

# Technical note: BFARe alignment review

## Summary

This technical note compares EWR Co's preferred alignment which would approach the Bedford area from the north with BFARe's proposed alternative which would approach Bedford from the south, as set out in their response to the 2019 and 2021 non statutory consultations.

Route options passing through the south of Bedford were considered before the selection of a preferred route option in 2020. Route Option E was selected in part because it would deliver higher transport user benefits by serving Bedford and Bedford St Johns stations directly, providing convenient access to other rail services, transport modes, local homes and businesses and facilities such as Bedford Hospital.

In particular, EWR Co had regard to information about the area south and southeast of Bedford which contains a significant number of sensitive or complex environmental constraints which would be difficult and expensive to overcome, including:

- large areas of floodplain which would require significant stretches of viaducts in order to prevent the exacerbation of flood risk in the area and detrimental impacts on the water environment downstream;
- large areas of best grade agricultural land, which respondents to 2019 and 2021 non statutory consultations told us we should seek to avoid. This category of land would also be more expensive to acquire not only to build the railway, but also to provide replacement flood water storage areas;
- designated and non-designated heritage assets and areas of ancient woodland on the route, which respondents to the 2019 and 2021 non statutory consultations told us we should avoid where possible; and
- either demolition of homes and commercial property in Wixams or crossing the former landfill site at Elstow. Building on this contaminated land would carry risks, be complex and more expensive.

BFARe has suggested an alternative route alignment passing to the south of Bedford with a triangular track junction allowing some EWR Co services to stop at Bedford St Johns and Bedford station. Although this alignment would serve the town centre, this would have the following disadvantages:

- Bedford town centre would see a significant reduction in services per hour to Cambridge, Bletchley and Oxford due to the time it would take for trains to turnaround at Bedford stations. This would reduce the attractiveness and convenience of the new railway for prospective passengers;
- a significant amount of additional infrastructure would be needed, including a complex viaduct over the River Great Ouse and the A421 dual carriageway south of Bedford; and
- timetabling would become more complex due to the existence of multiple junctions in close proximity and the need for reverse train moves which would adversely affect performance and reliability of the new services.

The information that BFARe has provided (see paragraph 1.2.3) is either not new or would not change these conclusions. As such, a route alignment following Route Option E and passing through Bedford town centre remains the preferred option.

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# 1. Introduction

## 1.1 Background

1.1.1 EWR Co has been following a sequential design development process for the new railway. This built on the initial selection of a broad route corridor by Network Rail. EWR Co then consulted on a variety of more focused route options for the section between Bedford and Cambridge in 2019<sup>1</sup>. The route options offered different combinations of potential routes and stations for the new line including whether to go through the centre of Bedford or by-pass the town to the south; potential station options on the East Coast Main Line and whether to serve Bassingbourn or Cambourne in Cambridgeshire.

1.1.2 The preferred route option – Route Option E, was selected and announced in 2020<sup>2</sup> at EWR Co's Preferred Route Option Announcement (PROA). This would entail the new EWR services going through the centre of Bedford (including stopping at both of the Bedford stations) and continuing north, then east to cross over the East Coast Main Line south of St Neots or near Tempsford and then on to Cambourne.

## 1.2 Feedback from non-statutory consultation

1.2.1 Following ROA in 2020, EWR Co presented Alignment 1 and Alignment 9 at the non-statutory consultation in 2021 (NSC 2021) as the emerging preferred options for EWR's route alignment between Bedford and Cambridge.

1.2.2 A significant number of responses to NSC 2021 (generally from respondents located in the area north and northeast of Bedford), said that they opposed Route Option E as the preferred route option. Many of these respondents suggested that the options for route corridor selection should be re-opened. Respondents suggested that a different route option, Route Option B, which would by-pass Bedford to the south before crossing the East Coast Main Line near Tempsford and continuing to Cambourne should be selected.

1.2.3 Many respondents referred to a proposed alignment for the new railway being promoted by [BFARe](#), a campaign group primarily based in the villages to the north and northeast of Bedford. BFARe's preferred alignment would pass through the south of the town with a new junction near Elstow, to allow trains to access the two stations in the centre of Bedford from both Cambridge and Bletchley directions. It would then continue broadly eastwards to the south of Cardington before turning northeast in order to pass just to the north of Sandy, before joining and running northwards parallel to the East Coast Main Line (ECML). The centre of Bedford would be provided with a less frequent service, including some of the EWR

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<sup>1</sup> <https://eastwestrail-production.s3.eu-west-2.amazonaws.com/public/MediaObjectFiles/db652106d4/EWR-Technical-Report-1.pdf>

<sup>2</sup> <https://eastwestrail-production.s3.eu-west-2.amazonaws.com/public/MediaObjectFiles/a72dbd2d81/Preferred-Route-Option-Announcement-Preferred-Route-Option-Report-v2.pdf>

services by-passing the stations in the centre of the town altogether and calling at a station in the vicinity of the current Kempston Hardwick station.

- 1.2.4 BFARe set out their proposed alternative to alignments proposed in the NSC 2021 for a route between Bedford and St Neots Station in the North Bedfordshire elected representatives' forum 23 November 2021, as version 2. Version 1 of their alignment is shown as a green line and version 2 is shown as a purple line in Figure 1. The key difference between the two alignments is that the latter was amended to avoid constraints in the Cardington, Cople and Willington areas.
- 1.2.5 Importantly, the BFARe Alignment (considered to be version 2 of the alignment) is broadly similar to the alignment considered as part of an alignment feasibility study developed to support the environmental analysis undertaken in 2019 to inform PROA. The environmental analysis was a key consideration in the decision-making process for PROA. The developed 'representative' alignments for each Route Option allowed a fuller and more accurate analysis of costs, environmental impacts and opportunities amongst other factors to support the PROA.
- 1.2.6 Figure 1 shows EWR's Co's preferred route alignment 1(Tempsford Variant) as a navy blue line (following the [Route Update Announcement in 2023](#)) and version 1 and version 2 of BFARe's proposed alignment.

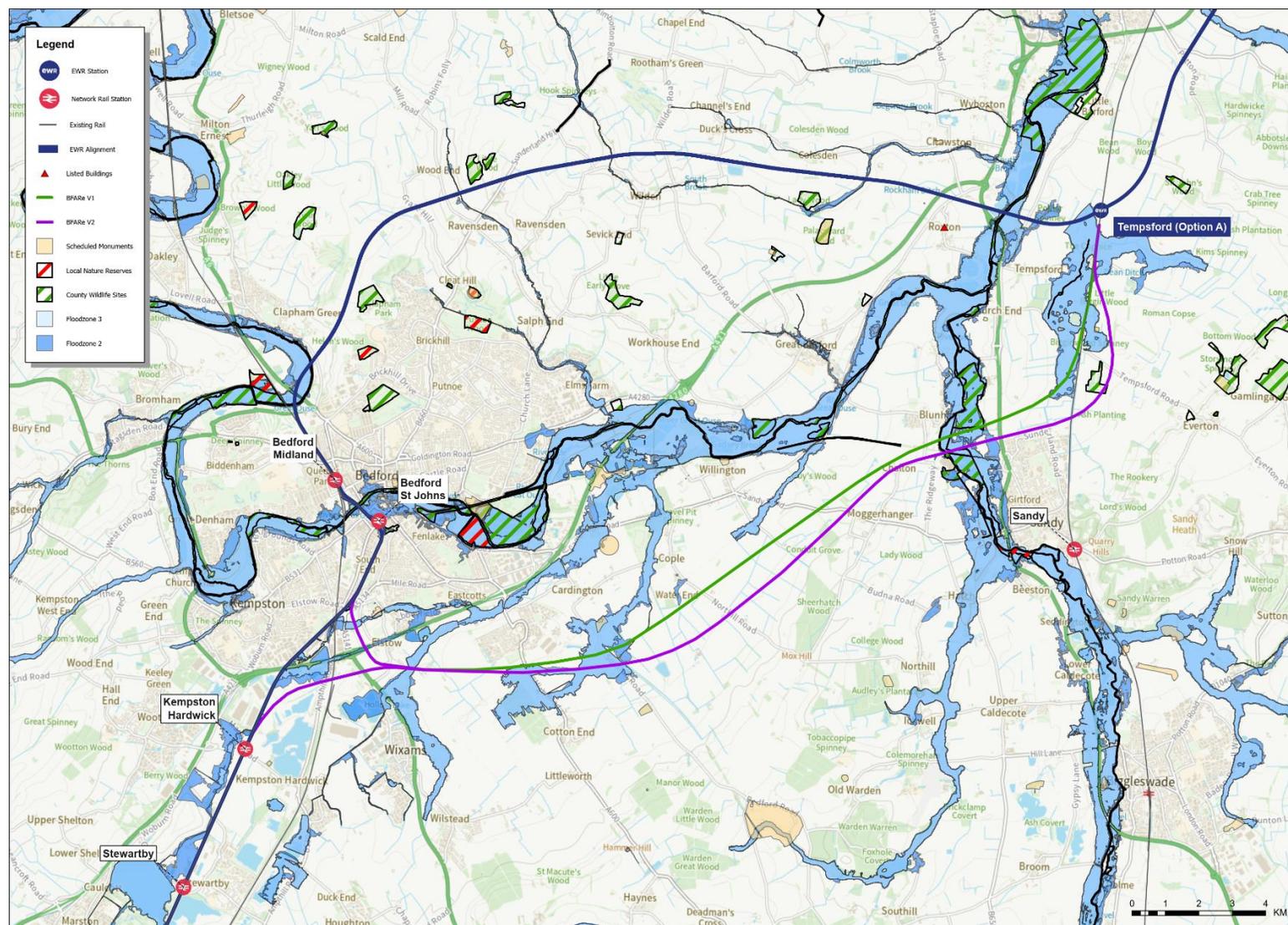


Figure 1- Map showing EWR Co's preferred route alignment 1 (Tempsford variant) and version 1 and version 2 of BFAre's alternative alignments against local environmental consideration.

## 2. BFARe feedback review and alternative route assessment

### 2.1 Overview

- 2.1.1 This section sets out an evaluation of the BFARe alignment in comparison with an alignment that uses Route Option E.
- 2.1.2 Given the similarity between the proposed BFARe alignment and EWR Co's B1 alignment, this evaluation is supported by the analysis that was undertaken to support the PROA. This in itself, demonstrates that EWR Co considered the potential benefits and disbenefits identified by BFARe's proposal when making the PROA.
- 2.1.3 In addition to an evaluation of the merits of the BFARe alignment, further consideration has been given to feedback received in relation to the cost estimate developments, which took place between the 2019 non-statutory consultation (NSC 2019) and PROA in 2020.

### 2.2 Rationale for proposed BFARe alignment option

- 2.2.1 The principal arguments advanced by respondents in favour of selecting Route Option B or the alignment promoted by BFARe in comparison to Route Option E and the proposals for alignments (1 and 9) published by EWR Co as part of NSC 2021, are as follows:
- Removing the need to upgrade the track and stations at Bedford and Bedford St Johns.
  - Avoiding the expense of relocating the Jowett Sidings in the centre of Bedford, currently used by Thameslink.
  - Avoiding local roads and parking in the centre of Bedford from being over-loaded, both during construction and operation of the new railway, and unsuitability of local roads in the landward parts of the borough.
  - Removal of the need to acquire and demolish residential property adjacent to the Midland Mainline north of Bromham Road in order to construct two new tracks for the EWR service, including the replacement or alteration of existing bridges.
  - Avoidance of the Clapham area where the new railway would need to cross highways, the River Great Ouse and a flood plain under a viaduct, all of which is not required if an alignment to the south of Bedford is used.
  - Difficult terrain and undulating topography north of Bedford, whereas the land to the south and east of Bedford is flatter which would mean less complex infrastructure requirements such as long viaducts, deep cuttings or high embankments and the new railway would comply with best practice for freight operations.

- BFARe considers that an alignment to the south of Bedford would be cheaper to build and would have a lower impact in terms of carbon emissions and climate change, including 'climate emergency' declarations by local government.
- That it would be preferable to follow closely the route of the existing A421 road to the south and east of Bedford.
- Avoiding concerns over additional trains (including freight trains) being routed through the centre of Bedford, including with regard to potential impacts such as noise, pollution, vibration and air quality (parts of the centre of Bedford fall within a designated Air Quality Management Area (AQMA)).
- Concerns about the potential impact of the new train service on communities north and northeast of Bedford including with regard to noise, pollution and vibration (particularly if the new line is not electrified).
- Avoiding impacts on the countryside and landscape (including unspecified 'heritage landscape') to the north and northeast of Bedford.
- Avoiding impacts on high-grade agricultural land, public rights of way, heritage assets and ancient woodland such as Park Wood, Clapham Wood, Little & Great Early Woodland, Great Wood, Helen's Wood and Crabtree Spinney.
- Preventing prejudice to the outcome of development options under the emerging Bedford Borough Local Plan.

2.2.2 The following sections deal with each of the above arguments

## 2.3 Operational Considerations

2.3.1 The key arguments in relation to operational considerations put forward by BFARe in support of their alignment are addressed in this section and comprise:

- *It removes the need to upgrade the track and stations at Bedford and Bedford St Johns.*
- *It avoids the expense of relocating the Jowett Sidings in the centre of Bedford currently used by Thameslink.*
- *Avoiding local roads and parking in the centre of Bedford from being over-loaded, both during construction and operation of the new railway, and unsuitability of local roads in the landward parts of the borough.*

### Bedford stations and sidings area

2.3.2 With respect to the need to upgrade the track and stations at Bedford and Bedford St Johns, this would be required in any event if the new EWR services (or some of them) are to serve

these stations in the centre of Bedford in the future. This is because additional platforms would be required at Bedford station to accommodate the enhanced level of services, whether these terminate in Bedford or reverse at Bedford station en route from Oxford and Bletchley on to Cambridge.

2.3.3 Bedford St Johns is a particular issue in this regard. The current station is located on a single-track section of line with only one platform and subject to a low line speed because of the curvature of the track at each end. There is insufficient space available to extend the existing platform to the length required for EWR services and to construct a second line and platform in this area which means that retaining the existing station and track layout would create a 'bottleneck' and would therefore not achieve the Project's objectives.

2.3.4 This means that the need to undertake these improvements (including potential impacts on Jowett Sidings if track in this area needs to be re-aligned and level of service increased) would not be removed even if a different route option or an alignment passing through the south of Bedford was selected.

### **Additional operational considerations**

2.3.5 EWR Co considered whether it would be possible for services from Oxford and Bletchley to enter the centre of Bedford from the south, reverse or terminate at Bedford station and then return to re-join the new EWR alignment to the south in order to continue their journey to Cambridge. This would require additional infrastructure to enable this type of service pattern and we considered a number of options for how this might be constructed, including an option that is broadly the same as the alignment promoted by BFARe.

2.3.6 There are a number of inherent issues and constraints with such proposals including:

- The need for a new north to east curve from the Amphill Road area (near its junction with the B530 road) to southwest of Elstow. This would require a lengthy viaduct to enable the railway to cross the River Great Ouse and its floodplain as well as the A421 dual carriageway – these features are in close proximity in this location. This would be complex and expensive to engineer.
- The north end of this new curve (where it would diverge from the Marston Vale Line at a new junction) is constrained by built development. Linespeed through the junction would be severely constrained due to the limited radius of the curve which could be built and this would adversely affect capacity on both routes due to the longer time required for conflicting train movements to clear the junction. A larger radius curve with a higher linespeed or a grade separated junction (to reduce conflicting train movements) would be likely to be needed and this would require the acquisition and demolition of residential and commercial property on West End or Amphill Road. This would further increase the capital and maintenance costs of this additional infrastructure.
- The new curve would also have potential significant effects on the setting of the sensitive and important group of heritage assets connected with the Elstow Abbey

site. This includes a number of listed buildings (including those listed at Grade I and II\*) and two scheduled monuments. There would also be potential effects on the setting of other listed buildings further south on Wilstead Road. The railway would need to be elevated at this location which could exacerbate the potential impact on the significance of these assets and their setting.

- The south end of this new curve (where it meets the main EWR line passing through the south of Bedford) would be located in the area immediately to the west of Elstow. The new junction would be approximately 250 metres or less from the existing residential properties in the village. Both lines would also need to be elevated in this location. This is because of the need for the curve to cut across environmental features described in section 2.5 as well as the main EWR line to cut across the B530 road, the Midland Main Line, the former Elstow landfill site and the A6 dual carriageway. This could increase the potential adverse effects on the local community in Elstow.
- If the EWR services were to approach and serve Bedford station from the south this would entail reversing moves at stations. Reversing moves are where a train enters a station, reverses direction and then leaves back the way it came, on the same journey. Performance on services incorporating such reversing moves could potentially lead to a worsening of train operation in terms of both punctuality and reliability. Reversing trains have to cross over to the proper running line on entering or exiting the station, meaning signalling delays whilst the points are reset for other services and reducing the overall capacity of the railway. A service using only two lines is at great risk of blocking both and this would be further exacerbated if the current single-track alignment through Bedford St Johns station was retained in its current state. If the service is frequent (such as four trains per hour in each direction) trains can become quickly backed up to the point that efforts to recover the service, getting trains in the right place and services back on time would see not just delays, but a large number of cancellations. It would therefore not be desirable to design a new, high-frequency service with a reversing move included, as this would be a designing risk and fragility into the service with potential knock-on impacts on the resilience of the wider network.
- Reversing moves would also have to be factored into the timetable design, which must allow sufficient time for trains to turn around. For a frequent service, this creates a risk of delay due to the time which must be allowed for the train crew to change ends and the gap which must be allowed between the previous and subsequent services. In this regard, the six minute reversing time suggested by BFARe is not realistic (currently other service operator turnaround times range between 10 and 14 minutes) and would impact on the reliability and punctuality of services because it builds a potential bottleneck into the timetable. Even if this was achievable within the overall service pattern, it would lengthen the journey time for all passengers who are not travelling to or from Bedford. This would make the new EWR services less attractive for many passengers and reduce the overall transport user benefits that the Project will unlock across the whole route.

- The location for the 'Bedford Parkway' station proposed by BFARe near Kempston Hardwick is over a mile from the edge of the built-up area of the town. It is also separated from the town by the A421 dual carriageway. These factors mean that it would be less accessible or attractive using active travel modes, such as walking and cycling, for the majority of those who live in the town without significant additional infrastructure. This would also potentially result in customers accessing the station using less sustainable modes, such as by private car and result in potentially increased environmental impacts, such as from increased carbon emissions from those driving to the station, the impact on the local road network from increased (and longer) trips and increased parking provision near the station requiring the acquisition and development of more land.

2.3.7 These significant constraints would make it both difficult and expensive to deliver the necessary infrastructure to facilitate the new EWR services should an alignment running south of Bedford, such as that promoted by BFARe, be selected. The service pattern would in turn be less resilient, less reliable, less attractive to passengers and have lower transport user benefits than services passing through the centre of the town without reversal en route. This additional infrastructure would not be required, and the associated impacts would not arise, under EWR Co's proposals. As such, for the reasons mentioned above it does not appear to be justifiable for Route Option E to be re-opened.

### **Bedford local roads**

2.3.8 In the process of making a PROA, EWR Co considered the potential of increased impacts to the noise, air quality and disturbance within the Bedford town centre associated with a Route E option as a result of construction and operation of the railway. This is set out in 14.14 of the PROA.

2.3.9 As the Project develops, EWR Co will undertake a Transport Assessment of impact on the strategic and local highway networks, road safety, and local sustainable modes of transport, including public transport. Outcomes of this will be reported in the Preliminary Environmental Information Report published at statutory consultation and the Environmental Statement submitted alongside the DCO Application. The assessment will consider the impacts of construction on the road network, such as changes to existing traffic patterns because of predicted construction traffic and the suitability of roads, including those around Bedford as mentioned by respondents. Following consultation with all the relevant highway authorities and other bodies, EWR Co will prepare a Traffic Management Plan (TMP) for management of traffic during the construction period that includes measures aimed at maintaining safety for road users and reducing the impacts of construction traffic.

## **2.4 Infrastructure considerations**

2.4.1 The key arguments in relation to infrastructure considerations put forward by BFARe supporting their alignment addressed in this section are:

- *Significant difficulties in the Clapham area where the new railway would need to cross highways, the River Great Ouse and flood plain on a viaduct which is not required if an alignment to the south of Bedford is used.*
- *Difficult terrain and undulating topography north of Bedford, whereas the land to the south and east of Bedford is flatter which would mean less complex infrastructure requirements such as long viaducts, deep cuttings or high embankments and the new railway would comply with best practice for freight operations.*
- *BFARe considers that an alignment to the south of Bedford would be cheaper to build and would have a lower impact in terms of carbon emissions and climate change, including 'climate emergency' declarations by local government.*
- *That it would be preferable to follow closely the route of the existing A421 road to the south and east of Bedford.*

## Topography

- 2.4.2 Whilst the prevailing topography of the land to the south and southeast of Bedford is generally flatter and less undulating than that to the north and northeast of the town, this does not in itself mean that it would be more suitable for the construction of the new railway. Nor would it necessarily mean that an alignment in this area is less risky, cheaper or less complex to build.
- 2.4.3 In particular, it is important to note that the flatter topography in this area is largely due to it being located within the valley of the River Great Ouse. As a result, there are two principal issues which affect potential alignments located to the south and east of Bedford (such as that promoted by BFARe), but not those to the north and northeast of Bedford following the preferred Route Option E selected in 2020. These are:
- The ability to re-use excavated material to construct embankments and other earthworks known as the cut and fill balance.
  - The significantly greater extent of floodplains and land at risk of flooding along the river valley.

## Cut and fill balance

- 2.4.4 With respect to excavated material, for a linear infrastructure project like East West Rail it is generally considered good construction practice to try to match the volume of material excavated (from cuttings, excavations and so on) to the volume of material required to build earthworks (such as embankments) where possible. This is referred to as the cut-fill balance.
- 2.4.5 Matching excavated and fill material effectively reduces the volume of material to be imported for fill and exported for excavated material thus reducing overall volume of material to be transported and consequently the number of lorry movements and the overall carbon footprint of the Project.

2.4.6 Network Rail carried out a Geotechnical Sensitivity Assessment in 2018 which concluded much of the excavated material from the initial 'site strip' is unlikely to be suitable for re-use in embankments. Although lower laying strata is more suitable for fill material, the inadequacy of the site strip has two specific implications for the new railway:

- The excavated material has to be taken away and disposed of elsewhere.
- New fill material has to be imported in order to construct embankments.

The practical effect of this is that alignments that pass through flatter, lower-lying ground (such as the areas south and east of Bedford) are affected more than alignments passing through higher ground (such as the area north of Bedford) because a greater proportion of the total excavated material cannot be re-used. As a result, an alignment option passing the south or southeast of Bedford would require more material to be extracted from borrow pits or imported with would result in higher carbon emissions and increased congestion from lorry movements.

### **Interaction with floodplains**

2.4.7 With respect to the interaction with floodplains and areas at risk of flooding, this is greater for alignments along the river valley south and east of Bedford compared to the area north and northeast of the town. There are broadly two ways that the railway could cross these: embankments and viaducts. Embankments are generally cheaper to construct, but this introduces a greater requirement to mitigate flood risk impacts as a result; impacts require mitigation to prevent both an increase in water levels on the upstream side (due to the risk of the embankments holding back water like a dam) and impact on water flow downstream which can have knock on effects on ecology and biodiversity.

2.4.8 As such, it is necessary to provide compensatory flood storage to ensure flood risk is not increased in the area. This could be provided through creation of new drainage channels as well as on third party land. Land would have to be compulsorily acquired, or otherwise secured, in order so to do.

2.4.9 In addition, it is common for there to be soft ground within lower lying and floodplain areas to embankments which require caution due to risk of settlement over time through changes in soil volume. These changes in volume are due to equalising pore water pressures through the migration of water in the soils. This reduces the porosity of the land and has the potential to change ground water movement and levels due to the weight of the embankments themselves. This too can exacerbate flooding issues in neighbouring areas and cause harm to water-based wildlife habitats, sometimes a significant distance from the embankments themselves.

2.4.10 Whilst utilising viaducts in flood areas can avoid or mitigate some of these risks, they generally cost more to build and have significantly higher embedded carbon due to the volume of concrete required to construct them.

2.4.11 These issues do not affect the alignments that EWR Co has proposed to the same extent, because of the smaller flood areas on the higher ground to the north and northeast of Bedford.

### **Following the route of the A421**

2.4.12 With respect to suggestions that the new railway should closely follow the route of the existing A421 road to the south and east of Bedford, the possibility for the new railway to be built close to this road has been considered in the selection of a preferred route option and also in designing potential route alignments.

2.4.13 In some cases, there may be potential benefits from building the new railway close to other transport infrastructure. For example, the selection of an alignment that broadly parallels the route of the proposed A428 dual carriageway being promoted by National Highways between Black Cat and Caxton Gibbet offers the opportunity to achieve efficiencies between the two projects by consolidating the interaction with other infrastructure, such as side roads and utilities, as well as reducing the number of properties affected by these linear transport schemes.

2.4.14 It would be difficult for the new railway to be located in close proximity to the A421 because of the existing settlements along the route such as Elstow, Harrowden, Shortstown and Cardington. This would necessitate using an alignment further away from the road and would mean that these villages would be sandwiched between the A421 and the new railway, increasing the impacts on these local communities from the combined infrastructure.

2.4.15 These matters were taken into account in the decision to select Route Option E as the preferred route option in 2020 and to discount the other route options, including Route Option B. There has been no new information on these matters and no change of circumstances regarding them that would indicate that the preferred route option decision should be re-opened. This is because these matters remain in substance the same as they were in 2020 when that decision was taken and, as a result, the comparative performance of the route options (including Route Options B and E) has not changed.

### **Capital cost comparison**

2.4.16 Cost estimates that were reported in the 2019 route options consultation documents were produced by Network Rail on behalf of EWR Co as part of the design development for [Phase 2e](#), which covers the development of EWR between 1st October 2017 and 30th September 2018. This phase of development continued the analysis of route options within the preferred geographic corridor between Bedford and Cambridge.

2.4.17 These cost estimates assumed that:

- Floodplains could be crossed by a mixture of embankments and viaducts.
- All cut or excavated material could be re-used in construction.

- An even and standard earthwork profile in terms of height and slope were adopted across the route.

2.4.18 The route corridors consulted on in 2019 were:

- Route corridor A: Bedford South – Sandy (re-located south) – Cambridge (via Bassingbourn).
- Route corridor B: Bedford South – Sandy (re-located north) / Tempsford area / south of St Neots – Cambourne – Cambridge.
- Route corridor C: Bedford South – Tempsford area – Sandy – Cambridge (via Bassingbourn).
- Route corridor D: Bedford Midland – Tempsford area – Sandy – Cambridge (via Bassingbourn).
- Route corridor E: Bedford Midland – Tempsford area / south of St Neots – Cambourne – Cambridge.

2.4.19 The cost estimates can be found in the NSC 2019 Technical Report <sup>3</sup> and duplicated in Table 1 of this report for the shortlisted route options for consultation namely, route corridors A to E.

*Table 1- Phase 2e and NSC 2019 estimate*

Route corridor option	A	B	C	D	E
Up front capital costs (£ billion)	1.7	2.2	2.1	2.2	2.8

2.4.20 Further estimating work undertaken after NSC 2019 was reported in the [Phase 2f report](#), which covers development work undertaken by Network Rail on behalf of EWR Co between 1<sup>st</sup> August 2018 and 31<sup>st</sup> March 2019. This work is explained in the paragraphs below.

2.4.21 Upon completion of the Preliminary Geotechnical Sensitivity Assessment undertaken by Network Rail on behalf of EWR Co, assumptions relating to cost estimates provided in NSC 2019 were amended in light of new information on ground conditions in the Bedford area and reported in the Phase 2f report.

2.4.22 The cost estimate developed for Phase 2f assumed that:

- Floodplains could be crossed by a mixture of embankments and viaducts, which is the same assumption as for Phase 2e.

<sup>3</sup> <https://eastwestrail-production.s3.eu-west-2.amazonaws.com/public/MediaObjectFiles/db652106d4/EWR-Technical-Report-1.pdf>

- All cut or excavated material could be re-used in construction, which is the same assumption as for Phase 2e.
- Different earthwork profiles (height and slope) in certain areas due to the completion of the Preliminary Geotechnical Sensitivity Assessment.

2.4.23 The cost estimates can be found in the Phase 2f report produced by Network Rail and duplicated in Table 2 of this report for the shortlisted route options for consultation namely, route corridors A to E.

*Table 2 – Phase 2f and pre Preferred Route Option Announcement 2020 estimate*

Route corridor option	A	B	C	D	E
Up front capital costs (£ bil)	1.5	2.2	2.1	1.9	1.9

2.4.24 Given the difference in the Network Rail estimates from Phase 2e to Phase 2f (including the ranking of the route options in terms of overall anticipated capital costs), EWR Co commissioned Atkins to undertake an independent cost estimate to check the position.

2.4.25 This third estimate assumed that:

- Floodplains would be crossed by viaducts, which is a change from previous assumptions for Phase 2e and 2f.
- Half of the cut or excavation material could be re-used in construction due to the unsuitability of certain soils as per the Geotechnical Sensitivity Assessment, including arisings from the site strip, which once again is a change from previous assumptions for Phase 2e and 2f.
- The alignments were revised to avoid environmental constraints identified as a result of further design development (unlike Phase 2e and 2f) with associated changes to earthworks volumes.
- All roads/public rights of way would be retained by providing bridge or underpasses with revised earthworks volumes in certain areas as a result.

2.4.26 The revised assumptions for earthworks resulted in the cost estimates all being higher than was previously estimated, but the route options all ranked in the same order nonetheless. **The estimate** from the PROA in 2020 can be found in the PROA Report 2020<sup>4</sup> and is duplicated in Table 3 of this report for the shortlisted route options for consultation, namely route corridor A to E.

<sup>4</sup> <https://eastwestrail-production.s3.eu-west-2.amazonaws.com/public/ListsBlockMedia/a72dbd2d81/Preferred-Route-Option-Announcement-Preferred-Route-Option-Report.pdf>

Table 3 – Atkins and Preferred Route Annoucenment 2020 estimate

Route corridor option	A	B	C	D	E
Up front capital costs (£ bil)	3.4	4.1	4.3	4.0	3.7

2.4.27 It is important to note that the cost estimates presented in section 2.4.26 are representative of route corridor option B and would need to factor the additional track and infrastructure that would be required as part of the BFARe proposal to partially serve Bedford station. It is expected that crossing the A421 twice to establish the BFARe proposed triangular track arrangement as well as the additional track work would increase the capital cost for this proposal significantly.

## 2.5 Environmental considerations

2.5.1 The key arguments in relation to environmental considerations put forward by BFARe supporting their alignment addressed in this section are:

- *Avoiding concerns about additional trains (including freight trains) being routed through the centre of Bedford, including with regard to potential impacts such as noise, pollution, vibration and air quality (parts of the centre of Bedford fall within a designated Air Quality Management Area (AQMA)).*
- *Concerns about the potential impact of the new train service on communities north and northeast of Bedford including with regard to noise, pollution and vibration (particularly if the new line is not electrified).*
- *Avoiding impacts on the countryside and landscape (including unspecified 'heritage landscape') north and northeast of Bedford.*
- *Avoiding impacts on high-grade agricultural land, public rights of way, heritage assets and ancient woodland such as Park Wood, Clapham Wood, Little & Great Early Woodland, Great Wood, Helen’s Wood and Crabtree Spinney.*

2.5.2 There is a significant number of sensitive environmental features in the area to the south and east of Bedford which would be difficult and expensive to avoid or, if they cannot be avoided altogether, for which mitigation would be required, adding cost, risk and complexity to the EWR Co programme.

### Environmental considerations

2.5.3 The presence of environmental features were identified and the potential for the Project to have impacts on each them was considered and taken into account in each of the route options we consulted on and used to support the decision to proceed with Route Option E. The environmental features considered included:

- Heritage assets and their settings.
- Ancient woodland.
- Agricultural land.
- Public rights of way and other highways or roads, including the route of the A421.
- Watercourses and floodplains, including near Clapham.
- The prevailing topography and geotechnical conditions of the land, including the implications of these matters for the civil engineering works that might be required.
- Landscape and visual impacts, including on the countryside.
- A high level appraisal of the potential carbon emissions impacts. This included carbon emission impacts from construction traffic and embedded carbon in structures, and how the new railway might have an impact in terms of climate change (not only during construction, but also the potential sustainability benefits once it is operational).
- The anticipated costs, both in terms of upfront capital expenditure and whole-life costs.
- The impact on the local road network and parking, during both the construction and operational phases of the Project.
- The potential impact of the new infrastructure and train services on local communities, including in terms of noise, vibration, pollution and air quality – this includes the AQMA.

## Agricultural land

2.5.4 When considering the potential impact on agricultural land, both when selecting a preferred route option and developing potential alignments which were published as part of our 2021 non-statutory consultation, regard was had to the Agricultural Land Classification (ALC) for England. The ALC provides a framework for classifying land according to the extent to which its physical or chemical characteristics impose long term limitations on agricultural use or, conversely, make it suitable for such use. The ALC classifies land into one of five grades: Grade 1 land (the highest grade) being of excellent quality and Grade 5 land (the lowest grade) of very poor quality. The most productive and flexible land falls into Grade 1 and, in general terms, the higher the grade the more valuable the land will be and the more it will cost to acquire.

2.5.5 The ALC also describes a number of other categories of land. These include:

- **Urban**, which comprises built-up or 'hard' uses with relatively little potential for a return to agriculture such as housing, industry, commerce and derelict mineral workings.

- **Non-agricultural**, which comprises 'soft' uses where most of the land could be returned relatively easily to agriculture such as golf courses, public open spaces and allotments.

- 2.5.6 Urban land is generally significantly more valuable and costs significantly more to acquire than Grade 1 land.
- 2.5.7 The majority of the Grade 1 agricultural land in the area around Bedford is located to the south and southeast of Bedford. Some of this would inevitably be directly affected by and required for alignments that pass to the south of Bedford. This would lead to higher land acquisition costs to acquire the land needed to construct the railway.
- 2.5.8 By comparison, there is no Grade 1 land located to the north or northeast of Bedford (i.e. in the areas where the alignments published by EWR Co), that falls broadly within the Route Option E location. Whilst there would be some interaction with Grade 1 land in the area around Roxton, a significantly smaller extent of this land would need to be acquired in total compared to alignments to the south and east of Bedford (including the alignment promoted by BFARe). In addition, much of the land near Roxton is already proposed to be used in conjunction with the A428 Black Cat to Caxton Gibbet project being promoted by National Highways. This means that it is less likely to be in active agricultural use (or agricultural use at all) than Grade 1 land elsewhere.

### **Landfill site at Elstow**

- 2.5.9 A further constraint which affects route options and route alignments passing through the south of Bedford, but does not affect EWR Co's proposals, is the former landfill site at Elstow. This is located between the A6 dual carriageway and the Midland Main Line just south of the A421 dual carriageway. Building on this contaminated land would be risky, complex and expensive with the remediation costs alone estimated by Network Rail to be over £150million, exclusive of any new railway infrastructure required. The unstable ground conditions also mean that the new viaduct in this location would be more complex and expensive to design, construct and maintain.

## **2.6 Planning considerations**

- 2.6.1 The key arguments in relation to planning considerations put forward by BFARe supporting their alignment addressed in this section are:
- *Preventing prejudice to the outcome of development options under the emerging Bedford Borough Local Plan.*
  - *Removal of the need to acquire and demolish residential property adjacent to the Midland Mainline north of Bromham Road in order to construct two new tracks for the EWR service, including the replacement or alteration of existing bridges.*

## Local Plan

- 2.6.2 EWR Co monitors the progress of emerging and adopted local plans across the whole route, including the Bedford Borough Council Local Plan 2040 Review and the Central Bedfordshire Local Plan 2015-2035.
- 2.6.3 The Bedford Borough Council Local Plan 2040 Review is now at an advanced stage following several rounds of consultation and was submitted to the Secretary of State for Independent Examination on 12th January 2023. Bedford Borough Council Local Plan 2040 Plan's focus of growth is within the Bedford urban area; at strategic locations adjacent to the urban area which contribute to delivering the Bedford-Milton Keynes Waterway and Bedford River Valley Park; and at new growth locations focussed on the EWR Co / A421 transport corridor with the potential for rail-based growth, particularly in the south of Bedford area and at a new settlement in Little Barford. The area south of Bedford includes a proposed new settlement at Kempston Hardwick (to deliver at least 4,000 new homes).
- 2.6.4 The selection of an EWR Co alignment passing through Bedford St Johns and Bedford stations (as envisaged by the preferred Route Option E and the alignments which formed part of EWR Co's 2021 non-statutory consultation) would not preclude the new railway from supporting growth in Kempston Hardwick and Stewartby, with both of the service concepts for the Marston Vale Line set out in our 2021 non statutory consultation featuring one or two stations in this area.
- 2.6.5 The eastern and southern expansions to the Wixam's new settlement and the delivery of a new station on the Midland Main Line are also proposed. The new Wixams station on the Midland Mainline is being taken forward separately.
- 2.6.6 The Little Barford new settlement of at least 4,000 new homes identified by Bedford Borough Council is proposed to be located near the EWR station at Tempsford on the East Coast Mainline as per Alingment 1 (Tempsford variant) that will now be taken forward for further development as set out in the 2023 Route Update Report.
- 2.6.7 Whilst the new railway might be able to provide sustainable travel options for new residents and businesses, the question of access to any new settlements and how they would connect into the local transport network is one for developers and the Council to determine through the normal planning process.
- 2.6.8 In any event, the advantages of providing a frequent service to and through the centre of Bedford (from the local area and further afield,) means that a route option providing this enhanced connectivity would continue to deliver higher transport user benefits. This is as services would be more frequent and interchange more convenient than if some or all of the new EWR services were to by-pass the town to the south. EWR Co's proposals would enable the new services to call at both stations in the centre of the town (at Bedford and Bedford St Johns stations) as well as a station or stations to the south in the vicinity of Stewartby and Kempston Hardwick, whilst avoiding the need for additional infrastructure to be built and the disadvantages of trains reversing en route.

- 2.6.9 Bedford Borough Council's proposed preferred spatial strategy and the allocation of land for future development will be examined by an independently appointed Inspector later this year to assess whether the Local Plan has been prepared in accordance with legal and procedural requirements and if it is sound.
- 2.6.10 As such, the advanced position of the Bedford Borough Council Local Plan 2040 Review does not indicate that the decision to select Route Option E, as the preferred route option, should be re-opened.
- 2.6.11 The new Central Bedfordshire Local Plan 2015-2035 was adopted on 22 July 2021, replacing the previous Development Plan. The new Local Plan was adopted after Central Bedfordshire Council accepted the Inspector's proposed modifications to the draft plan during examination, including the deletion of the previously proposed Identified Area for Future Growth that surrounded Tempsford; and the Important Countryside Gaps, around Tempsford and to the north of Sandy. The result of these changes is that the adopted Local Plan does not allocate any land for development within the areas of relevance to the Project. The review of the adopted Plan is at an early stage and there is no indication of the likely future spatial development strategy for the Borough at this stage.

### **Acquisition and demolition of properties**

- 2.6.12 The need for the acquisition and potential demolition of residential and commercial property north of Bromham Road in the 'Poets' area of Bedford was confirmed after the selection of Route Option E in 2020. We reported on this and the reasons why, as part of our 2021 non-statutory consultation. As such, this was a change of circumstances compared to the time the preferred route option decision was made. Consequently, EWR Co has considered whether this new information indicates that this decision should be re-opened.
- 2.6.13 The selection of a route option or an alignment passing to the south of Bedford would not in itself mean that the acquisition and demolition of property in the town can be ruled out. This would include the potential need to acquire and demolish residential and commercial property on West End and Ampthill Road. In addition, it may also be necessary to acquire and demolish property elsewhere. For example, our analysis of the alignment promoted by BFARe indicates that residential property in Elstow and potentially Blunham would need to be demolished and the redevelopment of the former Elstow landfill site could also be directly affected.
- 2.6.14 These potential environmental impacts apply in addition to the other constraints and impacts in the area to the south and east of Bedford which would need to be avoided or mitigated if an alignment in these areas were to be taken forward. This includes the need for and impact of additional infrastructure to provide connecting lines into the centre of the town, the need to upgrade the track and stations at Bedford St Johns and Bedford and the operational issues that would arise if the new EWR services are required to reverse en route.
- 2.6.15 Works have now been completed to re-purpose the former Elstow landfill site as a 'Green Technology and Innovation Park'. Over £1.8million was committed to this project by Bedford Borough Council and the South East Midlands Local Enterprise Partnership (SEMLEP) in

summer 2020. The site is home to 8000 solar panels, which will generate up to 4.2 megawatts of electricity and supply onsite buildings and local businesses with low carbon, clean energy. There are also plans to use the site as an education and training centre with early support already pledged by the University of Bedfordshire, Cranfield University and local colleges.

- 2.6.16 This means that the construction of a route alignment in this area (such as that promoted by BFARe) would be expensive, risky, complex and would directly affect the redevelopment of the site, including rendering the sums of public money already committed to this project potentially abortive. As such, re-opening the decision to select Route Option E as the preferred route option in 2020 on this basis, would not be justified.