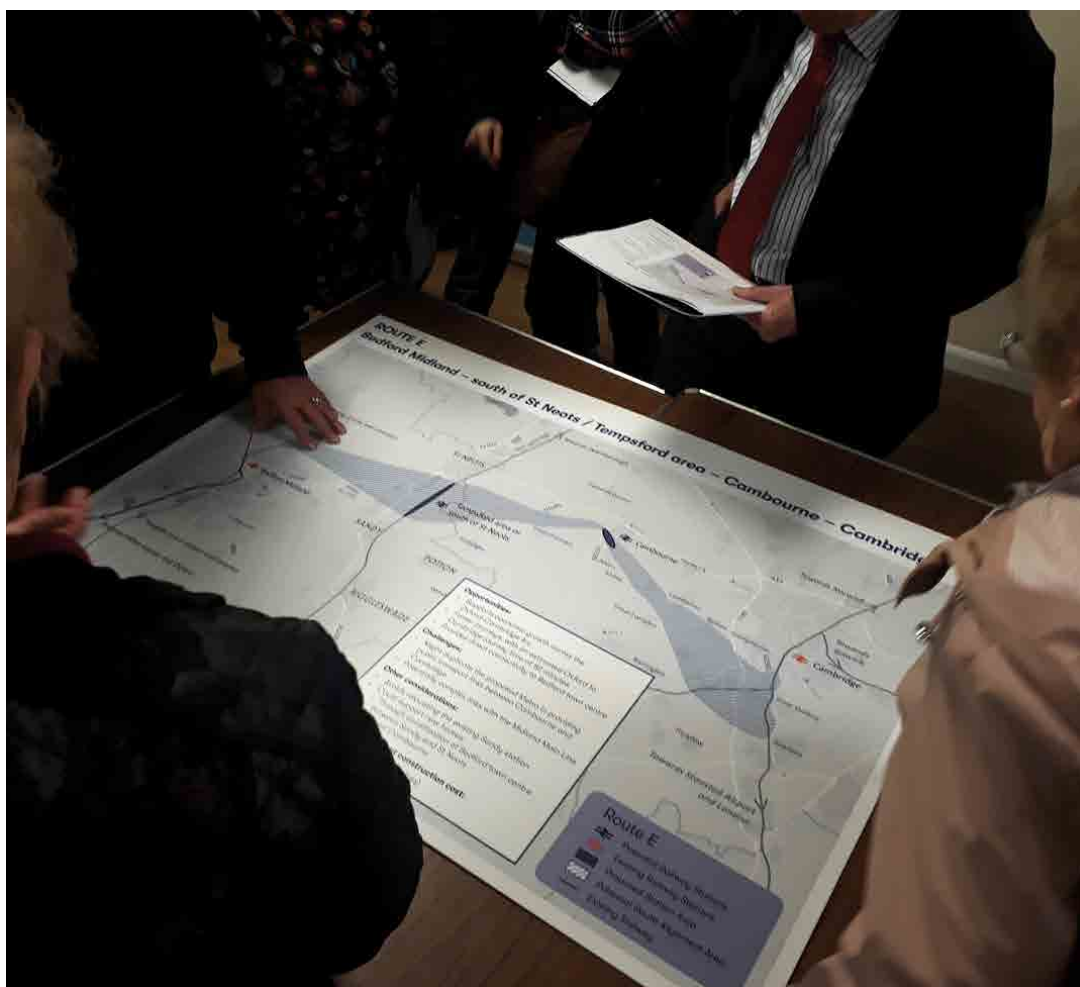
²⁵ Contrary to views expressed during EWR Co's non-statutory consultation, the NIC did not envisage the EWR track sitting immediately adjacent to the Expressway, rather serving the same broad catchment areas.

09.

Further assessment of route options since consultation



- 9.1** Following the non-statutory consultation between January and March 2019 EWR Co has considered the responses from members of the public and other organisations, including statutory consultees. EWR Co has also undertaken further analysis to develop the evidence base that informed the choice of a preferred route.



Participants reviewing route options at a consultation event

Benefits to transport users

9.2 Passenger demand for EWR and its associated impact on transport users has been estimated using a transport model ('EWR transport model') based on established methodologies used across transport appraisal schemes.

9.3 Transport user benefits are those typically assessed for rail appraisal schemes and are aggregated over a 60-year period. The impacts cover:

- Benefits to rail users from faster journeys and lower fares²⁶
- Benefits to road users associated with diverting road users towards rail, including from faster journeys and reduced fuel/maintenance costs
- Reduction in indirect tax revenue from passengers using rail more frequently and spending less on taxable goods and services such as fuel
- Benefits of reduced environmental impacts (air quality, greenhouse gases and noise) and fewer road traffic accidents as a result of less road travel, which are partly offset by carbon emissions from trains

9.4 The DfT initially commissioned the transport model to assess the benefits to transport users of EWR services to the west of Bedford to support the TWAO application for upgrades to infrastructure between Oxford and Bedford that was submitted by Network Rail in July 2018.

9.5 A further version of the model was then developed to estimate the incremental benefits to transport users of a new railway between Bedford and Cambridge and extending EWR services to Cambridge.

9.6 EWR Co commissioned further updates to the EWR transport model following the consultation to:

- Better capture benefits associated with Oxford-Cambridge services, particularly where EWR would serve areas that are not currently served by rail
- Incorporate the latest DfT appraisal guidance and rail demand projections

²⁶ Fares are assumed to be lower than for existing journeys because of the shorter distances and more direct connectivity provided by EWR.



9.7 EWR Co has assessed benefits under two demand scenarios, varying the level of future housing and population growth in light of wider growth ambitions for the Oxford-Cambridge Arc:

- **A ‘DfT business as usual’ demand scenario** uses DfT forecasts on national population and housing growth. The scenario assumes an average of 11,000 new homes across the Arc each year by 2050
- **An ‘NIC-based high growth’ demand scenario** is based on the NIC’s vision for an additional one million new homes by 2050 across the Arc. The scenario assumes an average of 30,000 new homes across the Arc per year. The spatial allocation of these new homes is based on supporting analysis undertaken for the NIC by Steer

9.8 Neither scenario assumes that the magnitude of housing growth across the Arc is dependent on EWR. Both demand scenarios are indicative and do not reflect EWR Co’s views on the location or number of homes that would be built in any particular area.

9.9 Annex A provides further detail on the updates to the EWR transport model since consultation and the assumptions underpinning the analysis of transport user benefits.

Supporting economic growth

- 9.10** Ahead of the non-statutory consultation between January and March 2019, EWR Co commissioned analysis of the potential increases in productivity and employment arising from changes in land use and business activity in response to the better transport connectivity provided by EWR.
- 9.11** Following the consultation, EWR Co commissioned further analysis of the wider economic impacts that DfT appraisal guidance considers to be additional to ‘transport user benefits’ without any changes in land use:
- Agglomeration benefits from reducing journey times between businesses and their labour markets, referred to as static clustering
 - Increased output in imperfectly competitive markets, which DfT guidance suggests should be equal to 10% of business transport user benefits
- 9.12** These wider impacts considered within the DfT appraisal guidance were only estimated under the ‘DfT business as usual’ demand scenario. While they give an indication of some wider growth benefits of EWR, they do not capture all of the impacts that would be expected when there are changes in land use in response to the railway are also considered.



EWR Consultation at
Potton Community Centre

Cost and overall affordability

- 9.13** The estimates of upfront capital costs for each route option that EWR Co published for the consultation between January and March 2019 were provided by Network Rail and presented as indicative figures based on the information that was available at the time.²⁷
- 9.14** Following the consultation, the cost estimates were updated based on further assessment of environmental, engineering and technical challenges. This further work sought to anticipate the issues that other projects have faced and thereby reduce the risk of further cost increases later in the project.
- 9.15** The approach to updating the indicative cost estimates included:
- More detailed consideration of how environmental and heritage risk areas could be avoided, and the potential additional land requirements for ecological habitat creations and relocations
 - Considering how properties and buildings could be avoided to minimise adverse impacts on local communities and land acquisition and compensation costs
 - Assuming viaducts would be required to mitigate known areas of flood plain risk in advance of detailed flood risk assessments
 - Seeking to respect existing rights of way by including provision to maintain access through appropriate structures (e.g. bridges, underpasses)
- 9.16** This more conservative approach to generating the most recent indicative cost estimates largely accounts for the increase in estimated capital costs for most route options since consultation. It has enabled the decision on a preferred route to be based on more robust and reliable information, while still providing an opportunity to optimise the design in the next stage of the project.

²⁷ EWR Co noted in the EWR Bedford to Cambridge Route Option Consultation Technical Report Cost that cost estimates had been developed in more detail for some route options at the time of consultation.

- 9.17** Estimates for the operating costs, whole life costs, and revenues of each route option were generated through the model that was used to estimate transport user benefits.
- 9.18** Operating costs include rolling stock lease costs, energy costs, rolling stock maintenance, variable and capacity track charges, staff costs and station operating costs. Whole Life Costs (WLCs) are made up of two components: fixed infrastructure maintenance and capital expenditure renewal. Revenue estimates capture the net change in railway passenger fare revenues after the introduction of EWR services.²⁸
- 9.19** Following the consultation EWR Co also commissioned analysis of the potential uplift in land values around EWR stations.
- 9.20** This analysis was used primarily to understand how land values might evolve over time as the project progresses and local authorities consider allocating sites for development. However, it was also used to confirm that the opportunities for seeking to capture a share of the uplift in land values were broadly comparable across route options and therefore not a key differentiating factor.

Supporting the delivery of new housing

- 9.21** Following the non-statutory consultation between January and March 2019, EWR Co's further consideration of the opportunities for each route option to support the delivery of new housing has focused on reviewing responses to the consultation, in particular responses from, and further engagement with, the relevant local planning authorities.

²⁸ These revenue projections exclude potential revenue arising from car parking or other ancillary services.

Environmental impacts and opportunities

- 9.22** In advance of the consultation EWR Co mapped a wide range of potential environmental features to inform potential route options, and identify some of the key environmental challenges associated with each route option.
- 9.23** Following consultation a more detailed comparative assessment of route options was undertaken to evaluate their environmental sustainability. This desk-based study identified the key environmental features of each route option, the differences between them, and their relative merits and constraints. It also outlined the potential for mitigating environmental impacts and the opportunities for supporting environmental net gain, particularly biodiversity net gain.
- 9.24** The detailed approach to the environmental sustainability comparative assessment is outlined in Annex B. The main aims were to:
- Develop environmental objectives and criteria to assess the environmental sustainability and level of mitigation required for each route option
 - Determine the environmental baseline conditions of the route corridor between Bedford and Cambridge
 - Identify environmental features where every reasonable effort should be made to avoid such features;
 - Take account of how the route options compare in coming to a final decision on the preferred route option

Equality Impacts

- 9.25** EWR Co is subject to the Public Sector Equality Duty under section 149 of the Equality Act 2010 so has chosen to carry out an Equality Impact Assessment (EQulA) of its proposals for EWR.
- 9.26** The EQulA will be undertaken for the preferred route to inform the final route alignment and to assess whether proposals for the EWR project have a disparate impact on persons with protected characteristics.
- 9.27** EWR Co will put in place mitigating measures to reduce any interference with the human rights of those affected by the development and will ensure that it discharges its duty of care towards persons affected as the project progresses.

10.

Route A:

Bedford South – Sandy (re-located south) – Bassingbourn – Cambridge



Figure 10.1: map of Route A



Description of Route A

10.1 Route A would:

- Diverge from the Marston Vale Line around Stewartby near Bedford and serve ‘Bedford South’ station to the south of the A421, providing a direct interchange with Thameslink services along the Midland Main Line
- Serve a new split-level Sandy station re-located to the south of the existing station, providing an interchange with the East Coast Main Line, before running between the Sandy Warren SSSI and Biggleswade Common
- Potentially serve an additional station on the MoD site at Bassingbourn
- Connect to the West Anglia Main Line at/around Shepreth Junction near Great Shelford, possibly after first connecting to the existing Hitchin-Cambridge Line

Consultation feedback

- 10.2** Route A received support for the shorter, quicker nature of the route, as well as the cheaper delivery cost, compared to other route options.
- 10.3** However, potential concerns were raised around:
- Potential impacts to the RSPB Nature Reserve at Sandy, Biggleswade Common, ancient woodland, and Wimpole Hall
 - Bassingbourn already being served by Royston and therefore not needing an EWR station
 - Fewer people being served by this route option due to it serving rural and underpopulated areas compared to other route options;
 - Speculative housing growth at Bassingbourn being used as a basis for choosing this route option
 - The impacts on existing Sandy residents of relocating Sandy station

Performance against the key criteria

Benefits for transport users

- 10.4** While Route A provides the fastest journey time between Oxford and Cambridge and other destinations across the Oxford-Cambridge Arc, passengers would have to interchange via Thameslink services to connect to Bedford town centre.
- 10.5** Route A would also forego the opportunity to serve the growing population of Camboorne. These two factors result in slightly lower estimated transport user benefits when compared with Routes D and E.
- 10.6** When EWR Co tested the impact of increased journey times for Sandy residents, the benefits of Route A were reduced by 8% in the 'DfT business as usual' demand scenario and 14% in the 'NIC-based high growth' scenario.

Supporting economic growth

- 10.7** Route A would be expected to contribute to wider economic benefits by connecting key areas of economic activity.
- 10.8** If the MoD site at Bassingbourn were to be developed, Route A could support this housing growth and commuting into Cambridge, effectively expanding the catchment area of Cambridge.
- 10.9** However, Route A would not provide direct connectivity to the centre of Bedford and would therefore not provide the same level of support for growth and regeneration in Bedford in line with Bedford Borough Council's aspirations.

Supporting the delivery of new homes

- 10.10** EWR Co is not in a position to have a view on the specific number of homes that could be directly supported by EWR because it will depend both on third parties obtaining permission for housing and the choice of the final railway alignment.
- 10.11** However, the following points have emerged from consultation feedback and engagement with local stakeholders:
- Several sites to the south of Bedford have already been allocated for housing or employment uses, in part linked to the proposed Thameslink station at Wixams. In so far as new rail connectivity could support further additional development, stopping north-south services on the Midland Mainline would likely have a significantly greater impact than the provision of direct east-west services. Additional housing growth beyond what is already planned and supported by a north-south station may therefore be limited. It was also noted that developing on the site of former clay pits would be expected to incur additional costs and may not be viable
 - Development around Sandy is likely to be constrained by the proximity to sensitive environmental sites (the RSPB nature reserve and Biggleswade Common), the A1, and River Ivel flood plains. A new re-located Sandy station is therefore likely to be a parkway station catering for growth in nearby Biggleswade and Sandy, whereas a new station between Sandy and St Neots could provide a focal point for higher density development
 - Development in the Bassingbourn area is likely to be strongly opposed by the local community, reflecting concerns about the impact on local infrastructure, the character of the area, and the setting of Wimpole Hall and its avenue. The costs of additional local infrastructure (e.g. road upgrades and utilities) that could be required to support the new housing are unknown at this stage

Costs and overall affordability

- 10.12** Route A is estimated to incur upfront capital costs of £3.6 billion (2019 prices) the lowest of any route option.
- 10.13** Operating and whole life costs are assumed to be similar across all route options. The revenues for Route A are estimated to at least match the operating costs or exceed them in the ‘NIC-based high growth’ scenario.

Environmental impacts and opportunities

- 10.14** The comparative environmental assessment identified high-risk hotspots of environmental features within the indicative area shown for each route option that may require a high-level of mitigation effort or compensation. Hotspots highlighted under Route A included:
- The route around Northill (between Bedford and Sandy) is problematic due to the potentially unavoidable direct loss of either areas of Ancient Woodland or Ickwell Bury Registered Park and Garden
 - The potential impacts on the Grade 1 listed Wimpole Hall, even if the EWR track was to be located slightly to the south of the avenue
 - Several SSSIs are located within the route option area, with the potential for adverse effects on the setting and ecological connectivity of the sites, especially with the presence of SSSI Impact Risk Zones across the whole width of the route
 - In the area south of Sandy there are several environmental features of importance which includes the RSPB nature reserve at The Lodge in Sandy and Sandy Warren SSSI. Developing a feasible alignment through this area is heavily constrained
 - The risk of flooding associated with flood zones in specific locations of the route option
 - An appropriate zone of influence should be established around Eversden and Wimpole Wood Special Area of Conservation (SAC) and SSSI to identify suitable mitigation for potential indirect effects on this site



Trinity Hall, Cambridge

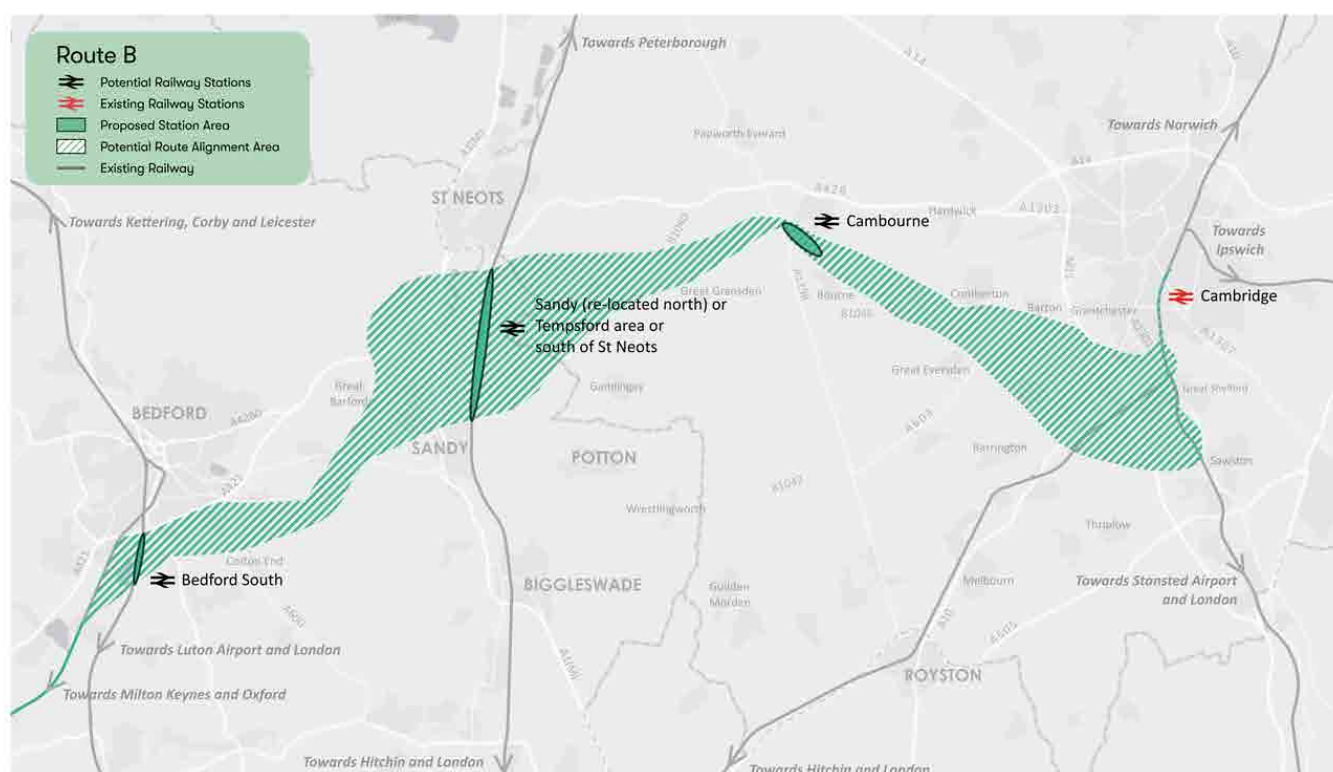
11.

Route B:

Bedford South – Sandy (re-located north)/Temsford area/south of St Neots – Cambourne – Cambridge



Figure 11.1: map of Route B



Description of Route B

11.1 Route B would:

- Diverge from the Marston Vale Line around Stewartby near Bedford and serve 'Bedford South' station to the south of the A421, providing a direct interchange with Thameslink services along the Midland Main Line
- Serve a new split-level station between Sandy and St Neots that could provide an interchange with the East Coast Main Line (either a new, relocated Sandy station slightly to the north of the existing station or a new station further north in the broad area around Tempsford or south of St Neots)
- Serve a new station around Cambourne
- Connect to the West Anglia Main Line at/around Shepreth Junction near Great Shelford

Consultation feedback

- 11.2** Route B received support at consultation for serving Cambourne and the opportunity to align EWR with the proposed new A428 between Black Cat and Caxton Gibbet, which could reduce environmental impacts and enhance overall benefits.
- 11.3** Concerns were raised against Route B for:
- The potential conflict with the proposals for a guided busway between Cambourne and Cambridge and the Cambridgeshire Autonomous Metro
 - The impacts on existing Sandy residents of relocating Sandy station if this were to be required
 - Potential to cause damage or loss to ancient woodland;
 - Lack of infrastructure in the area between Sandy and St Neots to support a new station
 - Difficult access to the centre of Bedford due to building a station to the south of Bedford compared to serving Bedford Midland

Performance against the key criteria

Benefits for transport users

- 11.4** Journey times between Oxford and Cambridge and other destinations within the Oxford-Cambridge Arc for Route B were estimated to be slightly longer than Route A.
- 11.5** Route B would also require passengers to change onto Thameslink services to connect to Bedford town centre. These factors contribute to the lower estimated transport user benefits when compared with Routes A, D and E.

Supporting economic growth

- 11.6** Route B would be expected to contribute to wider economic benefits by connecting key areas of economic activity.
- 11.7** By serving Cambourne, Route B could support housing growth and commuting into Cambridge, effectively expanding the catchment area of Cambridge.
- 11.8** However, Route B would not provide direct connectivity to the centre of Bedford and would therefore not provide the same level of support for growth and regeneration in Bedford in line with Bedford Borough Council's aspirations.

Supporting the delivery of new homes

- 11.9** EWR Co is not in a position to have a view on the specific number of homes that could be directly supported by EWR because it will depend both on third parties obtaining permission for housing and the choice of the final railway alignment.
- 11.10** However, the following points have emerged from consultation feedback and engagement with local stakeholders:
- Several sites to the south of Bedford have already been allocated for housing or employment uses, in part linked to the proposed Thameslink station at Wixams. In so far as new rail connectivity could support further additional development, stopping north-south services on the Midland Mainline would likely have a significantly greater impact than the provision of direct east-west services. Additional housing growth beyond what is already planned and supported by a north-south station may therefore be limited. It was also noted that developing on the site of former clay pits would be expected to incur additional costs and may not be viable
 - Central Bedfordshire Council has previously considered proposals for a new settlement in the Tempsford area, which could be suitable for development if EWR were to provide sustainable public transport connectivity. This was reflected in Central Bedfordshire's technical response to EWR Co's consultation which identified a route via the broad area around Tempsford (Route C) as its preferred option. However, subsequent engagement with the Council indicated a preference for Route A
 - Alternatively, St Neots is expanding in a south-eastwards direction and Huntingdonshire District Council identified an alternative route with a new station in the area to the south of St Neots (Route E) as its preferred option

- Further development at Cambourne would not be inconsistent with existing local planning policies. The local planning authority (South Cambridgeshire District Council) identified an alternative route via Cambourne (Route E) as its preferred option

Costs and overall affordability

- 11.11** Route B is estimated to incur upfront capital costs of £3.9 billion (2019 prices), which is around £0.3 billion higher than Route A and £0.2 billion higher than Route E.
- 11.12** Operating and whole life costs are assumed to be similar across all route options. The revenues for Route B are estimated to match the operating costs in the ‘DfT business as usual’ demand scenario and exceed them in the ‘NIC-based high growth’ scenario.

Environmental impacts and opportunities

- 11.13** The comparative environmental assessment identified high-risk hotspots of environmental features within each route option that may require a high level of mitigation effort or compensation.
- 11.14** The main hotspot highlighted under Route B was the requirement for an appropriate zone of influence to be established around Eversden and Wimpole Wood SAC and SSSI to identify suitable mitigation for potential indirect effects on this site.
- 11.15** In addition there is a risk of flooding associated with flood zones in specific locations of the route option.



Trinity Hall, Cambridge

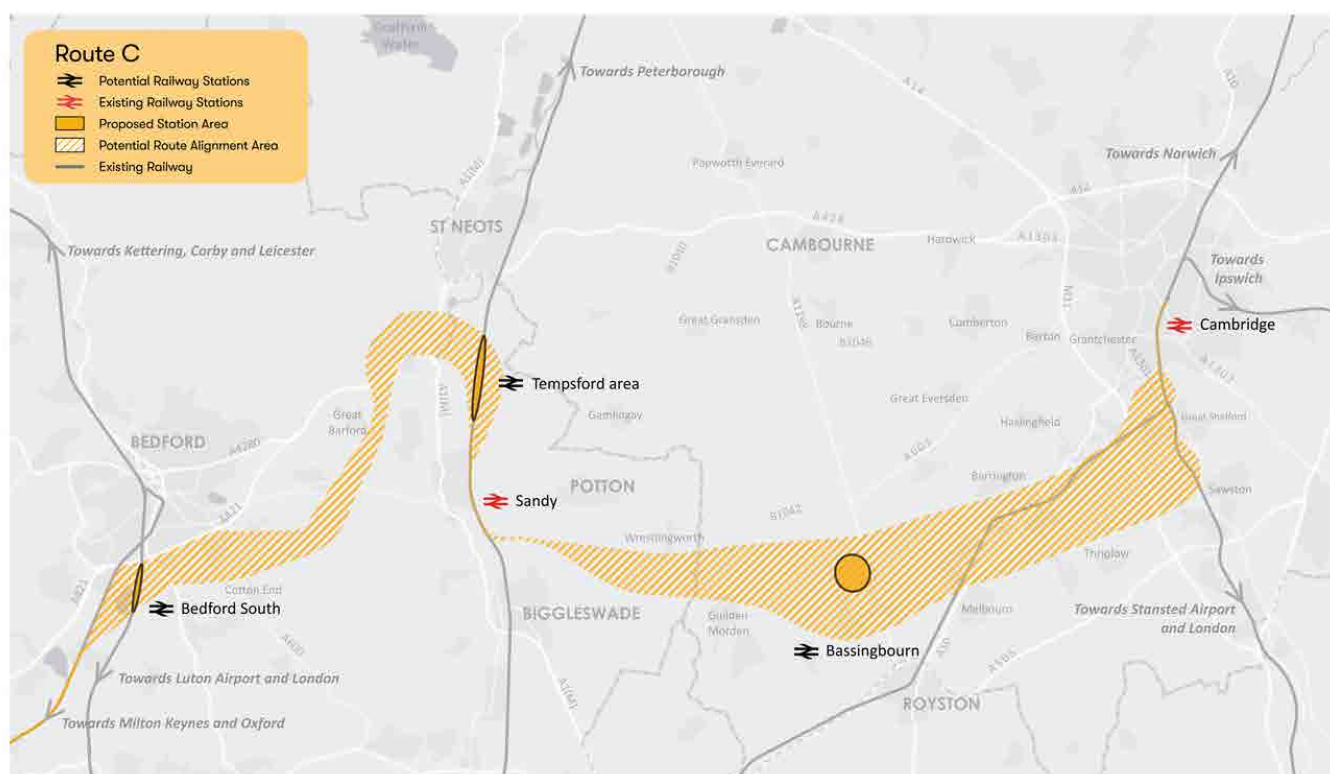
12.

Route C:

**Bedford South – Tempsford area –
Sandy – Bassingbourn – Cambridge**



Figure 12.1: map of Route C



Description of Route C

12.1 Route C would:

- Diverge from the Marston Vale Line around Stewartby near Bedford and serve ‘Bedford South’ station to the south of the A421, providing a direct interchange with Thameslink services along the Midland Main Line
- Loop round and provide interchanges with the East Coast Main Line via a new station in the broad area around Tempsford and the existing Sandy station, before diverging away from the East Coast Main Line between the Sandy Warren SSSI and Biggleswade Common
- Potentially serve an additional station on the MoD site at Bassingbourn
- Connect to the West Anglia Main Line at/around Shepreth Junction near Great Shelford, possibly after first connecting to the existing Hitchin-Cambridge Line

Consultation feedback

12.2 Public consultation responses indicated support for Route C because it serves the existing Sandy station.

12.3 Concerns for Route C were based on:

- Potential impacts on RSPB Nature Reserve at Sandy, Biggleswade Common, and Wimpole Hall, as well as a flood risk in some sections of the route
- Bassingbourn already being served by Royston and therefore not needing an EWR service
- Potential impacts of new housing in Bassingbourn on the local area as well as in the area between Sandy and St Neots
- The route being longer in time and length and costing more to build than other route options
- Difficult access to the centre of Bedford due to serving a new station to the south of Bedford rather than serving Bedford Midland

Performance against the key criteria

Benefits for transport users

12.4 Route C has longer journey times between Oxford and Cambridge, and other destinations across the Oxford-Cambridge Arc than Route B and would require passengers to interchange via Thameslink services to connect to Bedford town centre.

12.5 Route C would also forego the opportunity to serve the growing population of Cambourne. These factors result in the lowest estimated transport user benefits of all five shortlisted route options.

Supporting economic growth

12.6 Route C would be expected to contribute to wider economic benefits by connecting key areas of economic activity.

12.7 If the MoD site at Bassingbourn were to be developed, Route C could support this housing growth and commuting into Cambridge, effectively expanding the catchment area of Cambridge.

- 12.8** However Route C would not provide direct connectivity to the centre of Bedford and would therefore not provide the same level of support for growth and regeneration in Bedford in line with Bedford Borough Council's aspirations.

Supporting the delivery of new homes

- 12.9** EWR Co is not in a position to have a view on the specific number of homes that could be directly supported by EWR because it will depend both on third parties obtaining permission for housing and the choice of the final railway alignment.

- 12.10** However, the following points have emerged from consultation feedback and engagement with local stakeholders:

- Several sites to the south of Bedford have already been allocated for housing or employment uses, in part linked to the proposed Thameslink station at Wixams. In so far as new rail connectivity could support further additional development, stopping north-south services on the Midland Mainline would likely have a significantly greater impact than the provision of direct east-west services. Additional housing growth beyond what is already planned and supported by a north-south station may therefore be limited. It was also noted that developing on the site of former clay pits would be expected to incur additional costs and may not be viable
- Central Bedfordshire Council has previously considered proposals for a new settlement in the Tempsford area which could be suitable for development if EWR were to provide sustainable public transport connectivity. This was reflected in Central Bedfordshire's technical response to EWR Co's consultation, which identified Route C as its preferred option. However, subsequent engagement with the Council indicated a preference for Route A
- Development around Sandy is likely to be constrained by the proximity to sensitive environmental sites (the RSPB nature reserve and Biggleswade Common) the A1 and River Ivel flood plains. A new re-located Sandy station is therefore likely to be a parkway station catering for growth in nearby Biggleswade and Sandy, whereas a new station between Sandy and St Neots could provide a focal point for higher density development
- Development in the Bassingbourn area is likely to be strongly opposed by the local community, reflecting concerns about the impact on local infrastructure, the character of the area, and the setting of Wimpole Hall and its avenue. The costs of additional local infrastructure (e.g. road upgrades and utilities) that could be required to support the new housing are unknown at this stage

Costs and overall affordability

- 12.11** Route C is estimated to incur upfront capital costs of £4.3 billion (2019 prices) the highest of all five shortlisted route options.
- 12.12** Operating and whole life costs are assumed to be similar across all route options. The revenues for Route C are estimated to match the operating costs in the 'DfT business as usual' growth scenario and exceed them in the 'NIC-based high growth' scenario.

Environmental impacts and opportunities

- 12.13** The comparative environmental assessment identified high-risk hotspots of environmental features within each route option that may require a high level of mitigation effort or compensation. Hotspots highlighted under Route C include:
- The potential impacts on the Grade 1 listed Wimpole Hall even if the EWR track was to be located slightly to the south of the avenue
 - Several SSSIs are located within the route option area with the potential for adverse effects on the setting and ecological connectivity of the sites, especially with the presence of SSSI Impact Risk Zones across the whole width of the route
 - In the area south of Sandy there are several environmental features of importance which includes the RSPB nature reserve at The Lodge in Sandy and Sandy Warren SSSI. Developing a feasible alignment through this area is heavily constrained
 - The curved nature of the route between St Neots and Sandy which provides a constraint with regards to landscape and accessibility to open green space. There could also be noise and visual impacts as well as flood risks relating to the flood zones associated with the River Great Ouse and River Cam
 - An appropriate zone of influence should be established around Eversden and Wimpole Wood SAC and SSSI to identify suitable mitigation for potential indirect effects on this site



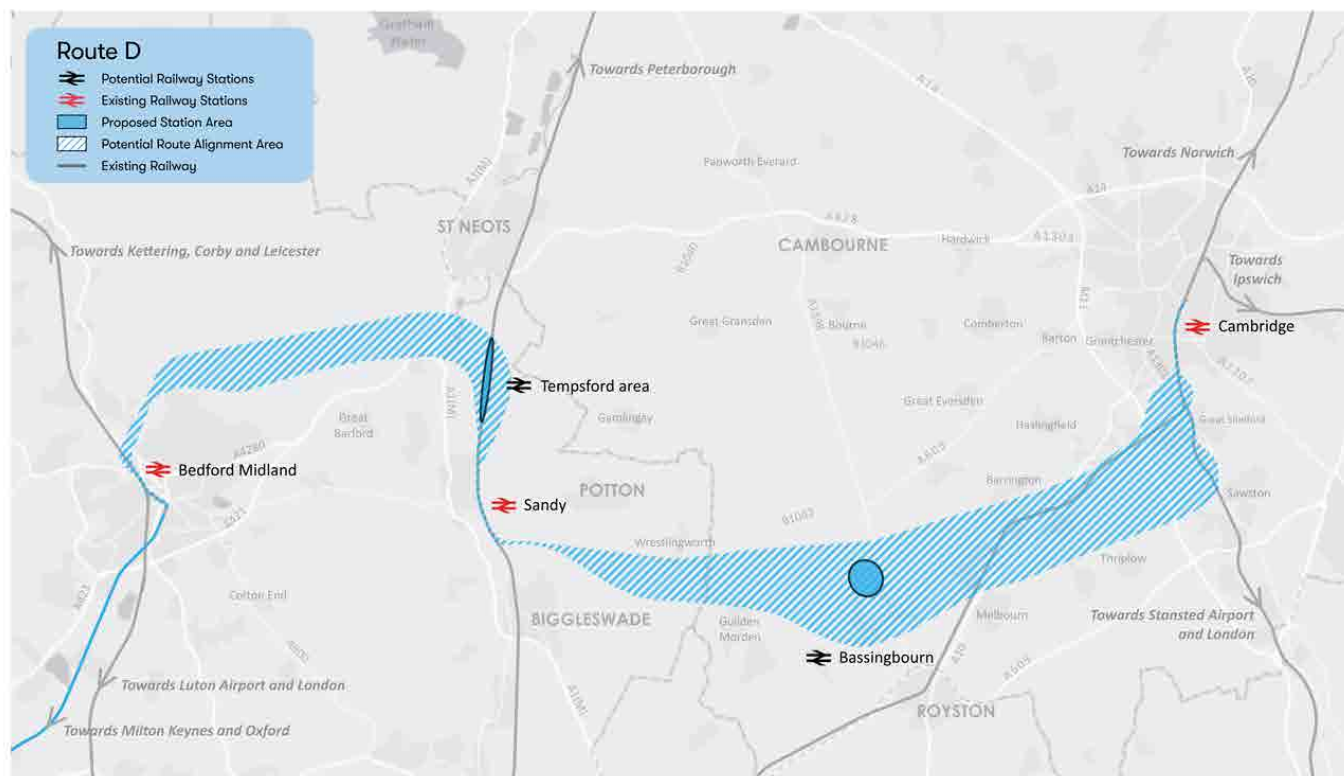
Parker's Tavern,
Cambridge

13.

Route D:

**Bedford Midland – Tempsford area –
Sandy – Bassingbourn – Cambridge**

Figure 13.1: map of Route D



Description of Route D

13.1 Route D would:

- Run along the existing Marston Vale Line through Bedford town centre and serve the existing Bedford Midland station, providing an interchange with Midland Main Line services, before diverging eastwards north of Bedford
- Provide interchanges with the East Coast Main Line via a new station in the broad area around Tempsford and the existing Sandy station before diverging away from the East Coast Main Line between the Sandy Warren SSSI and Biggleswade Common
- Potentially serve an additional station on the MoD site at Bassingbourn
- Connect to the West Anglia Main Line at/around Shepreth Junction near Great Shelford, possibly after first connecting to the existing Hitchin-Cambridge Line

Consultation feedback

- 13.2** The responses from consultation indicated support for Route D for serving the existing Sandy and Bedford Midland stations.
- 13.3** However, the responses also indicated concerns around:
- Potential impacts to the RSPB nature reserve at Sandy, Biggleswade Common, and Wimpole Hall, as well as the potential flood risk in some sections of the route option
 - A lack of existing infrastructure in the Tempsford area to accommodate a new station
 - Bassingbourn already being served by Royston and therefore not needing an EWR service
 - The potentially high cost of constructing Route D compared to other route options
 - Potential impacts of new housing in Bassingbourn and the area between Sandy and St Neots

Performance against the key criteria

Benefits for transport users

- 13.4** Route D provides direct connectivity to Bedford town centre. However, it has the longest indicative journey time out of the five route options and foregoes the opportunity to serve the growing population of Cambourne. Route D therefore has lower estimated transport user benefits than Route E.

Supporting economic growth

- 13.5** Route D would be expected to contribute to wider economic benefits by connecting key areas of economic activity.
- 13.6** By providing direct connectivity to Bedford town centre Route D would provide greater support for growth and regeneration in Bedford in line with Bedford Borough Council's aspirations.
- 13.7** If the MoD site at Bassingbourn were to be developed Route D could support this housing growth and commuting into Cambridge, effectively expanding the catchment area of Cambridge.

Supporting the delivery of new homes

- 13.8** EWR Co is not in a position to have a view on the specific number of homes that could be directly supported by EWR because it will depend both on third parties obtaining permission for housing and the choice of the final railway alignment.
- 13.9** However, the following points have emerged from consultation feedback and engagement with local stakeholders:
- Bedford Borough Council has indicated that by serving the existing Bedford Midland station EWR could support their plans for development and regeneration within Bedford town centre. The Council has also indicated that serving Bedford Midland could support opportunities for new settlements to the north of Bedford which could be considered as part of the Council's immediate review of its local plan once the current plan has been adopted
 - Central Bedfordshire Council has previously considered proposals for a new settlement in the Tempsford area which could be suitable for development if EWR were to provide sustainable public transport connectivity. This was reflected in the Council's technical response to EWR Co's consultation, which identified an alternative route via the broad area around Tempsford (Route C) as its preferred option. However, subsequent engagement with the Council indicated a preference for Route A
 - Development around Sandy is likely to be constrained by the proximity to sensitive environmental sites (the RSPB nature reserve and Biggleswade Common), the A1, and River Ivel flood plains. A new re-located Sandy station is therefore likely to be a parkway station catering for growth in nearby Biggleswade and Sandy, whereas a new station between Sandy and St Neots could provide a focal point for higher density development

- Development in the Bassingbourn area is likely to be strongly opposed by the local community, reflecting concerns about the impact on local infrastructure, the character of the area, and the setting of Wimpole Hall and its avenue. The costs of additional local infrastructure (e.g. road upgrades and utilities) that could be required to support the new housing are unknown at this stage

Costs and overall affordability

- 13.10** Route D is estimated to incur upfront capital costs of £4.0 billion (2019 prices) which is higher than Routes A and E.
- 13.11** Operating and whole life costs are assumed to be similar across all route options. The revenues for Route D are estimated to match the operating costs in the ‘DfT business as usual’ growth scenario and exceed them in the ‘NIC-based high growth’ scenario.

Environmental impacts and opportunities

- 13.12** The comparative environmental assessment identified high-risk hotspots of environmental features within each route option that may require a high level of mitigation effort or compensation. Hotspots highlighted under Route D include:
- The potential impacts on the Grade 1 listed Wimpole Hall even if the EWR track was to be located slightly to the south of the avenue
 - The several SSSIs located within the route option area mean this route could cause potentially adverse effects to the setting and ecological connectivity of the sites, especially with the presence of SSSI Impact Risk Zones across the whole width of the route
 - In the area south of Sandy there are several environmental features of importance which includes the RSPB nature reserve at The Lodge in Sandy and Sandy Warren SSSI. Developing a feasible alignment through this area is heavily constrained
 - The curved (looped) nature of the route between St Neots and Sandy which provides a constraint with regards to landscape and accessibility to open green space. There could also be noise and visual impacts as well as flood risks relating to the flood zones associated with the River Great Ouse and River Cam

- The proximity of this route to buildings in Bedford town centre could cause potential disturbance effects associated with noise, vibration and air quality. In addition Bedford town centre Air Quality Management Area is an important consideration in the consenting process if the scheme will affect the area's ability to be compliant with the Air Quality Directive
- An appropriate zone of influence should be established around Eversden and Wimpole Wood SAC and SSSI to identify suitable mitigation for potential indirect effects on this site



Pavilion, Bedford Park

14.

Route E:

**Bedford Midland – Tempsford area/south
of St Neots – Cambourne – Cambridge**



Figure 14.1: map of Route E



Description of Route E

14.1 Route E would:

- Run along the existing Marston Vale Line through Bedford town centre and serve the existing Bedford Midland station, providing an interchange with Midland Main Line services before diverging eastwards north of Bedford
- Serve a new split-level station between Sandy and St Neots that could provide an interchange with the East Coast Main Line, located either in the broad area around Tempsford or to the south of St Neots
- Serve a new station around Cambourne
- Connect to the West Anglia Main Line at/around Shepreth Junction near Great Shelford

Consultation feedback

14.2 At consultation Route E received support for:

- Having less of an environmental impact and serving more existing population areas compared to other route options
- A station being built at Cambourne and the potential benefits that EWR would bring to the area
- The potential for this route option to align with the A428 to reduce environmental impacts and enhance overall transport benefits
- Serving the existing Bedford Midland station

14.3 Areas of concern raised at consultation around Route E were:

- Potential conflict with the proposals for a guided busway between Cambourne and Cambridge and the Cambridgeshire Autonomous Metro
- Lack of supporting infrastructure in the Tempsford area to accommodate a new station
- The potential cost of constructing the railway with this route option²⁹
- Impacts on wildlife/biodiversity, the countryside and the landscape

Performance against the key criteria

Benefits for transport users

14.4 Route E has the third quickest journey time between Oxford and Cambridge out of the five route options.

14.5 However Route E provides direct connectivity to Bedford town centre and directly serves the most households within Bedford and the growing population at Cambourne.

14.6 These factors lead to Route E having the highest estimated transport user benefits of any route option.

²⁹ The cost estimates presented in the consultation suggested that Route E would incur the highest upfront capital costs. However, the revised cost estimates that have informed the final decision on a preferred route suggest that Route E would incur the second lowest upfront capital costs.

Supporting economic growth

- 14.7** Route E would be expected to contribute to wider economic benefits by connecting key areas of economic activity.
- 14.8** By providing direct connectivity to Bedford town centre Route E would provide greater support for growth and regeneration in Bedford in line with Bedford Borough Council's aspirations.
- 14.9** By serving Cambourne Route E could support housing growth and commuting into Cambridge, effectively expanding the catchment area of Cambridge.

Supporting the delivery of new homes

- 14.10** EWR Co is not in a position to have a view on the specific number of homes that could be directly supported by EWR because it will depend both on third parties obtaining permission for housing and the choice of the final railway alignment.
- 14.11** However the following points have emerged from consultation feedback and engagement with local stakeholders:
- Bedford Borough Council has indicated that by serving the existing Bedford Midland station EWR could support their plans for development and regeneration within Bedford town centre. The Council has also indicated that serving Bedford Midland could support opportunities for new settlements to the north of Bedford, which could be considered as part of the Council's immediate review of its local plan once the current plan has been adopted
 - Central Bedfordshire Council has previously considered proposals for a new settlement in the Tempsford area which could be suitable for development if EWR were to provide sustainable public transport connectivity. This was reflected in the Council's technical response to EWR Co's consultation which identified an alternative route via the broad area around Tempsford (Route C) as its preferred option. However subsequent engagement with the Council indicated a preference for Route A
 - Alternatively, St Neots is expanding in a south-eastwards direction and Huntingdonshire District Council identified Route E with a new station in the area to the south of St Neots as its preferred option
 - Further development at Cambourne would not be inconsistent with existing local planning policies. The local planning authority (South Cambridgeshire District Council) identified Route E as its preferred option

Costs and overall affordability

14.12 Route E is estimated to incur upfront capital costs of £3.7 billion (2019 prices) the second lowest of all route options and only £0.1 billion higher than Route A.

14.13 Operating and whole life costs are assumed to be similar across all route options. The revenues for Route E are estimated to match the operating costs in the 'DfT business as usual' growth scenario and exceed them in the 'NIC-based high growth' scenario.

Environmental impacts and opportunities

14.14 The comparative environmental assessment identified high-risk hotspots of environmental features within each route option that may require a high level of mitigation effort or compensation. Hotspots highlighted under Route E include:

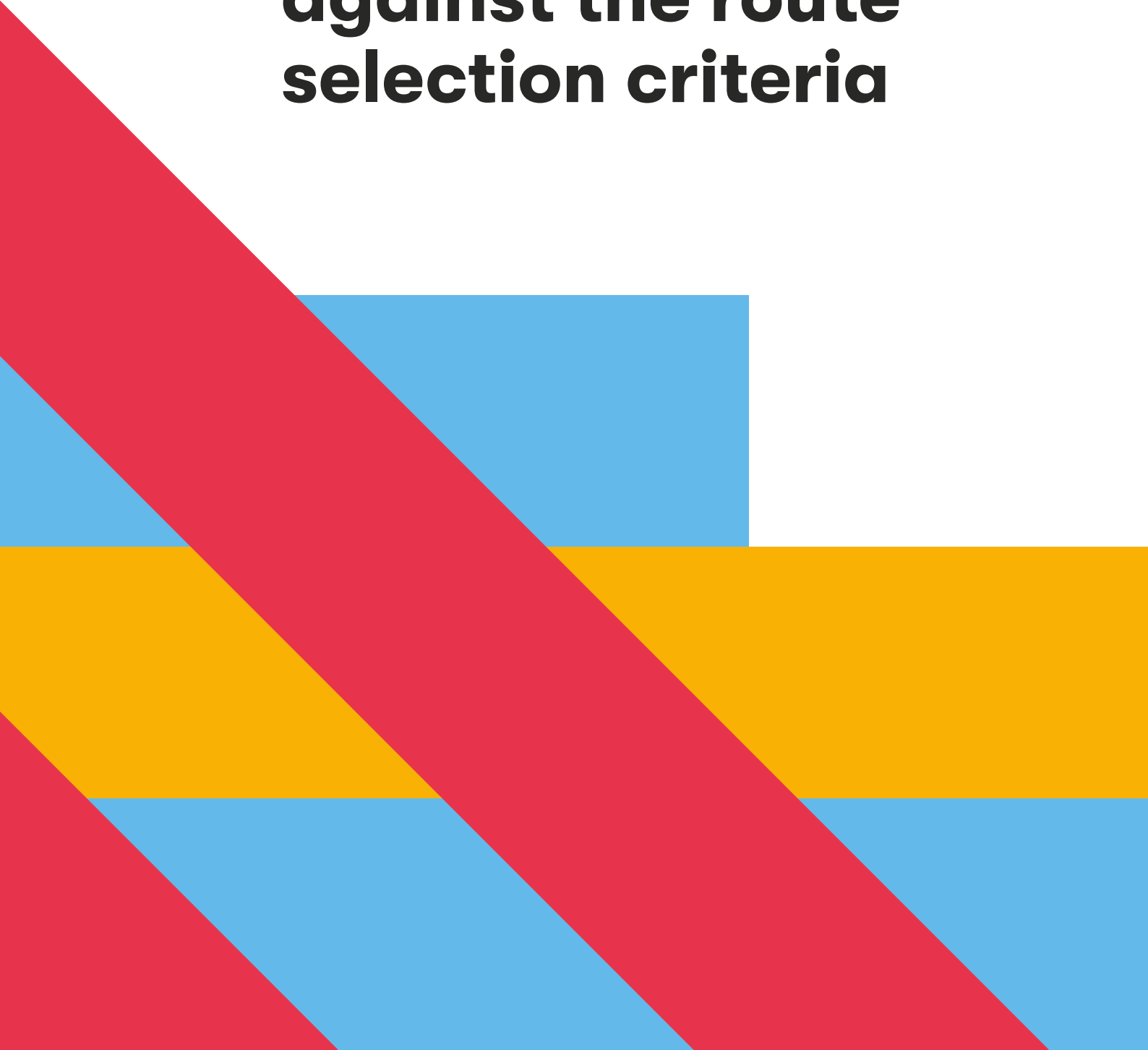
- The proximity of this route to buildings in Bedford town centre could cause potential disturbance effects associated with noise and vibration and air quality. In addition Bedford town centre Air Quality Management Area is an important consideration in the consenting process if the scheme will affect the area's ability to be compliant with the Air Quality Directive
- The risk of flooding associated with flood zones in specific locations of the route option
- An appropriate zone of influence should be established around Eversden and Wimpole Wood SAC and SSSI to identify suitable mitigation for potential indirect effects on this site



River Great Ouse,
Bedford

15.

How the shortlisted route options perform against the route selection criteria



Transport user benefits

- 15.1

The route option with the highest indicative transport user benefits under both the ‘DfT business as usual’ and ‘NIC-based high growth’ scenarios is Route E.
- 15.2

Route E is estimated to generate the highest transport user benefits because it provides direct connectivity to Bedford town centre and serves the growing population at Cambourne, which outweighs the disbenefits of slightly slower journey times for passengers travelling longer distances across the Oxford-Cambridge Arc.

| Route Option | Estimated transport user benefits ³⁰ | | Summary of transport user benefits |
|--------------|---|----------------------------------|---|
| | ‘DfT business as usual’ growth scenario | ‘NIC-based high growth’ scenario | |
| A | £1.7 billion | £2.8 billion | Route A is estimated to provide the fastest journey times between Cambridge and places west of Bedford. However, passengers would need to use Thameslink services (or other local transport options) to connect to Bedford town centre. Route A also foregoes the opportunity to serve the growing population at Cambourne. |
| B | £1.6 billion | £2.7 billion | Route B is estimated to provide slightly longer journey times than Route A between Cambridge and places west of Bedford. Passengers would need to use Thameslink services (or other local transport options) to connect to Bedford town centre. However, Route B would serve the growing population at Cambourne. |

Table 15.1:
summary of
estimated transport
user benefits for
the shortlisted
route options

³⁰ Figures are discounted 2010 present values. Journey times for EWR services remain indicative at this early stage of the project and will depend in part on the final route alignment that is chosen. The indicative journey times that have been used in the modelling of transport user benefits are set out in Table A.1 in Annex A.

15. How the shortlisted route options perform against the route selection criteria

| Route Option | Estimated transport user benefits ³⁰ | | Summary of transport user benefits |
|--------------|---|----------------------------------|---|
| | 'DfT business as usual' growth scenario | 'NIC-based high growth' scenario | |
| C | £1.4 billion | £2.6 billion | Route C is estimated to provide slightly longer journey times than Route B between Cambridge and places west of Bedford. Passengers would need to use Thameslink services (or other local transport options) to connect to Bedford town centre. Route C also foregoes the opportunity to serve the growing population at Cambourne. However, it does provide the best connectivity for users of the existing Sandy station. |
| D | £1.7 billion | £2.8 billion | Route D is estimated to provide the longest journey times between Cambridge and places west of Bedford. Route D foregoes the opportunity to serve the growing population at Cambourne. However, it provides direct connectivity to Bedford town centre and the best connectivity for users of the existing Sandy station. |
| E | £1.8 billion | £2.8 billion | Route E is estimated to provide the third fastest journey times between Cambridge and places west of Bedford. However, it provides direct connectivity to Bedford town centre and serves the growing population at Cambourne, thereby directly serving the most households and generating the highest estimated transport user benefits. |

Supporting economic growth

- 15.3

All shortlisted route options would support wider economic growth through agglomeration and increased business output corresponding to the estimated DfT TAG ‘Level 2’ benefits shown in Table 15.2.
- 15.4

As all route options connect key areas of economic activity with the same frequency of service and similar journey times, all route options would be expected to deliver broadly similar wider economic benefits when also taking account of potential changes in land use as businesses respond to the improved connectivity provided by EWR.
- 15.5

However, routes that serve Bedford Midland and provide direct connectivity to Bedford town centre are likely to provide greater support for growth and regeneration in Bedford in line with Bedford Borough Council’s aspirations.

| Route Option | Estimated TAG ‘Level 2’ wider economic benefits ³¹ | Summary of how EWR could support economic growth |
|--------------|---|--|
| A | £106 million | Route A would be expected to contribute to wider economic benefits by connecting key areas of economic activity. If the MoD site at Basingbourn were to be developed, Route A could support this housing growth and commuting into Cambridge. However, Route A would not provide direct connectivity to the centre of Bedford and would therefore not provide the same level of support for growth and regeneration in Bedford in line with Bedford Borough Council’s aspirations. |
| B | £104 million | Route B would be expected to contribute to wider economic benefits by connecting key areas of economic activity. By serving Cambourne, Route B could support housing growth and commuting into Cambridge. However, Route B would not provide direct connectivity to the centre of Bedford and would therefore not provide the same level of support for growth and regeneration in Bedford in line with Bedford Borough Council’s aspirations. |

Table 15.2: summary of how the shortlisted route options support economic growth

15. How the shortlisted route options perform against the route selection criteria

| Route Option | Estimated TAG 'Level 2' wider economic benefits ³¹ | Summary of how EWR could support economic growth |
|--------------|---|--|
| C | £103 million | Route C would be expected to contribute to wider economic benefits by connecting key areas of economic activity. If the MoD site at Basingbourn were to be developed, Route C could support this housing growth and commuting into Cambridge. However, Route C would not provide direct connectivity to the centre of Bedford and would therefore not provide the same level of support for growth and regeneration in Bedford in line with Bedford Borough Council's aspirations. |
| D | £115 million | Route D would be expected to contribute to wider economic benefits by connecting key areas of economic activity. By providing direct connectivity to Bedford town centre, Route D would provide greater support for growth and regeneration in Bedford in line with Bedford Borough Council's aspirations. If the MoD site at Basingbourn were to be developed, Route D could support this housing growth and commuting into Cambridge. |
| E | £114 million | Route E would be expected to contribute to wider economic benefits by connecting key areas of economic activity. By providing direct connectivity to Bedford town centre, Route E would provide greater support for growth and regeneration in Bedford in line with Bedford Borough Council's aspirations. By serving Cambourne, Route E could support housing growth and commuting into Cambridge. |

³¹ Benefits are estimated for the 'DfT business as usual' demand scenario. Figures are discounted 2010 present values.

Supporting the delivery of new homes

- 15.6 EWR Co is not in a position to have a view on the specific number of homes that could be supported by any of the potential route options between Bedford and Cambridge.
- 15.7 However, Table 15.3 summarises the key points that have emerged from responses to EWR Co’s non-statutory consultation between January and March 2019.

| Route Option | Summary of how EWR could support the delivery of new homes |
|--------------|--|
| A | Route A could support existing plans for housing growth to the south of Bedford. However, several sites to the south of Bedford have already been allocated for housing or employment uses, in part linked to the proposed Thameslink station at Wixams. In so far as new rail connectivity could support further additional development, stopping north-south services on the Midland Mainline would likely have a significantly greater impact than the provision of direct east-west services. Additional housing growth beyond what is already planned and supported by a north-south station may therefore be limited. It was also noted that developing on the site of former clay pits would be expected to incur additional costs and may not be viable. Development around Sandy is likely to be constrained by the proximity to sensitive environmental sites and development in the Bassingbourn area is likely to be strongly opposed by the local community. |
| B | Route B could support existing plans for housing growth to the south of Bedford. However, several sites to the south of Bedford have already been allocated for housing or employment uses, in part linked to the proposed Thameslink station at Wixams. In so far as new rail connectivity could support further additional development, stopping north-south services on the Midland Mainline would likely have a significantly greater impact than the provision of direct east-west services. Additional housing growth beyond what is already planned and supported by a north-south station may therefore be limited. It was also noted that developing on the site of former clay pits would be expected to incur additional costs and may not be viable. Route B could support opportunities for new housing in the broad area around Tempsford that were previously considered by Central Bedfordshire Council and/or to the south of St Neots, as well as further housing growth at Cambourne. |

Table 15.3: summary of consultation feedback on how EWR could support opportunities for the delivery of new homes

15. How the shortlisted route options perform against the route selection criteria

| Route Option | Summary of how EWR could support the delivery of new homes |
|--------------|---|
| C | <p>Route C could support existing plans for housing growth to the south of Bedford. However, several sites to the south of Bedford have already been allocated for housing or employment uses, in part linked to the proposed Thameslink station at Wixams. In so far as new rail connectivity could support further additional development, stopping north-south services on the Midland Mainline would likely have a significantly greater impact than the provision of direct east-west services. Additional housing growth beyond what is already planned and supported by a north-south station may therefore be limited. It was also noted that developing on the site of former clay pits would be expected to incur additional costs and may not be viable. Route C could support opportunities for new housing in the broad area around Tempsford that were previously considered by Central Bedfordshire Council. However, development around Sandy is likely to be constrained by the proximity to sensitive environmental sites and development in the Bassingbourn area is likely to be strongly opposed by the local community.</p> |
| D | <p>Route D could support Bedford Borough Council's plans for new housing as part of the development and regeneration of Bedford town centre, as well as opportunities for new settlements to the north of Bedford. Route D could also support opportunities for new housing in the broad area around Tempsford that were previously considered by Central Bedfordshire Council. However, development around Sandy is likely to be constrained by the proximity to sensitive environmental sites and development in the Bassingbourn area is likely to be strongly opposed by the local community.</p> |
| E | <p>Route E could support Bedford Borough Council's plans for new housing as part of the development and regeneration of Bedford town centre, as well as opportunities for new settlements to the north of Bedford. Route E could also support opportunities for new housing in the area between Sandy and St Neots that were previously considered by Central Bedfordshire Council and/or to the south of St Neots, as well as further housing growth at Cambourne.</p> |

Costs and overall affordability

15.8 The indicative estimates of the upfront capital costs for the new section of railway between Bedford and Cambridge and other associated infrastructure works to enable EWR services to run between Oxford and Cambridge were revised following the consultation, as described in Chapter 9.

15.9 The upfront capital costs are estimated to vary between £3.6 billion and £4.3 billion (2019 prices). The differences in cost between route options are primarily driven by:

- The amount of viaduct that could be required for crossing flood plains and other difficult ground
- The volume of earthworks that could be required due to local terrain and existing infrastructure interface points
- The amount of existing infrastructure and waterways that would need to be crossed and require bridge structures
- The amount and type of land that could be required

15.10 Operating and whole life costs are estimated to be similar across all route options:

- In the 'DfT business as usual' demand scenario the current modelling suggests that revenues from services using the new section of railway between Bedford and Cambridge would exceed operating costs for all route options
- In the 'NIC-based high growth' demand scenario the current modelling suggests that all route options would generate a net profit for the route operator and wider rail industry, with revenues covering both whole-life costs (infrastructure maintenance and renewal) and operating costs³²

15.11 Forecasts for future costs and revenues remain sensitive to assumptions on the level of demand for EWR services and economic and population growth in the Oxford-Cambridge Arc. Forecasts will continue to be refined as the project progresses

15.12 The indicative upfront capital cost estimates for each route option presented in paragraph 15.9 and Chapters 10 to 14 of this report are in 2019 prices

³² Revenues are projected fare revenues; non-ticket revenues are not included.

15. How the shortlisted route options perform against the route selection criteria

15.13 However the cost benefit analysis for the purposes of the economic appraisal of route options discounts these upfront capital cost estimates into 2010 appraisal values. The appraisal values are therefore directly comparable to the revenue, whole life cost, and operating cost estimates that are also calculated in 2010 discounted prices. The figures used in the cost benefit analysis are presented in Tables 15.14 and 15.15.³³

Table 15.4:
summary of the
estimated costs and
revenues of shortlisted
route options, 'DfT
business as usual'
scenario

| Route Option | Indicative upfront capital costs | Indicative operating costs | Indicative whole life costs | Indicative revenues |
|--------------|----------------------------------|----------------------------|-----------------------------|---------------------|
| A | £2.9 billion | £0.6 billion | £0.5 billion | £1.1 billion |
| B | £3.4 billion | £0.7 billion | £0.5 billion | £1.0 billion |
| C | £3.5 billion | £0.7 billion | £0.5 billion | £0.9 billion |
| D | £3.3 billion | £0.7 billion | £0.5 billion | £1.1 billion |
| E | £3.2 billion | £0.7 billion | £0.5 billion | £1.2 billion |

Table 15.5: summary
of the estimated
costs and revenues
of shortlisted route
options, 'NIC-based
high growth' scenario

| Route Option | Indicative upfront capital costs | Indicative operating costs | Indicative whole life costs | Indicative revenues |
|--------------|----------------------------------|----------------------------|-----------------------------|---------------------|
| A | £3.2 billion | £0.6 billion | £0.5 billion | £1.9 billion |
| B | £3.4 billion | £0.7 billion | £0.5 billion | £1.9 billion |
| C | £3.5 billion | £0.7 billion | £0.6 billion | £1.8 billion |
| D | £3.5 billion | £0.7 billion | £0.6 billion | £1.9 billion |
| E | £3.2 billion | £0.7 billion | £0.5 billion | £2.0 billion |

³³ Figures are in 2010 prices and based on operating costs over a 60-year appraisal period. Actual cash expenditure figures would be expected to be higher owing to inflation. These figures remain indicative. The estimated cost of the preferred route option will continue to be refined as more detailed design work is undertaken and EWR Co progress towards identifying a preferred route alignment.

The analysis assumes that for Routes A, C and D, EWR services stop at a new Bassingbourn station only in the 'NIC-based high growth' demand scenario. This is because the assumed cost of relocating the Bassingbourn MoD site to accommodate a new station is larger than any net benefit under the 'DfT business as usual' demand scenario. Capital costs therefore differ between growth scenarios for these route options.

- 15.14** Analysis commissioned by EWR Co suggests that the opportunities to capture a share of the uplift in land values are broadly comparable across route options and therefore are not a key differentiating factor.
- 15.15** EWR Co have also assessed indicative Level 1 and Level 2 Benefit Cost Ratios (BCRs) for each route option over a 60-year appraisal period in line with DfT Transport Appraisal Guidance (TAG).
- 15.16** Level 1 BCRs divide transport user benefits by the impact on the 'net transport budget' (sum of capital costs, whole life costs, operating costs and revenue). Level 2 BCRs add wider economic impacts to transport user benefits. These only include a narrow set of productivity benefits and exclude any benefits associated with changes in land-use.
- 15.17** Tables 15.6 and 15.7 summarise the BCRs of each route option. They indicate that Route E delivers the greatest value for money to taxpayers and the wider economy under the 'DfT business as usual' and 'NIC based growth scenario'.³⁴
- 15.18** These BCRs will be updated as we continue to develop the scheme. We will continue to work to capture, and where possible monetise, more of the likely impacts of EWR. This includes those related to supporting more affordable housing and some wider economic impacts such as easing pressure on wages, spreading prosperity more widely and creating a globally attractive place to start and grow businesses.

³⁴ The 'NIC-based high growth' scenario assumes that wider economic impacts are the same proportion of transport user benefits as the 'DfT business as usual growth' scenario

15. How the shortlisted route options perform against the route selection criteria

Table 15.6: indicative BCRs of shortlisted route options, ‘DfT business as usual’ scenario

| Route Option | Level 1 BCR | Level 2 BCR |
|--------------|-------------|-------------|
| A | 0.59 | 0.62 |
| B | 0.44 | 0.47 |
| C | 0.37 | 0.40 |
| D | 0.52 | 0.55 |
| E | 0.60 | 0.64 |

Table 15.7: indicative BCRs of shortlisted route options, ‘NIC-based high growth’ scenario

| Route Option | Level 1 BCR | Level 2 BCR |
|--------------|-------------|-------------|
| A | 1.14 | 1.22 |
| B | 1.01 | 1.07 |
| C | 0.80 | 0.86 |
| D | 0.97 | 1.04 |
| E | 1.23 | 1.31 |

Suspension Bridge over River Great Ouse, Bedford



Environmental impacts and opportunities

15.18 Based on the comparative environmental assessment of shortlisted route options, routes via Cambourne (Routes B and E) appear to have the fewest problematic areas with potential direct impacts on irreplaceable or sensitive features, especially areas of Ancient Woodland, SSSIs and Registered Parks and Gardens. Mitigation requirements are therefore likely to be less and more achievable.

| Route Option | Summary of environmental impacts |
|--------------|---|
| A | <p>High-risk hotspots for Route A include:</p> <ul style="list-style-type: none">• Potentially unavoidable direct loss of either areas of ancient woodland or Ickwell Bury Registered Park and Garden around Northill;• Potentially adverse effects on the ecological connectivity of several SSSIs;• Potential impacts on the Grade 1 listed Wimpole Hall;• Developing a feasible alignment through the area south of Sandy is due to several environmental features of importance;• Providing suitable mitigation for potential indirect effects on Eversden and Wimpole Wood SAC and SSSI. |
| B | <p>High-risk hotspots for Route B include providing suitable mitigation for potential indirect effects on Eversden and Wimpole Wood Special Area of Conservation (SAC) and SSSI.</p> |

Table 15.8:
summary of the
environmental impacts
for the shortlisted
route options

15. How the shortlisted route options perform against the route selection criteria

| Route Option | Summary of environmental impacts |
|--------------|--|
| C | <p>High-risk hotspots for Route C include:</p> <ul style="list-style-type: none"> • Potentially adverse effects on the ecological connectivity of several SSSIs; • Potential impacts on the Grade 1 listed Wimpole Hall; • Developing a feasible alignment through the area south of Sandy due to several environmental features of importance; • Potential effects relating to noise, visual impacts, environmental setting and flood risk arising from the curved (looped) nature of the route between Sandy and St Neots • Providing suitable mitigation for potential indirect effects on Eversden and Wimpole Wood SAC and SSSI. |
| D | <p>High-risk hotspots for Route D include:</p> <ul style="list-style-type: none"> • Potential disturbance effects associated with noise, vibration and air quality in Bedford town centre; • Potentially adverse effects on the ecological connectivity of several SSSIs; • Potential impacts on the Grade 1 listed Wimpole Hall; • Developing a feasible alignment through the area south of Sandy is due to several environmental features of importance; • Potential effects relating to noise, visual impacts, environmental setting and flood risk arising from the curved (looped) nature of the route between Sandy and St Neots; • Providing suitable mitigation for potential indirect effects on Eversden and Wimpole Wood SAC and SSSI. |
| E | <p>High-risk hotspots for Route E include:</p> <ul style="list-style-type: none"> • Potential disturbance effects associated with noise, vibration and air quality in Bedford town centre; • Providing suitable mitigation for potential indirect effects on Eversden and Wimpole Wood SAC and SSSI. |

Other considerations

15.19 While EWR Co has focused on the five key route selection criteria that were considered most likely to differentiate between route options, EWR Co has also reviewed the performance of each route option against the other criteria set out in Chapter 5.

15.20 The following conclusions have been drawn from this further consideration:

- All route options are expected to be able to provide capacity and capability to satisfy existing and potential freight demand
- All route options could provide an acceptable level of operational performance, particularly if the railway infrastructure for EWR services through Bedford is fully segregated from existing infrastructure
- Safety risk is not considered to be a differentiating factor as EWR will be designed, constructed, operated and maintained in accordance with international and national standards and regulations
- The likelihood of obtaining development consent for the new railway between Bedford and Cambridge will depend on demonstrating that the preferred route alignment for the preferred route option can meet the objectives for the project and is not inconsistent with policy contained in the National Networks National Policy Statement

16.

Approach into Cambridge



Analysis prior to consultation

16.1 The five shortlisted route options presented in EWR Co's non-statutory public consultation between January and March 2019 would approach Cambridge from the south by connecting to the West Anglia Main Line near Great Shelford.

16.2 Before EWR Co took responsibility for developing the case for the section of EWR between Bedford and Cambridge, Network Rail considered three main options for approaching Cambridge, illustrated in Figure 16.1:

- Approaching Cambridge from the south by connecting to the existing West Anglia Main Line in the vicinity of Shepreth Junction where the existing Hitchin-Cambridge Line joins the West Anglia Main Line
- Approaching Cambridge in a tunnel from the west and interchanging with the existing Cambridge station below ground
- Approaching Cambridge from the north, either by using the route of the existing guided busway into Cambridge North station, or by connecting to the West Anglia Main Line between Milton and Waterbeach

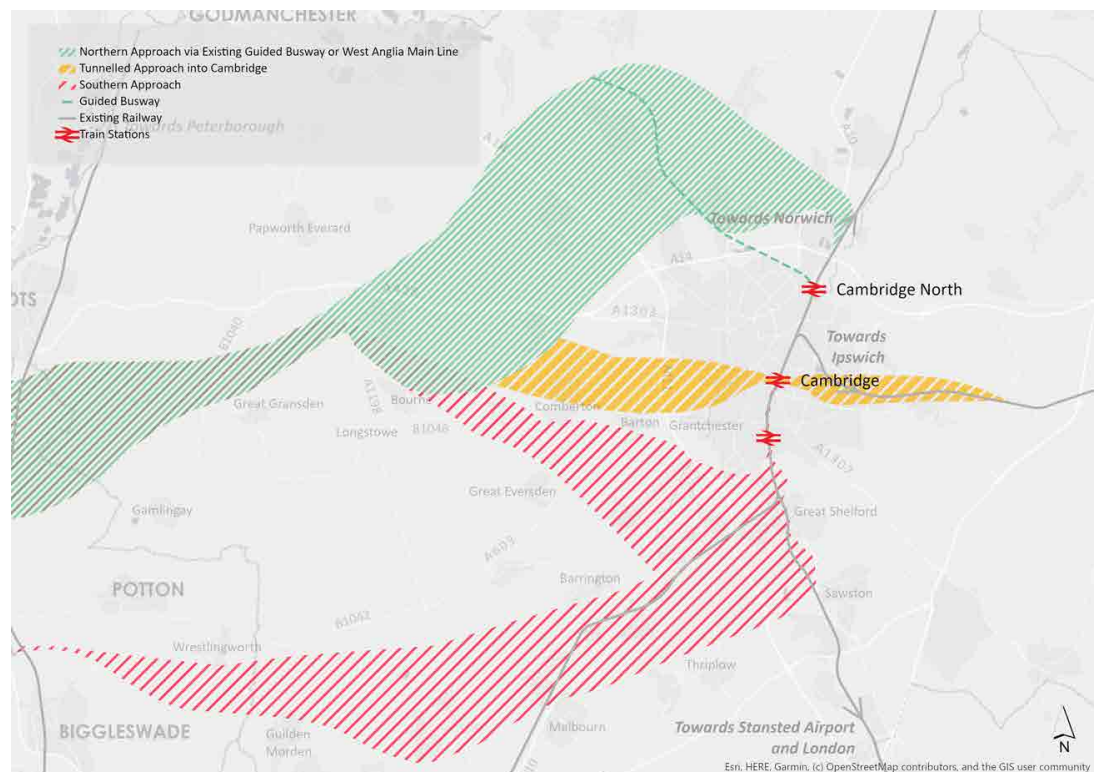


Figure 16.1: map of approaches into Cambridge

16.3 The analysis led by Network Rail and reviewed with local stakeholders concluded that the best option was for EWR services to approach Cambridge from the south.

16.4 EWR Co reviewed this decision ahead of the initial non-statutory consultation on route options and concluded that prioritising route options approaching Cambridge from the south appeared to remain sound.

16.5 EWR Co confirmed the key issues for a northern approach into Cambridge included:

- Adverse impacts on existing local transport connectivity if EWR were to use the route of the guided busway
- Additional tracks being required for a longer section of the West Anglia Main Line if EWR were to approach Cambridge from the north rather than the south, whereas some of the additional tracks south of Cambridge are likely to be required anyway to provide capacity for the proposed new Cambridge South station
- Additional route length if EWR were to approach Cambridge from the north would lead to higher costs and lower passenger benefits with longer journey times
- Requiring a reversing move at Cambridge station for any onward journeys to/from Ipswich and to/from Norwich if services were to serve Cambridge rather than bypass the city
- Better connectivity to economic and employment opportunities near Cambridge North station, but at a cost of not being able to directly support the planned biomedical campus and wider economic growth opportunities around the proposed Cambridge South station

Consultation responses

16.6 The documents published by EWR Co to inform the non-statutory consultation between January and March 2019 noted that of the five route options shortlisted for consultation, Routes B and E could alternatively approach Cambridge from the north.

16.7 Consultation response forms included a specific question on whether EWR Co were right to prioritise route options that approach Cambridge from the south rather than the north. Around a third of responses did not express a view, with the other two-thirds being broadly evenly split between agreeing and disagreeing with EWR Co's decision to prioritise route options that approach Cambridge from the south.

16.8 A local interest group CamBedRailRoad (CBRR) proposed an alternative route alignment between Bedford and Cambridge in their response to the consultation. Parts of the proposed route alignment fall outside of the area covered by EWR Co's shortlisted route options and it includes a northern approach into Cambridge.

16.9 CBRR independently promoted their proposed alignment during EWR Co's non-statutory consultation, including at public consultation events. A considerable number of consultation responses explicitly referenced CBRR and responses regarding the approach into Cambridge are likely to have been influenced by the CBRR proposal.

16.10 CBRR's proposed alignment would serve a new station to the south of Bedford on the Midland Main Line before closely following the route of the A421 and serving a new station on the East Coast Main Line to the south of St Neots. The CBRR route then broadly follows the A428 before serving a new station at Cambourne to the north of the A428. To the east of Cambourne the CBRR route crosses the A14 to serve a new station near the planned new development of Northstowe. The alignment joins the West Anglia Main Line to the south of Waterbeach, with EWR serving Cambridge North and Cambridge stations.³⁵

Fitzwilliam Street,
Cambridge

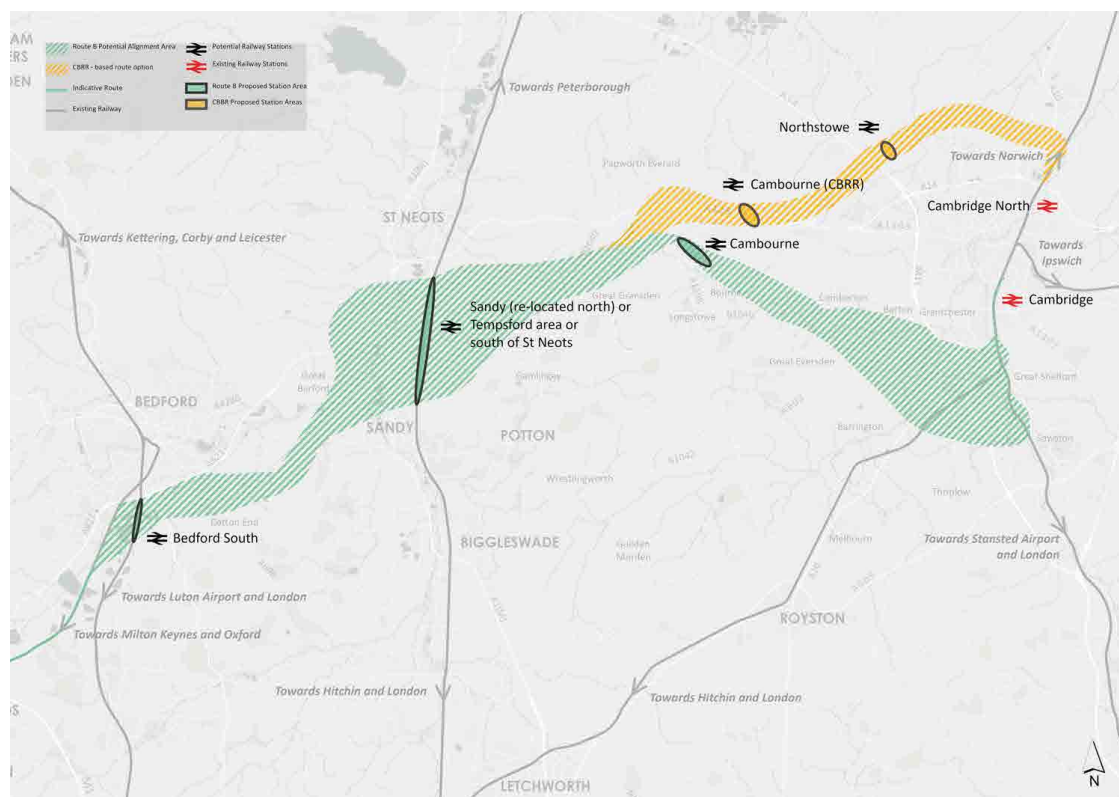


³⁵ More information on the route alignment proposed by CBRR is available at <http://www.cambedrailroad.org>.

CBRR-based route option that approaches Cambridge from the north

- 16.11** Given the substantial interest in the CBRR proposal and a northern approach into Cambridge in consultation feedback, EWR Co has given further consideration to a route that approaches Cambridge from the north, based on the alignment proposed by CBRR.
- 16.12** The indicative CBRR-based route option has been assessed against the same five key route selection criteria as EWR Co's shortlisted route options. The assessment sought to test if EWR Co's previous decision to prioritise route options that approach Cambridge from the south remains sound. A CBRR-based route option was developed by EWR Co and is a variant of Route B represented by the yellow shaded area in Figure 16.2.
- 16.13** In considering the indicative CBRR-based route option EWR Co assumed that to the west of Cambourne the CBRR alignment is broadly comparable to EWR Co's Route B. This is because even though parts of the proposed route alignment fall outside of the route option area identified by EWR Co, the additional costs incurred from the CBRR alignment passing through residential and industrial areas to the south of Bedford would lead the CBRR-based route option to be south of the A421.
- 16.14** However, the CBRR-based route option diverges from EWR Co's Route B in the area immediately to the west of Cambourne. EWR Co therefore assessed a CBRR-based route option from this point onwards. This involved some minor modifications to the alignment proposed by CBRR to minimise costs and potential adverse environmental impacts so that it could be considered on a comparable basis with EWR Co's other route options.
- 16.15** The CBRR-based route option analysed by EWR Co does not include the proposed chord linking the railway line from Cambridge North eastwards that would enable direct services towards Ipswich and Felixstowe from Bedford and other destinations to the west of Bedford. This is because the proposed chord would not serve Cambridge Station.
- 16.16** The chord element of the CBRR route alignment was also omitted from EWR Co's analysis as it would increase the capital cost of the route, which would have a material negative effect on the value for money assessment of the CBRR-based route option compared to the other route options assessed which would not require a chord to be constructed.
- 16.17** In addition, the chord goes through a Local Nature Reserve (Coldham's Common) which contains a County Wildlife Site, and the Countryside and Rights of Way Act (CROW Act) gave a public right of access to the area.

Figure 16.2: EWR Co's Route B plus indicative alignment used to assess CBRR-based route option that approaches Cambridge from the north



Assessing a CBRR-based route option that approaches Cambridge from the north against the five key route selection criteria

- 16.18** EWR Co's further assessment of a CBRR-based route option that approaches Cambridge from the north against the five key selection criteria has indicated that approaching Cambridge from the south should remain the preferred option.

Benefits for transport users

- 16.19** EWR Co has assessed the potential benefits of a CBRR-based route option that approaches Cambridge from the north with additional stations at Northstowe and Cambridge North using the EWR transport model.
- 16.20** Benefits were modelled under the 'NIC-based high growth' demand scenario to ensure that the modelling could take account of the 10,000 homes planned at Northstowe.

- 16.21** Modelling of transport user benefits suggests the benefits of approaching Cambridge from the north are similar to that of a southern approach if it is assumed that EWR services would stop at Cambridge North or Cambridge South stations respectively. Benefits are around £3.1 billion for a northern approach, compared to £2.9 billion for Route B including a stop at Cambridge South³⁶
- 16.22** However, approaching Cambridge from the north would require a reversing move at Cambridge station for any onward journeys to/from Ipswich, and to/from Norwich if services were to serve Cambridge rather than bypass the city, which would further increase journey times.

Supporting economic growth

- 16.23** EWR Co has undertaken a high-level assessment of the proposed economic activity around Cambridge North station and how it compares to activity around the proposed Cambridge South station to establish whether fast, direct connectivity to the north of Cambridge is likely to be more beneficial.
- 16.24** The assessment found that approaching Cambridge from the north would provide better connectivity to economic and employment opportunities near Cambridge North station but would forego the opportunity to directly support the planned biomedical campus and growth opportunities around the proposed Cambridge South station.
- 16.25** The economic and employment opportunities provided around Cambridge North station and the proposed Cambridge South station are considered to be similar in nature and scale.

Supporting delivery of new homes

- 16.26** EWR Co reviewed existing plans for the development at Northstowe and reviewed consultation responses to establish whether any additional opportunities for housing could be supported by an EWR route that approaches Cambridge from the north.
- 16.27** The assessment found that while EWR might support the delivery of the 10,000 homes that are planned at Northstowe, responses to the consultation did not identify any additional housing sites that could be supported if EWR were to approach Cambridge from the north. Moreover, South Cambridgeshire District Council stated a preference for a route via Cambourne (Route E) that approaches Cambridge from the south.

³⁶ Discounted 2010 present values under 'NIC-based high growth' demand scenario.

Costs and overall affordability

- 16.28** EWR Co assessed the cost of a CBRR-based route option that approaches Cambridge from the north by applying the same principles and methodology as for EWR Co's shortlisted route options.
- 16.29** The CBRR-based route option was estimated to incur upfront capital costs of around £4.5 billion (2019 prices) compared to £3.9 billion for EWR Co's Route B approaching Cambridge from the south.
- 16.30** This additional cost of a northern approach into Cambridge reflects both the longer distance and the complexities of connecting into the West Anglia Main Line in close proximity to the proposed new rowing lake to the north of Cambridge. A similar cost differential would be expected for a variant of Route E that approached Cambridge from the north.
- 16.31** Estimates for the revenues, operating costs, and whole life costs of a CBRR-based route option were also generated using the EWR transport model. The CBRR-based route would generate slightly higher revenues than Route B. However, these higher revenues are mostly offset by higher operating costs and whole life costs arising from the longer route and additional station at Northstowe.

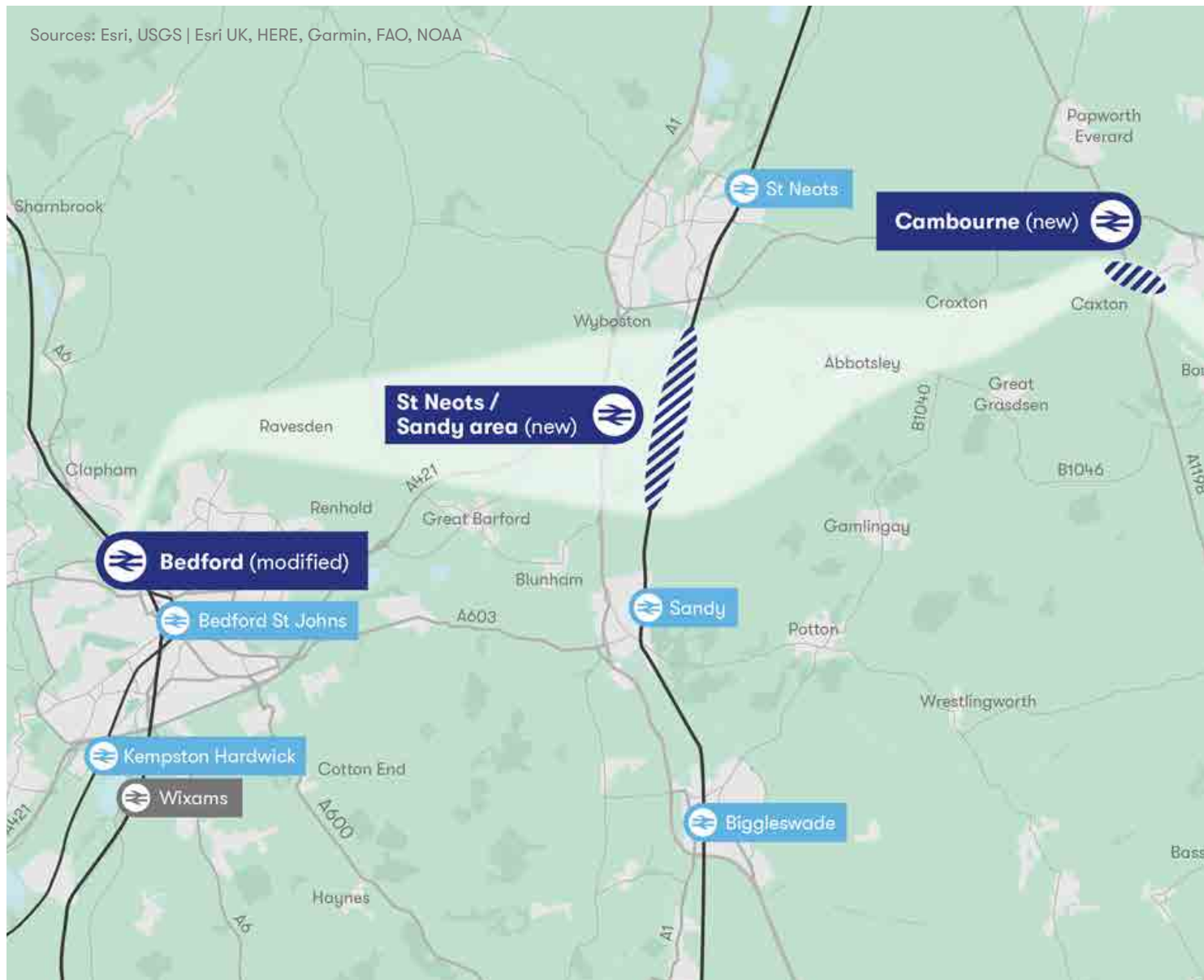
Environmental impacts and opportunities

- 16.32** EWR Co has assessed the environmental impacts and opportunities based on the environmental features in proximity to the indicative alignment developed for the CBRR-based route option approaching Cambridge from the north.
- 16.33** The analysis suggests there are a considerable number of significant environmental features in the area along the route, with potential impacts on the village of Oakington, loss of open green space, flood risk, and the Air Quality Management Area associated with the A14.
- 16.34** A higher level of effort is therefore likely to be required to mitigate the effects of the presence of multiple environmental features compared to route options that approach Cambridge from the south.

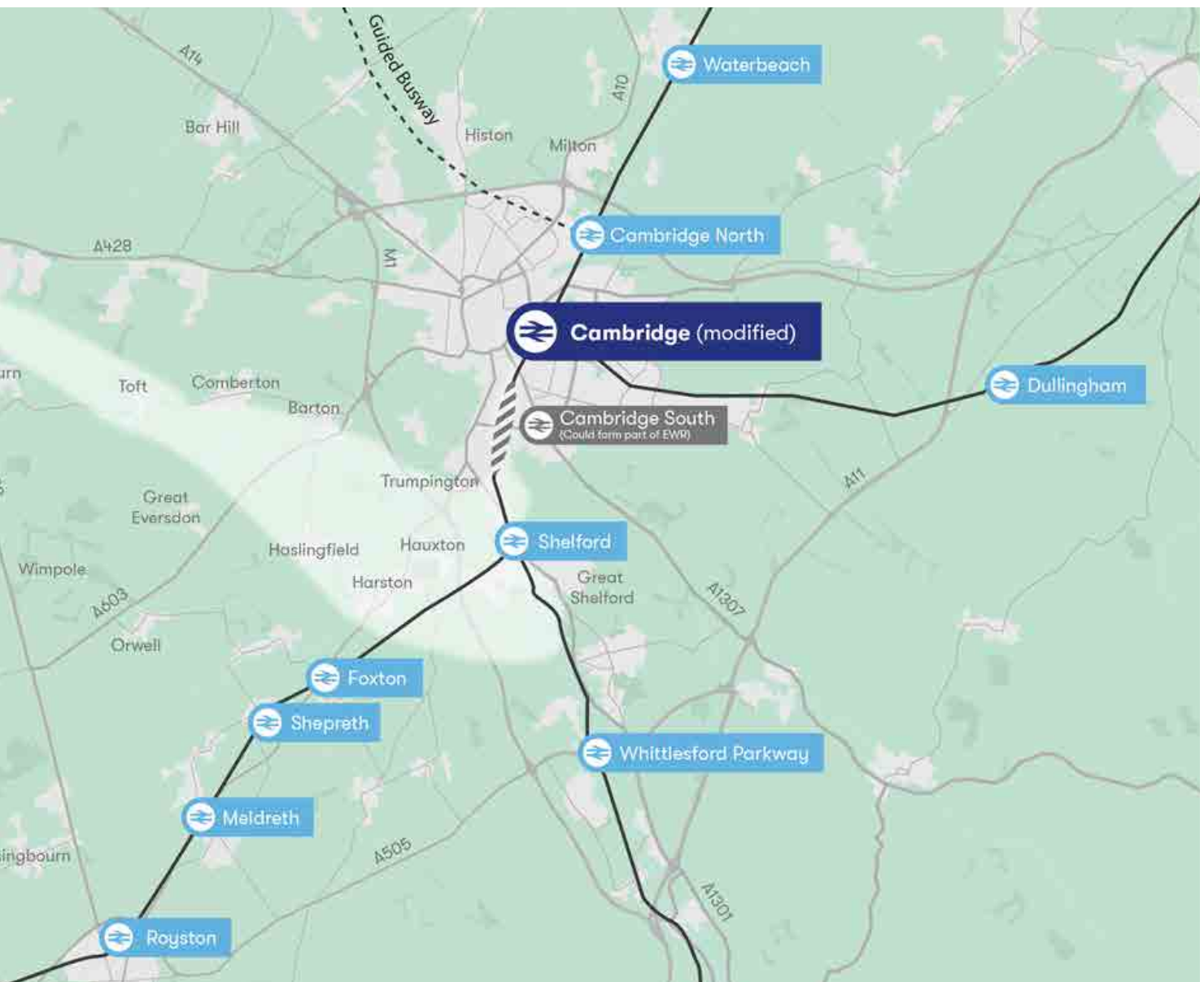
17.

Preferred route option

A more detailed interactive map is available at eastwestrail.co.uk



- 17.1** The government has chosen a route via Bedford Midland, a new station on the East Coast Main Line between the existing Sandy and St Neots stations, and a new station at Cambourne (Route E) as the preferred route option.
- 17.2** The government has come to this decision on the basis of a recommendation from EWR Co taking account of the feedback to EWR Co's initial non-statutory consultation on route options and the performance of each route option against the agreed route selection criteria.



Benefits for transport users

- 17.3** The modelling suggests that Route E provides greater transport benefits than other route options. This is because it provides direct connectivity to Bedford town centre, a single interchange with services to and from the East Midlands, and serves the most households including the growing population at Cambourne.
- 17.4** The greater benefits from providing better connectivity to existing population centres such as Bedford and Cambourne appear to outweigh the disbenefits of the slightly longer journey times for Route E for passengers travelling between other places across the Arc such as between Oxford and Cambridge.
- 17.5** EWR would be expected to complement the proposed guided busway between Cambourne and Cambridge by combining local and inter-urban connectivity, providing a faster service into Cambridge city centre than the busway and direct connectivity to employment opportunities to the south of Cambridge (e.g. the biomedical campus at Addenbrookes).³⁷

Supporting economic growth

- 17.6** Economic modelling undertaken for EWR Co suggests that all the route options for the new railway between Bedford and Cambridge are likely to have similar positive impacts on jobs and productivity (GVA) across the Oxford-Cambridge Arc.
- 17.7** However, routes that serve the existing Bedford Midland station (Routes D and E) are likely to provide greater support for growth and regeneration in Bedford in line with Bedford Borough Council's aspirations. Providing direct connectivity to Bedford town centre also aligns more closely with the strategic case for EWR providing fast direct connectivity to urban centres across the Oxford-Cambridge Arc.

Supporting the delivery of new homes

- 17.8** Responses to EWR Co's initial non-statutory consultation on route options, including from the relevant local planning authorities, suggests that Route E could support opportunities for new housing:
- Within Bedford as part of Bedford Borough Council's plans for growth and regeneration within Bedford town centre, and potentially also to the north of Bedford

³⁷ EWR Co's sensitivity testing suggests that removing rail demand between Cambourne and Cambridge in the NIC-based high-growth scenario would only reduce the benefits of Route E by 2% (less than £0.1 billion).

- Between Sandy and St Neots, either in the broad area around Tempsford as previously considered by Central Bedfordshire Council, or to the south of St Neots where a station is preferred by Bedford Borough Council and Huntingdonshire District Council
- At Cambourne where further housing would not be inconsistent with existing local planning policies and where the relevant local planning authority (South Cambridgeshire District Council) has indicated a preference for the EWR station in South Cambridgeshire to be located

17.9 In contrast, opportunities to support additional housing to the south of Bedford are likely to be more limited because several large sites have already been allocated for residential or commercial development, in part based on separate existing plans for a new north-south Thameslink station at Wixams. Development in the Bassingbourn area is likely to be strongly opposed by the local community.



Bedford Park

Costs and overall affordability

- 17.10** The revised indicative upfront capital cost estimates suggest that the costs of Route E (£3.7 billion) are similar to the costs for Route A (£3.6 billion) and lower than the costs for the other three route options (£3.9 billion to £4.3 billion).
- 17.11** The transport user benefits modelling suggests that the operating costs and revenues would be similar for all route options, with Route E generating the highest net profit for the rail industry in the 'NIC-based high growth' demand scenario.

Environmental impacts and opportunities

- 17.12** Based on the comparative assessment of environmental sustainability that has been undertaken, EWR Co has concluded that routes via Cambourne (Routes B and E) appear to have the fewest problematic areas with potential direct impacts on irreplaceable or sensitive features and the lowest likely mitigation effort.
- 17.13** However, the impact of the Bedford to Cambridge section of EWR on environmental features will ultimately be determined by the specific route alignment that is chosen. EWR Co will give particular consideration to the potential noise, vibration, and air quality impacts in the Bedford urban area when taking forward Route E for further assessment and design.

Other considerations

- 17.14** Route E would be expected to:
- Be able to provide capacity and capability to satisfy existing and potential freight demand
 - Provide an acceptable level of operational performance, particularly if the railway infrastructure for EWR services through Bedford is fully segregated from existing infrastructure
 - Be designed, constructed, operated and maintained in accordance with international and national standards and regulations

- 17.15** The likelihood of obtaining development consent for the new railway between Bedford and Cambridge will depend on being able to demonstrate that the preferred route alignment for Route E can meet the objectives for the project and is not inconsistent with policy contained in the National Networks National Policy Statement.
- 17.16** Route E was the most favoured option among the c.7,000 respondents to EWR Co's initial non-statutory consultation. It received the highest scores against four of the five main criteria: supporting economic growth; providing benefits for transport users; supporting new homes; and environmental impacts.
- 17.17** Route E was also the preferred option for Bedford Borough Council, Huntingdonshire District Council, South Cambridgeshire District Council, and Cambridge City Council.



Trinity Hall,
Cambridge

Annex A:

Benefits to transport users



Allocation of housing growth under demand scenarios

- A1.** The ‘DfT business as usual’ demand scenario broadly sees strong housing growth in the Bedford Midland catchment area, moderate housing growth in Cambridge, and relatively low levels of housing growth elsewhere.
- A2.** While the ‘NIC-based high growth’ demand scenario is broadly aligned with the government’s ambition it is not intended to represent government policy on the scale of development at any location.
- A3.** When allocating housing growth under the ‘NIC-based high growth’ demand scenario, where applicable locations have been taken directly from Steer’s analysis which was used to inform the NIC report.³⁸
- A4.** Where Steer was less specific about the location of housing growth, or where there were areas not considered in the study (e.g. Cambourne), EWR Co has assumed the location of housing is dependent on the route option.
- A5.** The ‘NIC-based high growth’ demand scenario makes the following key assumptions on the location of new housing:
- **Sandy-St Neots area:** Steer did not specify the location of housing growth around Sandy but identified the potential for new households in the area by 2050. The analysis for EWR assumes that 75% of this additional housing could fall within the catchment area of either a re-located Sandy station or a new station between Sandy and St Neots
 - **Cambourne and Bassingbourn:** Steer did not specifically identify an opportunity for further housing growth at Cambourne. The analysis assumes that if EWR took a route which served Cambourne instead of Bassingbourn, homes that Steer allocated to Bassingbourn would instead be allocated to Cambourne
 - **Bedford Midland and the area to the south of Bedford:** The ‘DfT business as usual’ demand scenario has higher housing growth in Bedford town than allocated by Steer. The scenario adjusts how the new houses at Bedford are allocated between Bedford town and the area to the south of Bedford. The growth in the Bedford Midland catchment area remains the same as in the ‘DfT Business as usual’ demand scenario, and the additional growth falls to the catchment area of a new station south of Bedford.

³⁸ Table 3.3: <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>

Train Service Specification (TSS)

- A6.** The ‘do minimum’ includes the EWR section between Oxford and Bedford. TSS assumptions for this section are assumed to be: two trains per hour between Oxford and Milton Keynes, one train per hour between Oxford and Bedford and one train per hour between Milton Keynes and Aylesbury. Services between Oxford and Bedford are assumed to be operated by Class 185 three-car vehicles.
- A7.** The ‘do something’ extends the Oxford-Bedford service to Cambridge and provides an additional train per hour between Oxford and Cambridge and an additional two trains per hour between Bletchley and Cambridge. This gives a total of four trains per hour between Bletchley and Cambridge. All trains are assumed to call at all EWR stations under each route option. From entry into service between Bedford and Cambridge, all services on this route are assumed to be provided by Class 185 four-car vehicles.
- A8.** At this stage, TSS assumptions have been developed primarily to support a relative appraisal of different route options between Bedford and Cambridge rather than to optimise the BCR for the scheme as a whole. The TSS assumptions will be revisited for future business cases.
- A9.** The analysis assumes that for Routes A, C and D, EWR services stop at a new Bassingbourn station only in the ‘NIC-based high growth’ demand scenario. This is because the cost of relocating the Bassingbourn MoD site to accommodate a new station is assumed to be much larger than any net benefit under the ‘DfT business as usual’ demand scenario.
- A10.** Assumed journey times under these TSS assumptions are presented below in Table A.1. These are indicative journey times developed for the purposes of modelling transport user benefits, and will be subject to further assessment as more detailed plans for the railway are developed.

Figure A.1:
assumed ‘do
minimum’ EWR
train service
specification
without a railway
between Bedford
and Cambridge

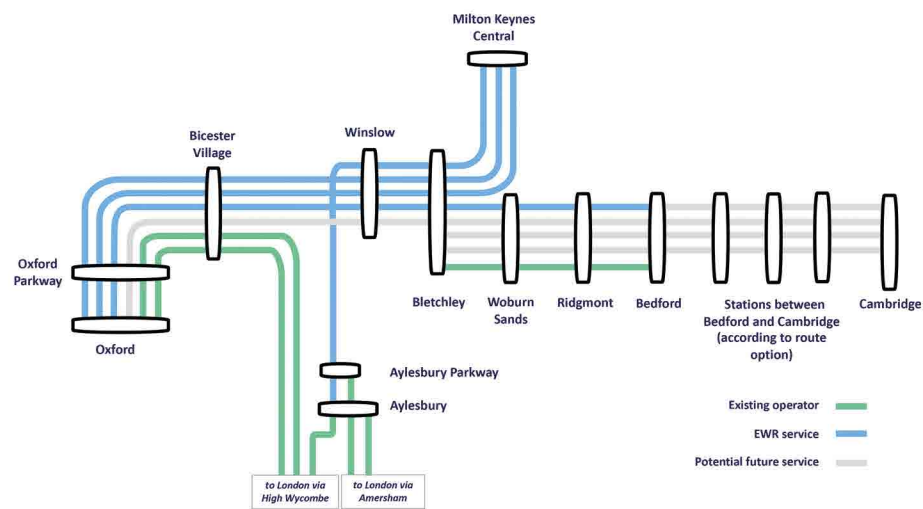


Figure A.2:
assumed ‘do
something’ EWR
train service
specification once
a new railway has
been built between
Bedford and
Cambridge

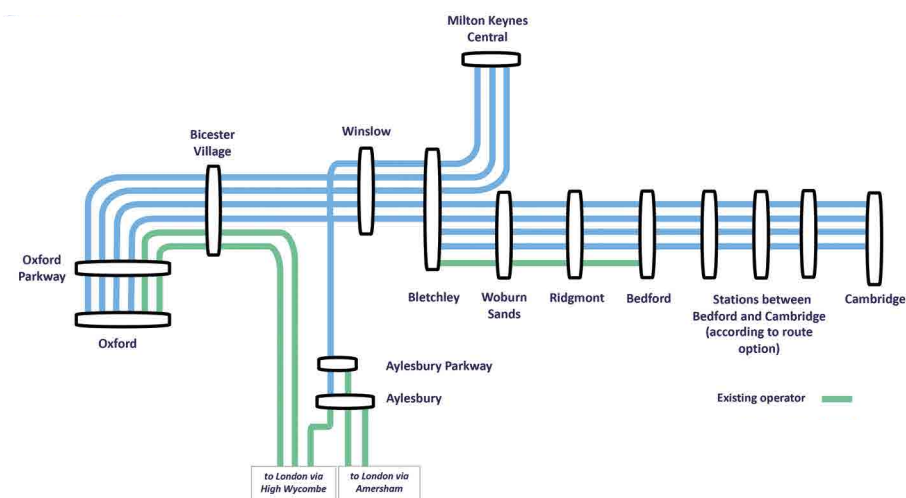


Table A.1: assumed rail
journey times under
the ‘do minimum’ and
‘do something’ EWR
train service
specification for each
route option

| Flow | Do Min | Route A | Route B | Route C | Route D | Route E |
|-----------------------------------|--------|---------|---------|---------|---------|---------|
| Bedford – Cambridge ³⁹ | 1h42 | 0h29 | 0h34 | 0h38 | 0h37 | 0h33 |
| Oxford – Cambridge | 2h36 | 1h21 | 1h26 | 1h30 | 1h32 | 1h28 |

³⁹ Journey times between Bedford and Cambridge are shown from the Bedford station that each route option would serve, either Bedford Midland or a new station to the south of Bedford.

Annex B:

Environmental impacts and opportunities



B.1 The detailed methodology for the environment sustainability comparative assessment is illustrated in Figure B.1 and includes:

- Developing environmental objectives for the EWR section between Bedford and Cambridge from an environmental policy and legislative review
- Determining the environmental baseline conditions of the broad route corridor between Bedford and Cambridge
- Determining the avoidance principles to identify environmental features that every reasonable effort should be made to avoid
- Developing a seven-point RAG (Red, Amber, Green) scoring criteria based on the environmental objectives and avoidance principles to assess the environmental sustainability of the route options
- Developing a general mitigation hierarchy for each environmental feature and ROY (red, orange, yellow) criteria to indicate the level of mitigation for each environmental feature
- Reporting the comparison of route options considering the results of the comparative assessment and the worst-case mitigation hierarchy for each environmental feature to inform the decision on a preferred route option

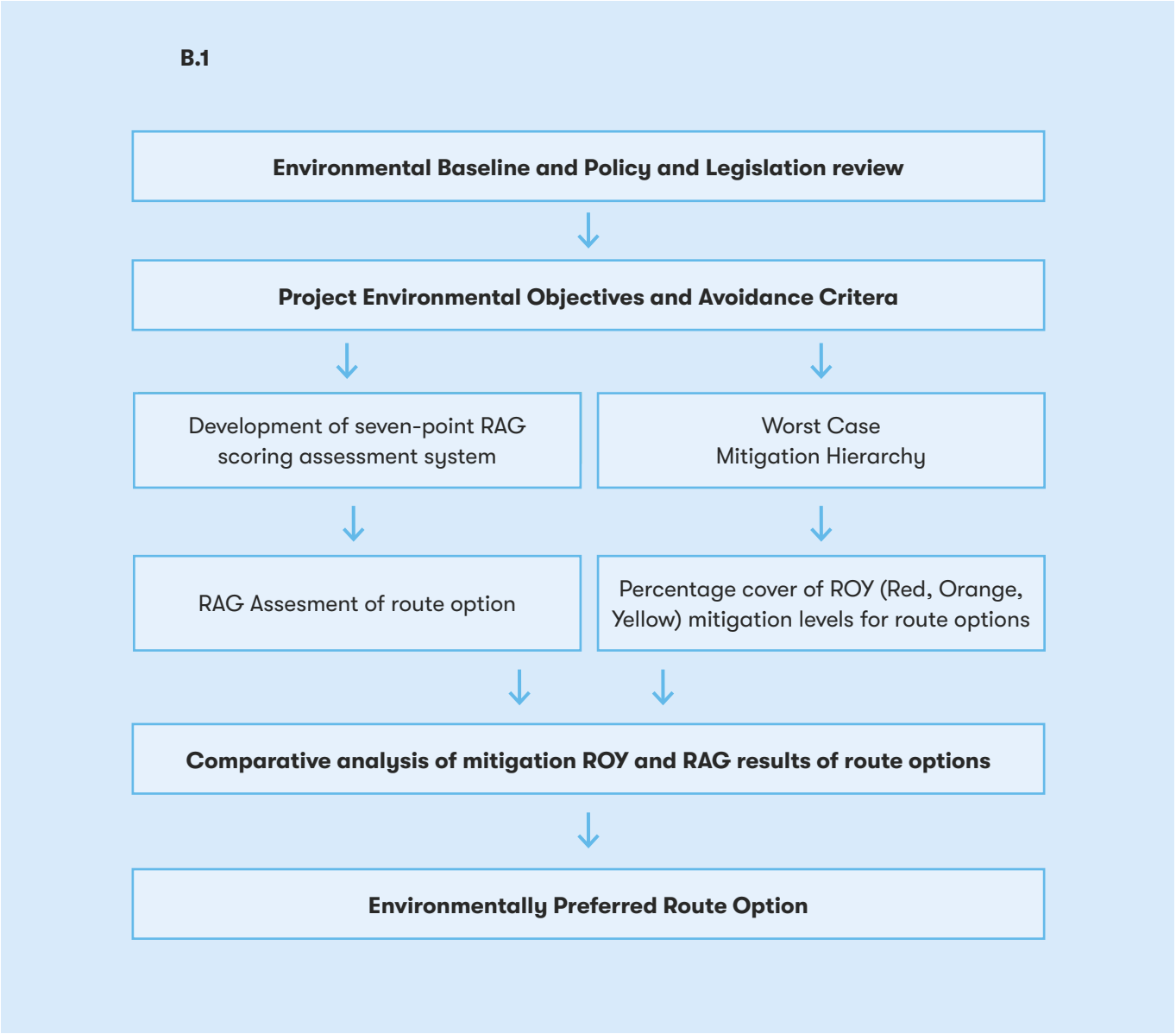


Figure B.1: methodology for the comparative environmental assessment of route options

| Environmental Feature | Description |
|-----------------------------------|---|
| 1. Biodiversity | Veteran/ancient tree, Ancient Woodland, Local Nature Reserves (LNRs), National Nature Reserves (NNRs), National Forest Inventory, OS Open Green Space, Priority Habitat Risk Scores, Ramsar Sites, RSPB Reserves, Special Areas of Conservation (SACs), Special Protection Area (SPAs), Sites of Special Scientific Interest (SSSIs), SSSI Impact Risk Zones (road and rail), Woodland Priority Habitat, County Wildlife Sites (CWS), Tree Protection Orders (TPOs) |
| 2. Cultural heritage | Grade I Listed Buildings, Grade II* Listed Buildings, Grade II Listed Buildings, Registered Battlefields, Registered Parks and Gardens, Scheduled Monuments, Bedford Archaeological Sites, Conservation Areas, Historic Environmental Records (HER) |
| 3. Landscape | Areas of Outstanding Natural Beauty (AONBs), Natural Character Areas (NCAs), Greenbelt |
| 4. Air quality | Air Quality Management Areas (AQMAs) |
| 5. Community health and wellbeing | Built Up Areas (2011 Census), Country Parks, CRoW Open Access Land, Hospital, Noise Important Areas, Schools, Sports Facility, Road Noise Contours, Rail Noise Contours, Public Rights of Way (PRoWs) |
| 6. Geology and Soils | Active Landfill Sites, Historic Landfill Sites, Agricultural Land Classification, Groundwater Source Protection Zone |
| 7. Water quality and resources | Drinking Water Protected Zones, Surface Water Bodies |
| 8. Flood risk | Flood Zone 2, Flood Zone 3 |

Table B.1:
environmental
features considered
by the comparative
environmental
assessment

Further environmental assessment

- B.3** The comparative environmental assessment undertaken to date is based on a broad review of the route option areas. However, the environmental impacts will ultimately be determined by the specific route alignment that is chosen, which will be informed by further assessment and surveys that may identify other environmental constraints.
- B.4** EWR Co intends to follow the best practice mitigation hierarchies. Potential alignments will avoid the greatest impacts where possible, with any residual impacts being minimised and adequately mitigated.
- B.5** Route alignment optioneering, selection, refinement, and design will be supported by statutory assessment processes, including an Environmental Impact Assessment (EIA).
- B.6** EWR Co intends to continue working with statutory and non-statutory stakeholders including but not limited to planning authorities, community and residents' groups, and environmental bodies to inform ongoing environmental considerations.

Transport-related environmental benefits

- B.7** The transport-related environmental benefits of a new railway between Bedford and Cambridge, including noise and air quality benefits from reduced car usage and carbon emissions impacts, have been monetised within the economic appraisal of each route option using standard DfT methodology.
- B.8** These monetised benefits have been incorporated into the indicative BCRs for each route but do not vary significantly by route option.

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The Embankment along the
River Great Ouse, Bedford

Glossary

| Commonly used acronym | Main term | Description |
|-----------------------|---------------------------------|--|
| | Agglomeration | Where the increased density of economic activity in an area increases productivity. Clustering benefits can occur either within or across industries. Density can be affected by physical proximity or where there is a reduction in travel time. |
| BCR | Benefit-Cost Ratio | Metric for assessing the value for money of a transport scheme. Ratio of benefits to cost indicating how much benefit is obtained for each unit of cost. |
| | Capital Costs | Costs of building the railway. |
| | Cambridgeshire Autonomous Metro | An electric-powered metro route proposed by the Cambridgeshire & Peterborough Combined Authority, which would serve inner transport corridors in the Greater Cambridge area. |
| CBRR | CamBedRailRoad | A local, community-based organisation that is promoting an alternative route alignment for EWR in which the railway would approach Cambridge from the north. |
| DfT | Department for Transport | UK government department responsible for transport. |
| | Developable land | Land that could in principle be used for new homes, subject to receiving the necessary planning consents. |
| DCO | Development Consent Order | Order made by the relevant Secretary of State to authorise the development of a Nationally Significant Infrastructure Project. |
| | 'Do minimum' scenario | Scenario for the purposes of economic modelling in which all planned transport improvements (except the EWR section between Bedford and Cambridge) are included. Used as a baseline against which to measure the benefits of building the railway between Bedford and Cambridge (the 'do something' scenario). |

| Commonly used acronym | Main term | Description |
|-----------------------|---------------------------------|--|
| | 'Do something' scenario | Scenario for the purposes of economic modelling in which the EWR section between Bedford and Cambridge is assumed to be built. |
| ECML | East Coast Main Line | Railway line running from London to Edinburgh, through Sandy and St Neots. |
| EWR | East West Rail | Strategic railway between Oxford and Cambridge. |
| EWR Co | East West Railway Company Ltd | Company set up by the Transport Secretary to oversee the delivery of East West Rail. |
| EWR Consortium | East West Rail Consortium | Group of local authorities and businesses working closely with the government, East West Rail Company and Network Rail. |
| | (EWR) Eastern section | The existing rail network from Cambridge through to East Anglia and east coast ports. Currently being reviewed by Network Rail. |
| | Economic growth | Long-term expansion of the economy's productive potential and economic activity. |
| EIA | Environmental Impact Assessment | Identifies the likely significant effects of a project on the environment so that these are considered in the decision-making process. |
| EQulA | Equality Impact Assessment | An assessment designed to assess the impacts of decisions on groups with protected characteristics as defined in the Equality Act 2010. |
| GJT | Generalised Journey Time | 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. |

| Commonly used acronym | Main term | Description |
|-----------------------|---|--|
| | Generalised Journey Time elasticity | The sensitivity of passenger demand to generalised journey times. |
| | Gravity model | Estimates rail demand between origin destination pairs based on flows between places with similar characteristics (population, employment etc). |
| GDP | Gross Domestic Product | The total monetary or market value of all the finished goods and services produced within the economy. |
| GVA | Gross Value Added | Measure of the value of goods and services produced in an economy net of the inputs used to produce those goods and services. |
| HMT | HM Treasury | The UK government's economic and finance ministry. |
| MVL | Marston Vale Line | Existing railway line running from Bletchley to Bedford. |
| MML | Midland Main Line | Existing railway line running from London to the Midlands through Bedford. |
| NIC | National Infrastructure Commission | Independent commission providing the government with advice on major long-term infrastructure challenges. |
| | Nationally Significant Infrastructure Project | Large scale developments (relating to energy, transport, water, or waste) that can use a national development consent process as set out in the Planning Act 2008. |
| | Network Rail | Railway company owning and operating most of Great Britain's railway infrastructure. An arms-length body of the Department for Transport. |

| Commonly used acronym | Main term | Description |
|-----------------------|--|--|
| | Oxford-Cambridge Arc (the Arc) and Cambridge-Milton Keynes-Oxford corridor | A region defined by the government and the National Infrastructure Commission covering local authorities across the counties of Northamptonshire, Cambridgeshire, Hertfordshire, Buckinghamshire, and Oxfordshire and the unitary authorities of Bedford, Central Bedfordshire, Luton, Swindon, and Milton Keynes. |
| | Present values | Where future costs and benefits are discounted (reduced) to reflect a societal preference for goods and services sooner rather than later. £1 today is valued higher than £1 next year, irrespective of inflation and interest rates. |
| | Route alignment | The exact route on which the new railway between Bedford and Cambridge would run. |
| | Route corridor | A wide area (up to around 15 kilometres wide) through which the railway could run. |
| | Route option | An area through which the line between Bedford and Cambridge could run, narrower than the route corridor. This is up to several kilometres in places. |
| RSPB | Royal Society for the Protection of Birds | Conservation charity. |
| SSSI | Sites of Special Scientific Interest | Areas of high conservation value protected by Natural England, which is a public body sponsored by the Department for Environment, Food and Rural Affairs. Activities on SSSIs require approval from Natural England. |
| SAC | Special Areas of Conservation | Areas of conservation protected under the European Union's Habitats Directive. |

| Commonly used acronym | Main term | Description |
|-----------------------|-------------------------------|---|
| TAG | Transport Appraisal Guidance | The Department for Transport's guidance on transport modelling and appraisal. |
| | Trains per hour | Number of trains to run on a particular service route within one hour. |
| TSS | Train Service Specification | A detailed outline of the types of trains to be used for a railway service. |
| TWAO | Transport and Works Act Order | A type of legislation made to authorise new railway or tramway schemes in England and Wales which are not nationally significant. |
| | Transport user benefits | Includes benefits to passengers (faster journey times and lower fares), benefits to road users (less congestion), environmental impacts of travel patterns (greenhouse gases, noise and air quality), reduced road accidents, disruption to rail and road users during construction of the railway, and impacts on government tax revenues. |
| WAML | West Anglia Main Line | Existing railway line running from London to Cambridge. |
| | West Coast Main Line | Existing railway line running from London to Scotland via the north west of England. |
| WLC | Whole Life Costs | The costs of maintaining and renewing the railway infrastructure. |

