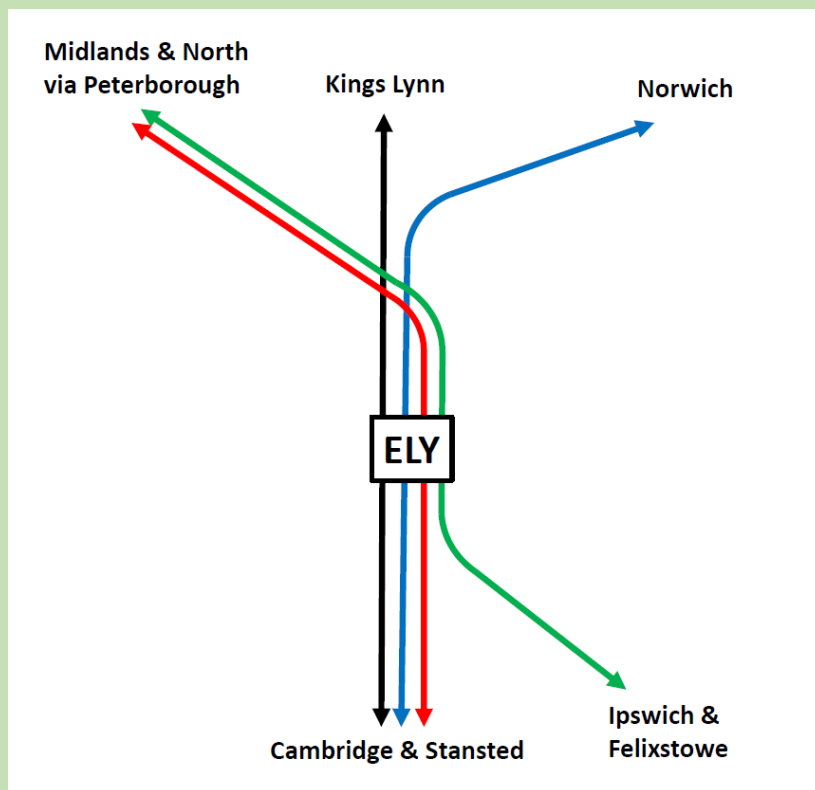




Enhancements rising in the East



Capacity enhancement with grade separation

Enhancements in the East – Grade Separation at Ely

Background

The railway junctions at Ely are recognised as the East of England’s highest transport investment priority for the following reasons:

- for the major East Anglian settlements of Cambridge, Norwich, Ipswich and Colchester their only rail route to the Midlands and North is via Ely
- passenger growth over the last 20 years has driven an increase in demand for the number of services passing through the junctions
- future growth both in the size of existing settlements and the planned location of new settlements in the region will see this trend continue
- the dramatic growth in global trade through the Port of Felixstowe, and the pressure to ‘decarbonise’ this strategic link between the southern ports and the main centres of demand in the Midlands, the North and Scotland, will accelerate this trend as rail becomes progressively more competitive with road over long distances.

Fulfilling these growth ambitions is not possible with the present layout which limits capacity through single lead junctions and the conflicting nature of freight flows (on a south-east : north-west axis) with the majority of other services passing through Ely.

The need for a radical solution has universal backing from the region’s commercial and political stakeholders. These include the MPs in Norfolk, Suffolk and Cambridgeshire, the County, City, Borough and District Councils across the three counties, together with the Cambridge & Peterborough Combined Authority (C&PCG), the New Anglia Local Enterprise Partnership (NALEP) and the Sub-National Transport Boards of England’s Economic Heartland (EEH) and Transport East (TE) together with passenger and freight train operators and the Port of Felixstowe.

The Current Consultation

Network Rail declared an intention to consult in 2021 on a scheme to increase capacity through Ely, the declared objectives of which are:

- to remove the conflict between the three rail lines which leave Ely for Peterborough, Kings Lynn and Norwich and Prickwillow Road which crosses all three lines by means of level crossings
- to replace or renew the Cutter and Common Muckhill bridges over the River Ouse immediately to the north of Ely station, which date from the 1890s and are subject to 20mph speed restrictions
- to increase capacity through Ely North Junction with an identified target of 10 trains per hour (from 6.5 tph at present).

The NALEP and the C&PCA have allocated £21.4m to develop proposals, and media reports that up to £500m might be available from the DfT to pay for the actual works.

**Railfuture's
comments**

The Network Rail consultation began in September 2020 with a Public Engagement exercise. It outlined the above objectives but contained no specific proposals at that stage. *Railfuture's* response dated 1 November 2020 therefore took the form of desired *outputs* rather than suggested interventions. We made two main points, the first that sufficient capacity should allow for a minimum of 14 / growth for 18 train paths per hour (TPH) in each direction (longer slower freight trains assumed to require two paths):

- ~ 2 TPH London King's Cross - Kings Lynn
- ~ 1 > 2 TPH Stansted Airport - Birmingham
- ~ 1 TPH Stansted Airport - Norwich
- ~ 1 TPH Nottingham - Norwich (uses North junction twice per direction)
- ~ 1 TPH Oxford - Norwich (upon opening of East West Rail)
- ~ 1 TPH Ipswich – Peterborough
- ~ 2 > 3 TPH Felixstowe freight with destinations in the Midlands and North
- ~ 1 > 2 TPH Cambridge - Wisbech (upon re-opening March - Wisbech)
- ~ 1 TPH Cambridge - Ely (via Newmarket and Soham)

Our second ask was to broaden the scope and include doubling the single line between Ely and Soham, without which the three freight trains and up to two passenger services per hour could not be accommodated. Our proposals for increasing capacity for both passenger and freight services are described in more detail in our publication "*From Branch Line to Main Line*"

The above service aspirations require additional capacity beyond that which Network Rail appear to be proposing, and that to avoid performance risk a grade-separated solution must be found. Examples on major freight routes can be found at Reading and more recently at Werrington near Peterborough. Network Rail's forecast to 2043 identifies the need for up to three freight trains per hour. In future these trains are expected to lengthen from 500m to between 700m and 775m and this, combined with their slower acceleration, means that they occupy junctions for longer than passenger trains.

Services, both freight and passenger, which approach Ely from the south-east all leave towards the north-west so this is the logical selection for grade separation. The option of achieving this using an avoiding line to the west of Ely was considered but not adopted as:

- ~ it did not address the problem of replacing the bridges over the Ouse
- ~ it still left most services crossing the Prickwillow Road
- ~ it may be seen as expensive for a route mainly benefitting freight
- ~ it maintains conflict between the Peterborough line and Kings Lynn / Norwich line services

It would be possible to eliminate the conflict between rail and road at Queen Adelaide by diverting the road further north, but this too is not recommended as it adds nothing to rail capacity.

The diagrams on the following page show the *Railfuture* proposal in outline.

Enhancements rising in the East

Fig. 1

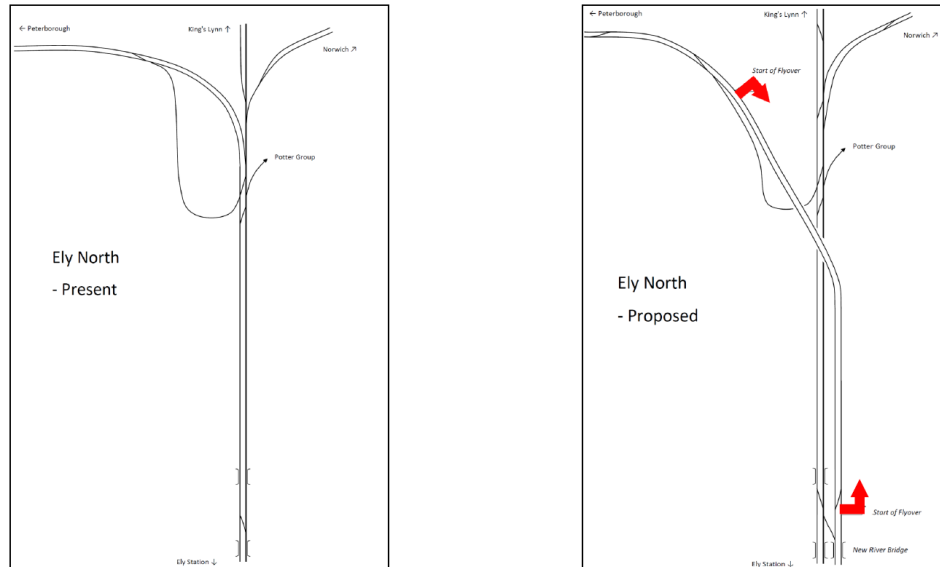


Figure 1 shows the north section. Current layout in the left diagram, proposed layout on the right. The elevated section is between the two red arrows and from north to south, crosses the Ely west loop and the West Anglia Main Line with sufficient clearance to pass over the Overhead Line Equipment (OLE). It also crosses Kiln Lane and finally crosses the River Ouse almost at grade before reaching level ground north of Cutter Bridge.

Fig. 2

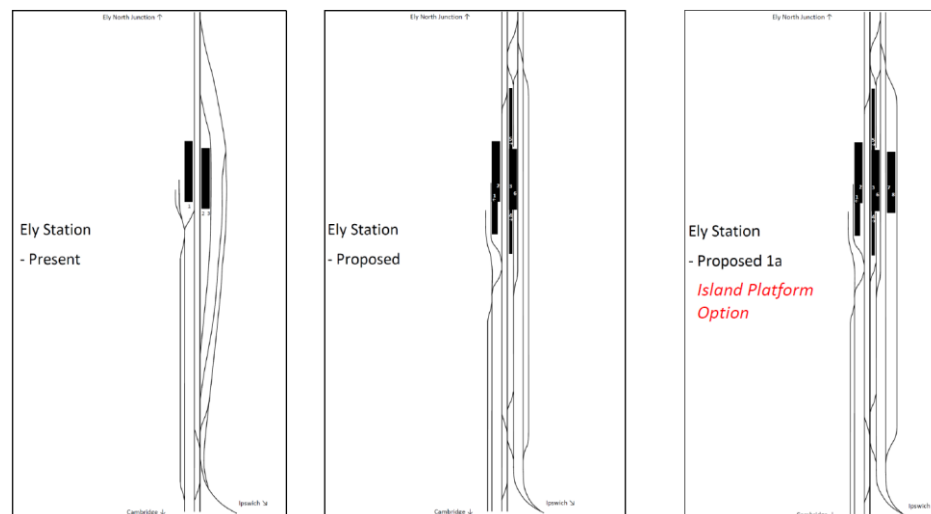


Figure 2 shows the southern portion with the current layout on the left. A choice of layouts is presented on the right showing various options for remodelling Ely station. Remodelling is currently outside Network Rail's scope in this round of consultation but we have shown what is possible. Both show bay platforms in addition to the island platform but these may not be required if a second island platform were to be constructed. Currently the Norwich - Nottingham services occupy a through platform when turning back at Ely and a bay platform would increase capacity here.

Enhancements rising in the East

Four tracks, two routes

The resulting four-track system is effectively two separate double-track routes.

One route for (7-8 tph)

- Ipswich - Peterborough (1)
- Stansted - Birmingham (1)
- Cambridge - Wisbech (2)
- Norwich - Nottingham (from Ely) (1)
- Freight (2-3)

A separate route for (5 tph)

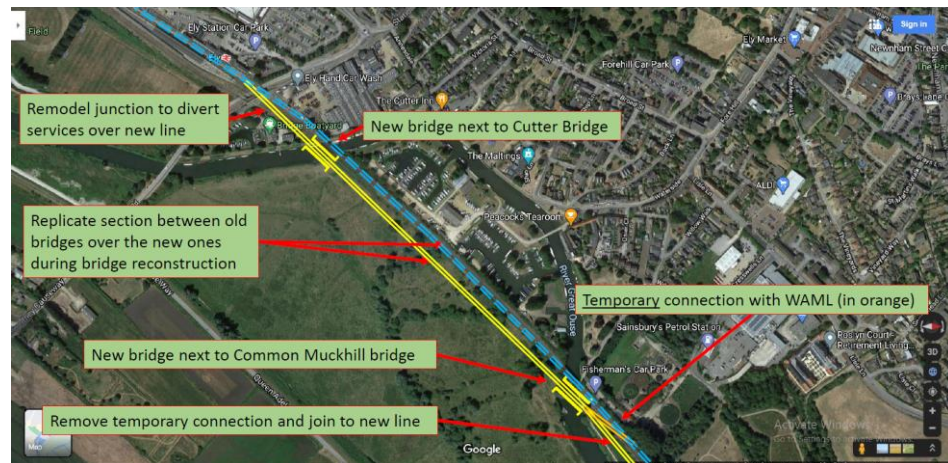
- King's Cross - Kings Lynn (2)
- Stansted - Norwich (1)
- Nottingham - Norwich (from Ely) (1)
- Oxford - Norwich on completion of 'East-West Main Line' (1)

Of the above trains, just seven operate between Ely and Cambridge and can be accommodated within existing infrastructure.

What about the bridges?

Although most of the heavy freight traffic moves onto the new line, the *Cutter* and *Common Muckhill* bridges will still carry aggregate trains and their speed restrictions impair timetable performance. Their replacement cannot be deferred any longer and must be included in the proposed works. In order to avoid closing the line for long periods while this is undertaken, *Railfuture* believes that an opportunity exists to stage the works in such a way as to divert the WAML over part of the new line as shown in the following plan (fig. 3)

Fig. 3



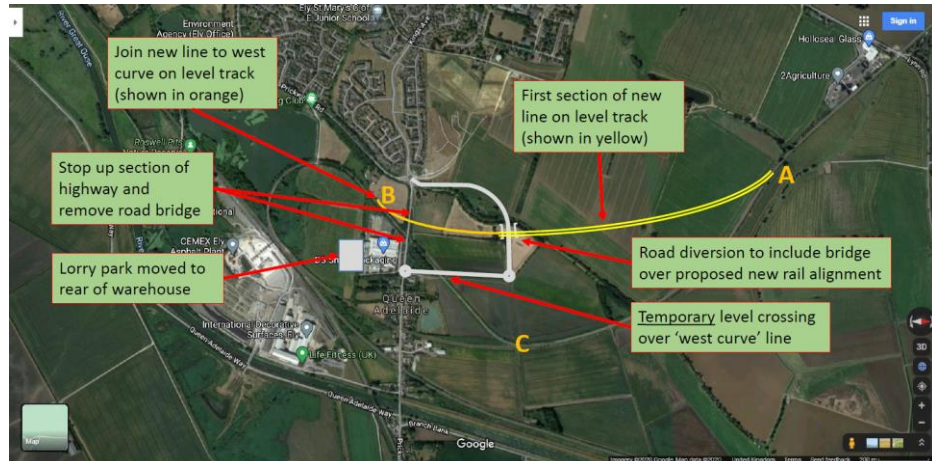
Diversion

As shown in Fig. 1 the new line requires two new bridges to be built over the River Ouse, with the one next to Common Muckhill bridge being raised later to become part of the flyover. Initially the new line will act as a diversionary route while the old bridges are being replaced. It is not intended to electrify this section at this stage, services to Kings Lynn will have to terminate at Ely and passengers transferred to a DMU unless the though service can be operated with bi-modes. By keeping the line open, for both freight and passenger traffic, significant savings can be made by avoiding *schedule 4* payments.

Enhancements rising in the East

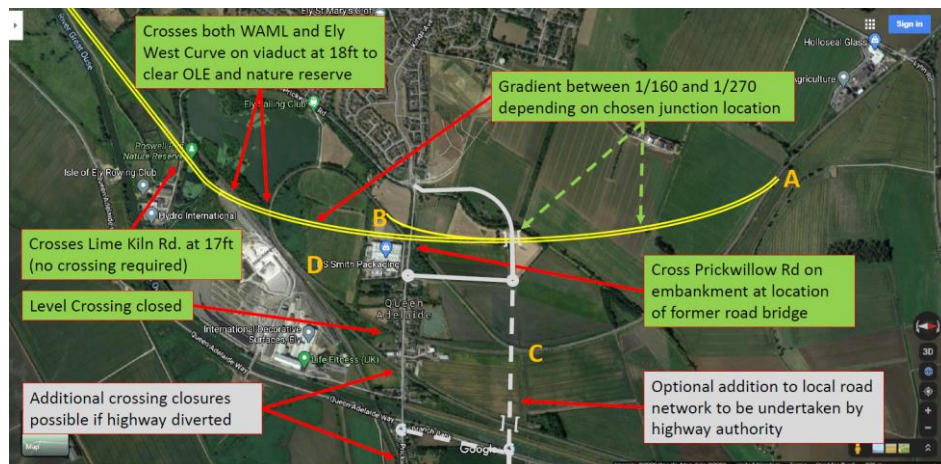
Queen Adelaide Constructing the flyover at the north end requires sufficient room to allow a gentle enough gradient for freight traffic. Given that our objective is to reduce the conflict between road and rail it may seem a little counter-intuitive to demolish the only rail bridge on the Prickwillow Road and construct another crossing! These are however only staging works, as the next two plans show. Throughout the works it is important that lines are kept open, including the west curve which is the first line to be diverted. Once this has been done, the temporary road crossing can be taken out when the section of line between 'B' and 'C' is taken out.

Fig. 4



Construction of the main section of the flyover then follows. Once complete the section of line between A and D is then removed. This is the busiest section and causes the greatest conflict with road traffic. Prolonged periods of 'down-time' risks queueing traffic backing up over the Kings Lynn line. Sufficient distance between this and the Norwich line, both of which carry fewer trains, means it is unlikely that further works will be required but the above diagram includes additions to the road network which could be added at a future date.

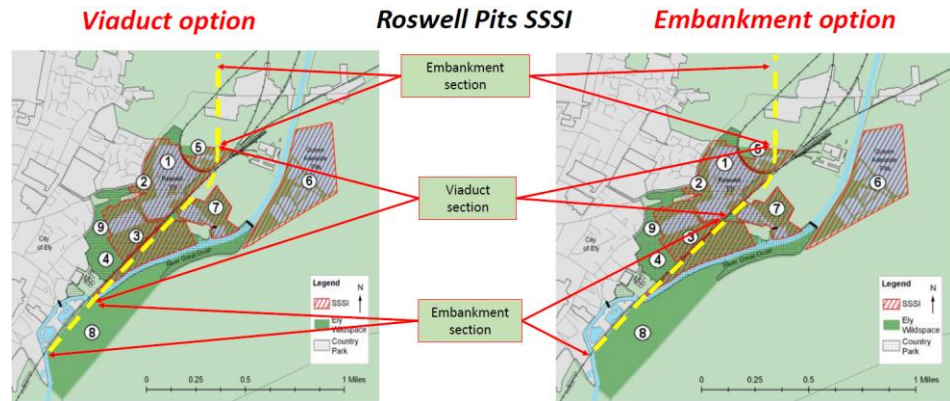
Fig. 5



Possible Constraints

The proposed flyover, besides crossing the WAML also crosses the Roswell Pits local nature reserve. Although the line avoids the pits themselves the designation covers some land to the east where either an embankment or viaduct may be acceptable along with other mitigation measures. These are shown in Fig. 6 below.

Fig. 6



Summary

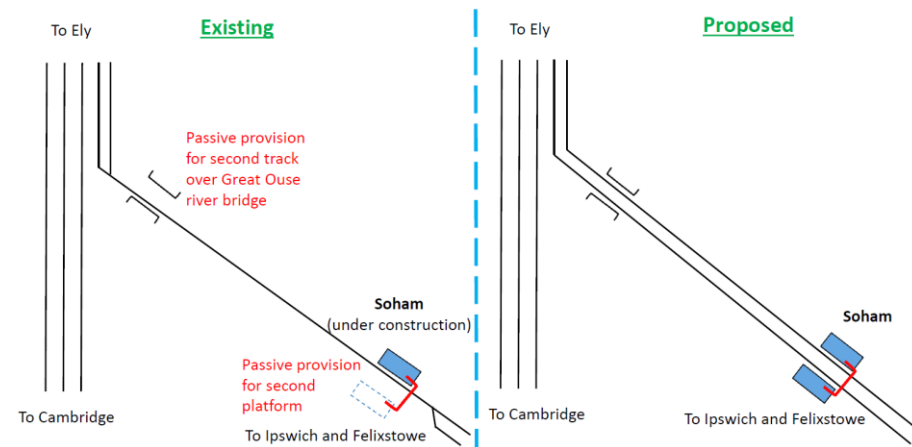
Railfuture's proposal has the following attributes:

- increased capacity for rail
- improved line speeds
- freight-friendly gradients
- improved timetable flexibility, service resilience and performance
- retains current train movements and allows for growth / development
- construction staged to minimise disruption to both rail and road traffic
- busiest level crossing closed (or all three if combined with a road scheme)
- renews life-expired Great Ouse bridges (while keeping the line open!)
- minimises impact on Roswell Pits Nature Reserve.

What next?

The benefits derived from extra capacity at Ely now justify the doubling of the single line towards Soham where a new station is being constructed with passive provision (fig. 6). This is outside the present project scope but must follow if modal shift for both passengers and freight is to be secured.

Fig. 6



Enhancements rising in the East

A proposal for grade separation at Ely



Freight from Felixstowe approaches Ely on the single line from Soham. Doubling of this line together with other capacity enhancements must be delivered before electrification of the Felixstowe to Midlands and North (F2N) route. Phil Smart

Scheme design by Peter Risebrow, Phil Smart and Peter Wakefield.
Text prepared by Phil Smart on behalf of Railfuture's East Anglia Branch and national Freight and Infrastructure & Networks groups.
Diagrams on page 3 by Peter Risebrow.

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railfuture

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