

# Executive summary

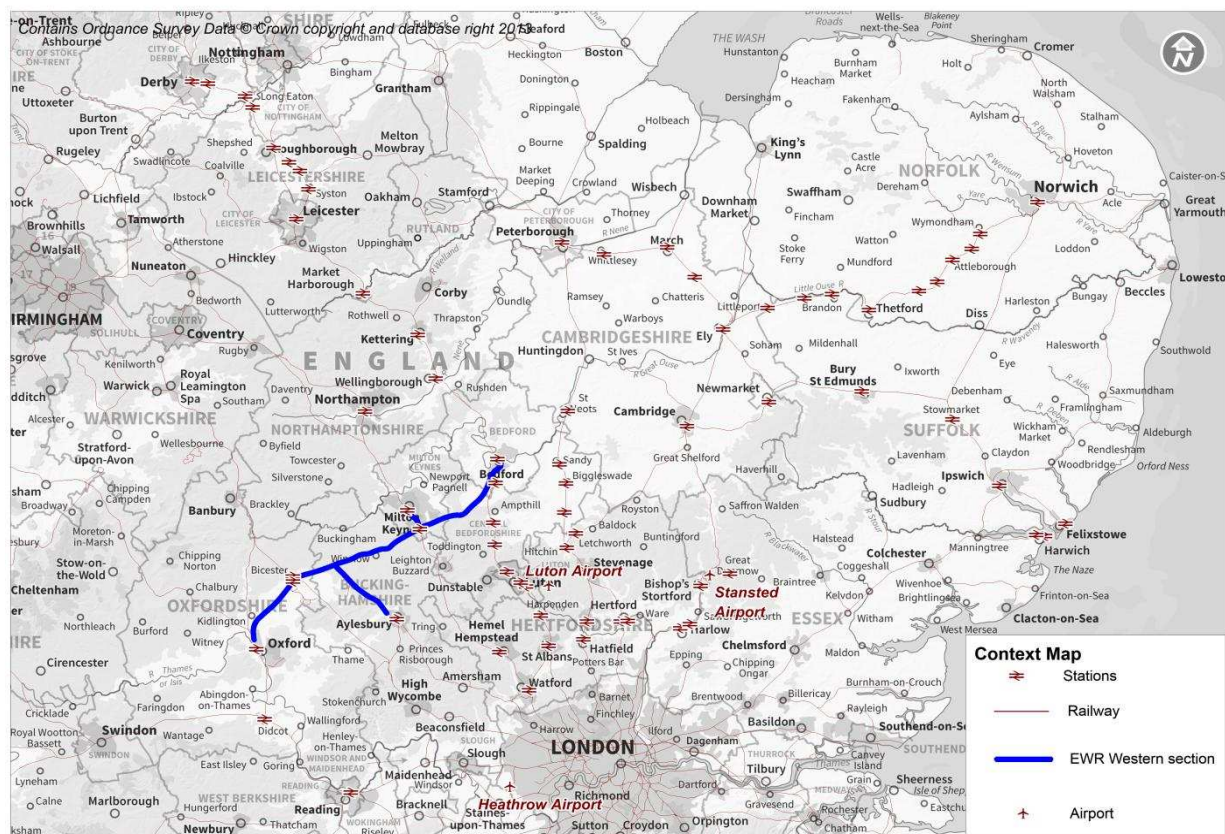
## Introduction

This report sets out the Conditional Outputs for the EWR Central Section (EWR-CS). The conditional outputs provide a set of target service outcomes without consideration being given to feasibility, deliverability or the adoption of specific routes for new infrastructure that may need to be provided. The focus has been on identifying service performance outcomes that have the prospect of delivering significant economic benefits and supporting economic growth that subsequent phases of the study can consider the design, operational feasibility of cost implications of achieving.

The study area for the EWR-CS conditional outputs is geographically large; it needs to take into account the extent of the existing Eastern Section of the EWR route, as well as the planned Western Section and the potential benefits and opportunities that it provides.

Figure 1 shows the study area and highlights the stations which will be included in the technical analysis.

Figure 1. EWR-CS Study Area



## Strategic Objectives

The East West Rail Consortium (EWRC) have developed the following strategic objectives for the East West Rail scheme, these are:

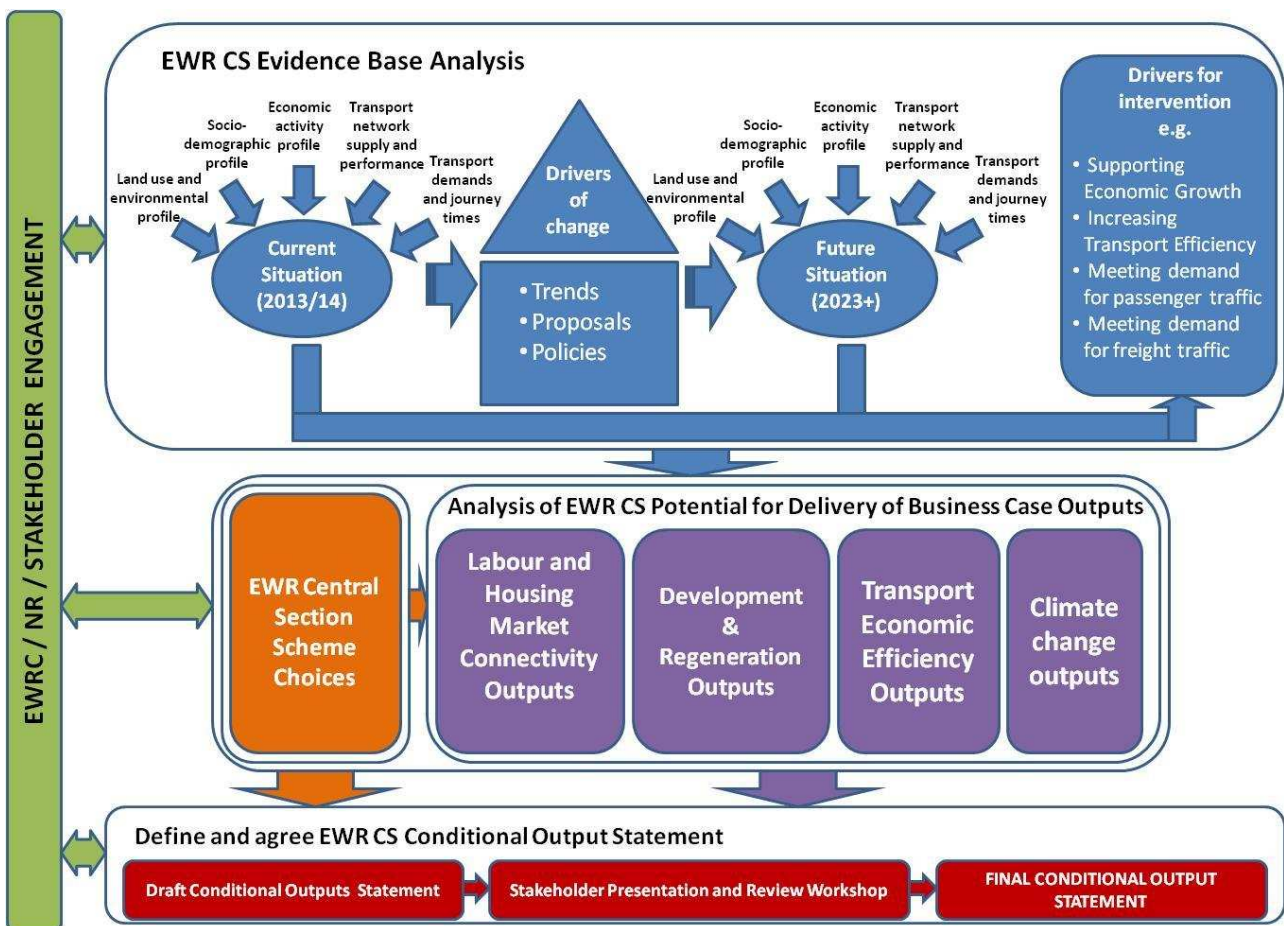
- Improve east west public transport connectivity;
- Increase economic growth, prosperity and employment within the South-East of England through improvements to east west rail links;
- Provide faster, more reliable and additional rail links from the west to Cambridge, Norwich and Ipswich;
- Improve journey times and reliability of inter-regional and commuter journeys;
- Increase capacity for inter-regional and commuter journeys;
- Maintain and enhance capacity for rail freight; and
- Contribute to tackling climate change.

These objectives will guide the creation of the Conditional Outputs for the EWR Central Section (EWR-CS) based upon a detailed analysis of future housing and employment developments, population growth and journey patterns.

## Study Process

We have developed a detailed process for examining the potential for EWR-Central Section services in three broad stages as shown in Figure 2.

Figure 2. Approach to delivering a Conditional Outputs Statement for the EWR Central Section



The stages to our study process are:

- Examining the evidence base to understand the current and future situations in terms of transport and development;
- Analysing the potential for EWR-CS to deliver business case outputs; and
- Defining the conditional outputs.

## Evidence Base Conclusions

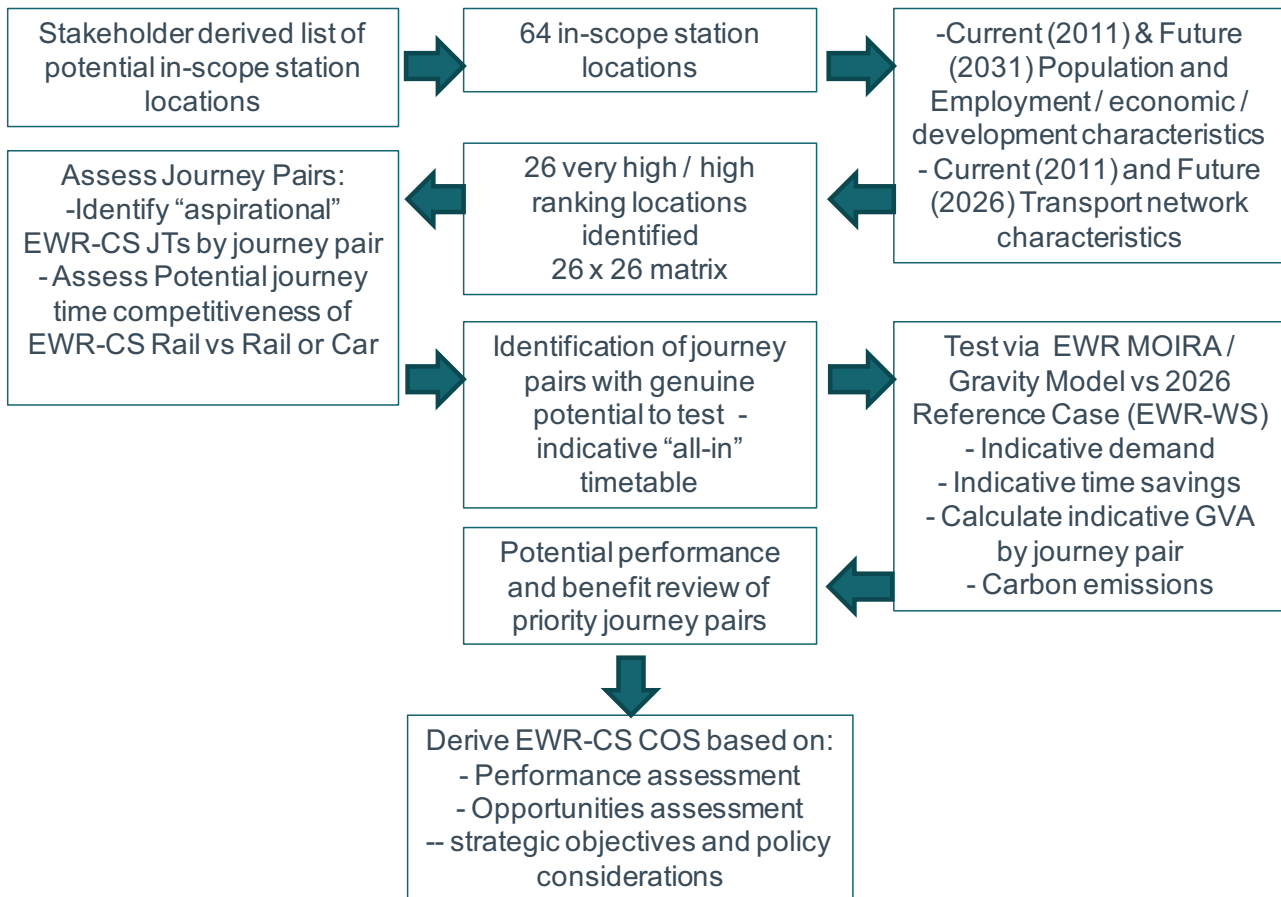
Following our review of the evidence base in terms of the economic and transport situations we can identify some key conclusions and drivers for a rail based intervention which will guide the development of the Conditional Outputs for the EWR-CS. These are as follows:

- There is very significant planned population and employment growth to 2031 within 'the 'golden triangle' of London-Oxford-Cambridge and the East Anglia to Reading 'Knowledge Arc' and across the wider study area:
  - In-scope settlement population forecast to grow by between 0.6m and 1.1m
  - In-scope settlement employment forecast to grow by between 0.2m and 0.4m
- There are a number of major business trip ends with a significant knowledge based employment offer which provides opportunities for business to business travel by rail ;
- There are a number of locations which have major development opportunities in very close proximity to rail stations where the enhancement of rail services might assist or encourage progress (however most of these locations are already well served by rail);
- Poor east-west orbital connectivity is apparent in long journey times by both rail and car and is also reflected in the very low demand at present between locations on this arc;
- There appears to be some genuine scope for delivering competitive rail east-west journey times by implementing the EWR-CS.
- The reference case forecasts show that increasing numbers of east-west movements will be made via London in the future making use of Crossrail and the improved Great Western and Thameslink Services. We consider that this highlights the latent demand for these movements and demonstrates the potential for EWR-CS to unlock demand;
- The Socio-demographic and economic profiles within the study area also highlight the latent demand for enhanced labour market connectivity that could translate into travel demands;
- There is also a common issue of mismatch between employment growth opportunities and labour market supply identified in SEPs across the LEPs within the study area;
- The lack of orbital connectivity appears to be creating an over-reliance on London commuting, which in itself generates issues of crowding and congestion on radial routes
- Freight demands and pressures on available routes in context of parallel pressures from enhancements to passenger services – significant Port expansion and plans for new rail accessible freight distribution centres
- Continued growth in Airport passenger demand to both Luton and Stansted Airports will generate additional surface access demands from both passengers and employees that rail could support

## The approach to identifying Passenger Service Conditional Outputs

Figure 3 provides an overall summary of the process through which the conditional outputs for the EWR-CS were derived.

**Figure 3. Summary of process to develop Passenger Service Conditional Outputs for EWR-CS**



### Initial location identification and sifting

The start of the process was the derivation of the 'long-list' of station locations which were potentially 'in-scope' for the central section. This was generated by the EWRC and was a key initial input into the overall process.

In parallel, a comprehensive evidence base was developed on current and future population, employment levels and economic development characteristics and transport characteristics. This information was then used to consider and place the 'long-list' of locations in context and to provide a basis for identifying locations that offered the greatest potential to generate service demand and support economic growth. This analysis identified 26 'very high' or 'high' ranking locations which should be the focus for conditional output consideration. These 26 locations provided the basis for a matrix of journey pairs for which the potential for an EWR-CS service should be examined.

### Deriving target EWR-CS service specifications to consider

For the next stage we then identified target journey times that might be delivered between the 26x26 journey pairs using an agreed set of assumptions on potential average train speeds and an agreed geographical basis for deriving indicative journey distances. These target journey times were then considered for competitiveness against existing rail service and car journey times. This comparison enabled the identification of a number of journey pairs with genuine potential to offer a competitive journey time and enabled identification of a set of indicative EWR-CS services between journey pairs to investigate the benefits potential of. It is important to note that EWR-CS services are assumed to operate at a 2 tph service frequency (per direction).

## Deriving an indicative view on the potential for EWR-CS services to deliver benefits

Journey pairs were tested using our MOIRA/Gravity Model against a reference case which included the EWR Western Section (EWR-WS). Two versions of the model were created. One reflecting the DfT's TEMPRO trend based forecasts for growth, the other reflecting the development plans of the local authorities in the study area. This provided an indication of the potential for an EWR-CS service between each journey pair to increase rail demand, generate a reduction in generalised journey time and generate an increase in passenger miles (indicating the potential to generate rail revenue).

This information was then utilised to enable the calculation of indicative annual benefits by journey pair:

- Transport user benefits reflecting journey time savings
- GVA benefits associated with improved business to business connectivity
- GVA benefits associated with improved labour market connectivity

Transport user benefits were calculated in a fashion consistent with WebTAG. GVA benefits were calculated using the approach used by Network Rail on the London and SE Market Study. **However, benefits values should be considered indicative and only suitable for comparing relative rather than absolute performance of EWR-CS service journey pairs at this stage.** In addition to the three benefit items above the level of highway demand forecast in the East of England model was also identified as providing an indicator of the potential to deliver mode shift from car. Benefits were calculated for both the TEMPRO and Local Plan growth scenarios, with the latter being a higher growth scenario with also an alternative distribution of growth to TEMPRO.

This data was collated for all journey pairs tested and analysis of this underpinned the identification and prioritisation of journey pairs recommended as conditional outputs.

## Journey Pair Benefits Analysis

### Process for identification priority journey pairs

Having established the indicative benefits performance of each journey pair the relative performance of pairs was assessed.

The number of journey pairs tested was very significant and for analysis purposes the pairs were identified with one of four target EWR journey time categories:

- 0 – 15 minutes;
- 15 – 30 minutes;
- 30 – 60 minutes; and
- 60+ minutes

The range of impact and benefit that the journey pairs generated was examined, and on the basis of this, thresholds were identified for journey pairs to meet for recommendation as a conditional output. The choice of thresholds was set using the two-way benefits performance of the Oxford-Cambridge EWR-CS service as a minimal level to be met. The thresholds adopted were:

- Change in rail passenger miles: 2.8m in 2031
- Indicative transport user benefit: £1m in 2031
- Indicative GVA business to business connectivity benefit: £28,000 p.a. in 2031
- Indicative GVA labour market connectivity benefit: £17,000 p.a. in 2031

Journey pairs were then categorised depending on how they met criteria:

- Very High Priority: meets or exceeds all thresholds with transport user benefits in excess of £5m in 2031;
- High Priority: meets or exceeds change in rail passenger miles threshold and two or the other three thresholds (including having a minimum value of transport user benefits of £0.5m in 2031); or
- Excluded from Conditional Outputs.

This analysis was undertaken for against both the NTEM/Tempo and Local Plan scenarios, with the thresholds used remaining unchanged for each.

### Passenger Service Prioritisation results

It is clear that journey pairs identified as meeting the prioritisation thresholds set reduce significantly as journey time increases. This reflects the impact of journey time on the potential to deliver economic benefits, reflecting the combination of significant enhancement in connectivity combined with greatest opportunities for service demand that short distance journeys represent. The study area offers a large number of opportunities for such benefits to be realised, most notably between locations in Luton/Bedfordshire and Hertfordshire towns, where currently no direct rail service is available. The relatively short geographical distance between these locations means that journey times of less than 30 minutes and often below 15 minutes should be targeted.

For longer distance journeys that exhibit commensurately longer journey times of greater than 30 minutes or 60 minutes, the scale of business activity or labour market needs to be very sizeable to generate sufficient demand for service to offset the impact of time on the propensity to travel, noting that businesses and workers will often have alternatives within more attractive journey time bands available to them. Consequently, a more limited set of journey pairs are identified as conditional outputs falling within the 30-60 minute and >60 minutes journey categories.

**What must be stressed is that this does not preclude the potential for EWR-CS to provide a service between locations with longer journey times**, rather that these longer journey time pairs in themselves are unlikely to generate sufficient demand and economic benefit to drive the case for EWR-CS. Delivering an attractive and competitive combination of multiple passenger service opportunities between sizeable business activity and labour market locations is likely to maximise the economic growth potential the scheme can offer, and if a number of these can fall below 30 minutes the value of economic benefits is likely to be enhanced.

What clearly has not been considered at this stage, and which may prove challenging, is the feasibility and deliverability of achieving the target level of connectivity underpinning the analysis presented.

### Passenger Service Conditional Outputs

The Passenger Service Conditional Outputs provide a set of journey opportunities that should be the primary focus for further examination and development of EWR Central Section proposals. It is recognised that not all journey opportunities will be realisable together, and in practice choices will need to be made as to the combination of pairs to incorporate in a service timetable. They present a range of journey opportunities one would explore the feasibility of enabling by new EWR Central Section infrastructure as yet to be defined. Operational, feasibility and cost considerations, as well as the potential to deliver services within target journey parameters and at a level of service to deliver benefits, will all have a bearing on ultimate choice of journey pairs for inclusion in proposed EWR-CS service timetable.

All of the journey pairs highlighted in our conditional output table are conditional upon suitable infrastructure being provided to enable the target journey times, or times close to these, to be achieved. Our conditions also include a minimum 2 train per hour level of service.

Tables 1 to 7 present the EWR-CS Passenger Service Conditional Outputs by journey time category, while Figures 4 and 5 present diagrams showing all Very High and High priority conditional outputs respectively.

**Table 1** Passenger Service Conditional Outputs for journeys of up to 15 minutes duration (NTEM/Tempo Growth to 2031)

Very High and High Priority Journey Pairs using NTEM/Tempo Growth to 2031	Notes:
<b>VERY HIGH PRIORITY JOURNEY PAIRS</b>	
<b>Luton - Stevenage</b>	(3)
<b>Luton - Welwyn Garden City</b>	(3)
<b>Luton Airport Parkway - Stevenage</b>	(3)
<b>Luton Airport Parkway - Welwyn Garden City</b>	(3)
<b>HIGH PRIORITY JOURNEY PAIRS</b>	
Bedford Midland - Hitchin	(3)
Bedford Midland - Letchworth	(3)
Harlow Town - Stevenage	(3)
Harlow Town - Welwyn Garden City	(3)
Hatfield - Luton	(3)
Hertford North - Luton	(3)
Hitchin - Luton	(3)
Hitchin - Luton Airport Parkway	(3)
Letchworth - Luton	(3)
Letchworth - Luton Airport Parkway	(3)
St.Albans City - Stevenage	(3)
St.Albans City - Welwyn Garden City	(3)

**Table 2** Passenger Service Conditional Outputs for journeys of up to 15 minutes duration (Local Plan Growth to 2031)

Very High and High Priority Journey Pairs using Local Plan Growth to 2031	Notes:
<b>VERY HIGH PRIORITY JOURNEY PAIRS</b>	
<b>Luton - Stevenage</b>	(3)
<b>Luton - Welwyn Garden City</b>	(3)
<b>Luton Airport Parkway - Stevenage</b>	(3)
<b>Luton Airport Parkway - Welwyn Garden City</b>	(3)
<b>HIGH PRIORITY JOURNEY PAIRS</b>	
Bedford Midland - Hitchin	(3)
Harlow Town - Stevenage	(3)
Harlow Town - Welwyn Garden City	(3)
Hatfield - Luton	(3)
Hatfield - Luton Airport Parkway	(3)
Hertford North - Luton	(3)
Hertford North - Luton Airport Parkway	(3)
Hitchin - Luton	(3)
Hitchin - Luton Airport Parkway	(3)
Hitchin - St.Albans City	(3)
Letchworth - Luton	(3)
Letchworth - Luton Airport Parkway	(3)
St.Albans City - Stevenage	(3)
St.Albans City - Welwyn Garden City	(3)

Notes:

- (1) Very Strong for Business 2 Business Trips
- (2) Strong for Business 2 Business Trips
- (3) Predominantly Commuting Trips

**Table 3** Passenger Service Conditional Outputs for journeys of 15 to 30 minutes duration (NTEM/Tempro Growth to 2031)

Very High and High Priority Journey Pairs using NTEM/Tempro Growth to 2031	Notes:
<b>VERY HIGH PRIORITY JOURNEY PAIRS</b>	
<b>Bedford Midland - Cambridge</b>	(3)
<b>Bedford Midland - Stevenage</b>	(3)
<b>Cambridge - Luton</b>	(2)
<b>Cambridge - Luton Airport Parkway</b>	(2)
HIGH PRIORITY JOURNEY PAIRS	
Bedford Midland - Northampton	(3)
Bedford Midland - Welwyn Garden City	(3)
Harlow Town - Luton	(3)
Harlow Town - Luton Airport Parkway	(3)

**Table 4** Passenger Service Conditional Outputs for journeys of 15 to 30 minutes duration (Local Plan Growth to 2031)

Very High and High Priority Journey Pairs using Local Plan Growth to 2031	Notes:
<b>VERY HIGH PRIORITY JOURNEY PAIRS</b>	
<b>Bedford Midland - Cambridge</b>	(3)
<b>Bedford Midland - Stevenage</b>	(3)
<b>Cambridge - Luton</b>	(2)
<b>Cambridge - Luton Airport Parkway</b>	(2)
<b>Harlow Town - Luton</b>	(3)
HIGH PRIORITY JOURNEY PAIRS	
Bedford Midland - Northampton	(3)
Bedford Midland - Welwyn Garden City	(3)
Harlow Town - Luton Airport Parkway	(3)
Harlow Town - St.Albans City	(3)

**Table 5** Passenger Service Conditional Outputs for journeys of 30 to 60 minutes duration (NTEM/Tempro Growth to 2031)

Very High and High Priority Journey Pairs using NTEM/Tempro Growth to 2031	Notes:
<b>VERY HIGH PRIORITY JOURNEY PAIRS</b>	
<b>Cambridge - Northampton</b>	(1)
<b>Cambridge - St.Albans City</b>	(2)
HIGH PRIORITY JOURNEY PAIRS	
Bedford Midland - Peterborough	(3)
Bletchley - Cambridge	(3)
Cambridge - Oxford	(1)
Luton - Northampton	(2)
Northampton - Stevenage	(3)
Northampton - Welwyn Garden City	(3)

Notes:

- (1) Very Strong for Business 2 Business Trips
- (2) Strong for Business 2 Business Trips
- (3) Predominantly Commuting Trips



**Table 6** Passenger Service Conditional Outputs for journeys of 30 to 60 minutes duration  
 (Local Plan Growth to 2031)

Very High and High Priority Journey Pairs using Local Plan Growth to 2031	Notes:
<b>VERY HIGH PRIORITY JOURNEY PAIRS</b>	
<b>Cambridge - Northampton</b>	(1)
<b>Cambridge - St.Albans City</b>	(2)
<b>HIGH PRIORITY JOURNEY PAIRS</b>	
Bedford Midland - Harlow Town	(3)
Bedford Midland - Peterborough	(3)
Cambridge - Oxford	(1)
Luton - Northampton	(2)
Luton Airport Parkway - Northampton	(2)
Northampton - Welwyn Garden City	(3)

**Table 7** Passenger Service Conditional Outputs for journeys longer than 60 minutes duration  
 (NTEM/Tempo Growth to 2031)

Very High and High Priority Journey Pairs using Local Plan Growth to 2031	Notes:
<b>HIGH PRIORITY JOURNEY PAIRS</b>	
Cambridge - Reading	(1)

Notes:

- (1) Very Strong for Business 2 Business Trips
- (2) Strong for Business 2 Business Trips
- (3) Predominantly Commuting Trips

The journey patterns indicated by the conditional outputs are shown in Figure 4 and 5 for the Very High Priority services and High Priority Services respectively.

Figure 4. Very High Priority journey pairs as identified in conditional outputs

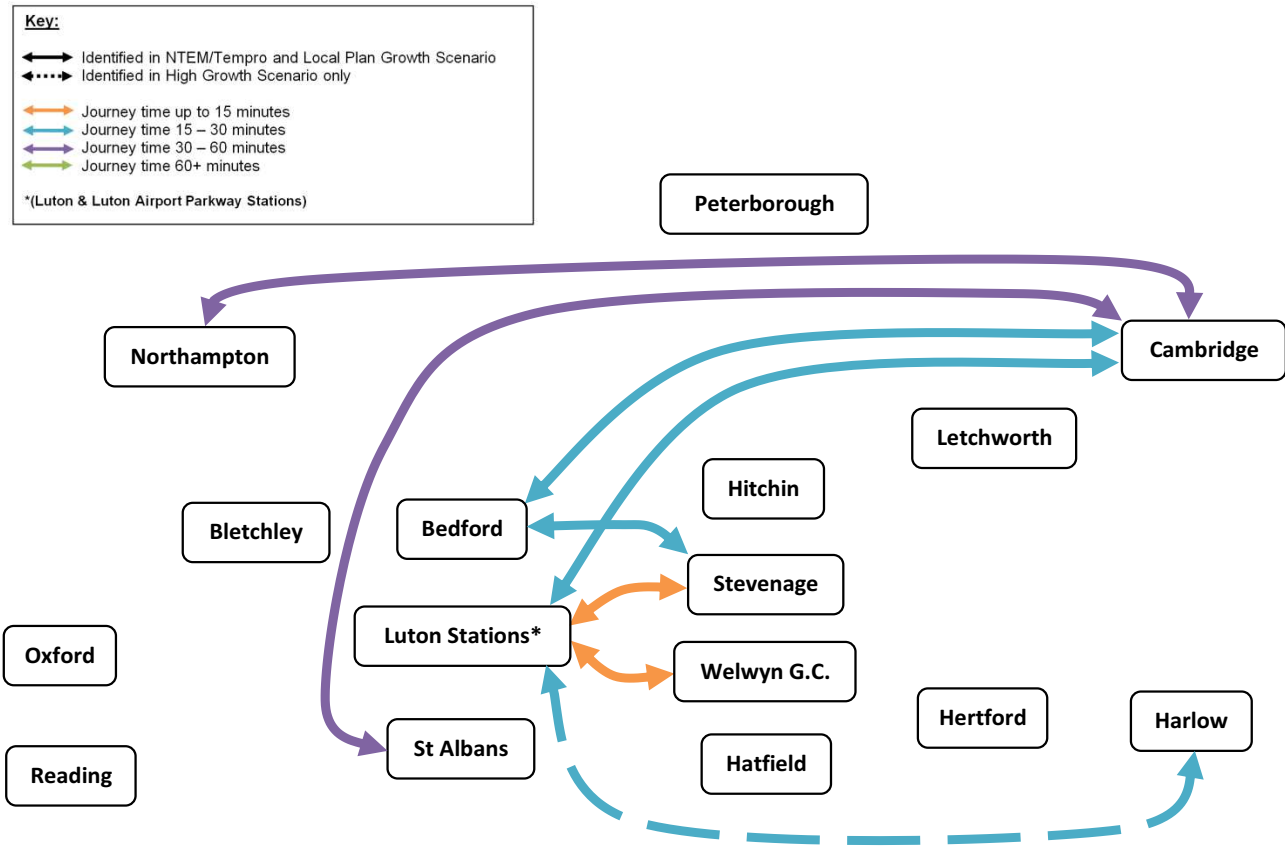
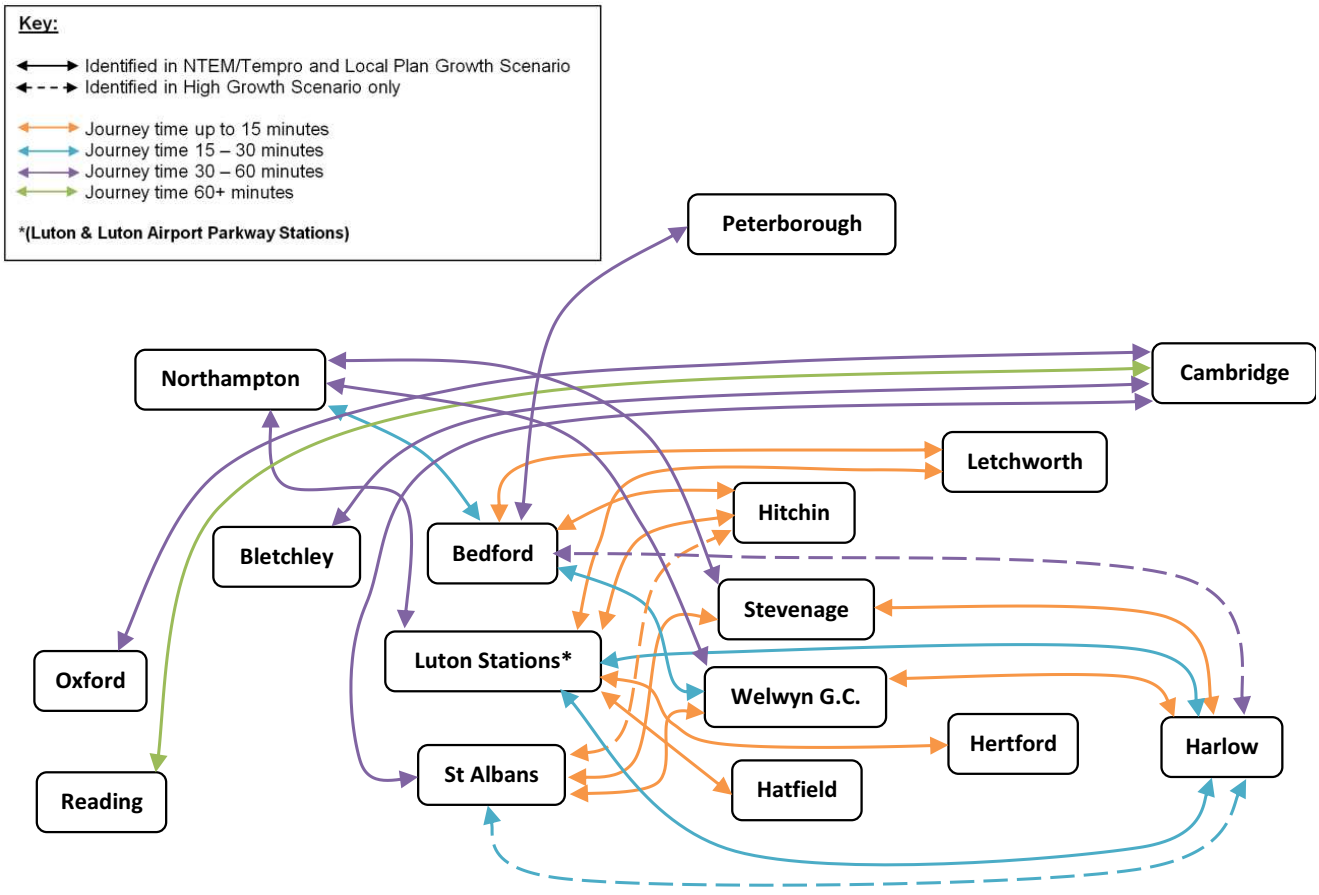


Figure 5. High Priority journey pairs as identified in conditional outputs



## Interpreting the Passenger Service Conditional Outputs

The EWR-CS Passenger COS outputs present a set of key station to station passenger journey opportunities that have been assessed to offer the greatest potential to deliver economic benefits, and generate new rail demand and revenue. It is anticipated that a selection of these key journey pairs in combination will form the core service specification within an EWR-CS enabled timetable.

Target performance for the journey pairs identified should be considered to be the delivery of a service journey time below the upper threshold for the journey time category they have been identified with, at a service frequency of 2 tph. This is a target to aim for in considering design options but this does not mean that if this target were not met the journey pair would not be worthy of inclusion as part of an EWR-CS service specification or timetable. That would be determined by more detailed consideration of the value a service would provide to an overall EWR-CS business case to be developed in due course.

It should also be stressed that the identification of the conditional output journey pairs does not preclude the inclusion of other journey pairs as part of an ultimate EWR-CS service timetable. The COS identifies the key pairs to focus examination of deliverability on. In developing a business case for an EWR-CS scheme in the future it would be expected that the additional value that can be realised from enabling other journey pairs to the core ones will be explored as part of the process of business case optimisation. Consequently, other pairs not identified as conditional outputs, particularly where they generate significantly more benefit and revenue relative to the incremental cost of enabling them, could form part of the ultimate EWR-CS scheme specification for which a business case is presented.

We have given some initial consideration of the scale of economic benefits and the potential to deliver new rail demand and revenue associated with the passenger service conditional outputs, and the likelihood of this being sufficient to support significant rail investment costs. This indicates that the delivery of a selection of conditional outputs has genuine potential to deliver significant transport user economic benefits, sufficient to support a viable value for money case. Transport user benefits alone over a 60 year appraisal period are likely to support a capital investment of over £400 million (in 2010 discounted prices) while still meeting the DfT's economic cost benefit threshold criteria.

This initial consideration suggests that an EWR-CS scheme that delivered a service specification consistent with the conditional outputs, has genuine potential to generate sufficient benefits to justify the capital investment that may be associated with the scheme.

## Freight Service Conditional Outputs

EWR-CS has the potential to provide vital additional capacity to the Strategic Freight Network to cater for the forecast increases in intermodal and bulk rail freight. Felixstowe and the Thames Gateway ports on the East Coast are expected to generate a significant increase in intermodal traffic.

If the EWR-CS was implemented, it would offer potential through running from East Anglia to the western side of the UK (south of the West Midlands). It could also provide links to the ECML, MML and WCML. This would facilitate new freight flows plus diversion of some existing traffic flows.

The route could provide relief for capacity on the existing heavily congested North London Line and / or the present West Midlands / Felixstowe route via Nuneaton, Leicester, Peterborough and Ely. There was a scheme in BR days in the 1950s to route existing cross London freight traffic over this line – hence the building of the Bletchley flyover.

Given the proposal to develop electric haulage over the route from Bedford to the west, the proposal to re-open the eastern end of the route to Cambridge, adding it to the national rail network, would give major benefits both in speeding up existing journey times, developing new freight flows and relieving capacity / pressure on existing routes.

In addition to this, two new proposed rail freight terminals could to a large extent depend upon the opening of EWR-CS to access to and from key parts of the county, such as the Haven Ports and London Gateway. Proposals for freight terminals have been suggested for:

- M1 Junction 13, though this does not have support of the local planning authority; and
- MOD Bicester.

With further potential terminals/railheads at:

- Sundon, in Central Bedfordshire (accessed from the MML); and
- Rookery South, near to Stewartby (accessed from the Marston Vale Line).

Based upon this Table 8 shows the Conditional Outputs for Rail Freight.

**Table 8. Rail Freight Conditional Outputs**

Conditional Output	Description
Freight CO 1	Provide sufficient freight paths/capacity to enable the planned growth of the Haven and Thames Ports whilst providing an alternative route to the Midlands and West of England avoiding the North London Line.
Freight CO 2	Provide sufficient freight paths/capacity to support potential development of a rail freight terminal in proximity to the M1. Capacity would need to be compatible with that planned for the Western Section of EWR.
Freight CO 3	Provide sufficient freight paths/capacity to enable the planned development of a rail freight terminal at MOD Bicester. Capacity would need to be compatible with that planned for the Western Section of EWR.

## The Next Steps

In terms of further activity, we recommend that the following next steps be considered:

- Review the conditional outputs journey pairs and develop a set of logical journey pair combinations as EWR-CS Service Scenarios (EWR-CS SS) to consider, focussed on the conditional outputs but also considering in-scope and logical additional non-conditional output pairs.
- Identify potential routes in concept that could enable each EWR-CS SS to be realised – this would draw on the extensive body of previous work and studies plus desktop research and consultation with EWRC, DfT and NR.
- Undertake an initial high level operational and planning constraints analysis and deliverability appraisal of each EWR-CS SS as basis for sifting down to a limited set EWR-CS SS (2 or 3 scenarios) that will provide a more manageable scope and focus for more detailed engineering feasibility consideration and outline business case analysis.
- Progress with more detailed operational and early engineering feasibility design study to develop key operational and design outputs (alignments, realisable service performance parameters, indicative timetables, high level cost estimates etc) to support production of an Outline Business Case.
- Undertake the various technical analyses and assessments on feasibility designs necessary, including updated modelling and forecasting, environmental scoping level assessment and economic analysis and appraisal to support preparation of an Outline Business Case – would include consideration of business case optimising EWR-CS SS inclusive of in-scope non-conditional output journey pairs.
- Prepare and present the EWR-CS Outline Business Case in line with the DfT's Five Cases Model template.