

Route Plans 2008
Route 7
Great Eastern



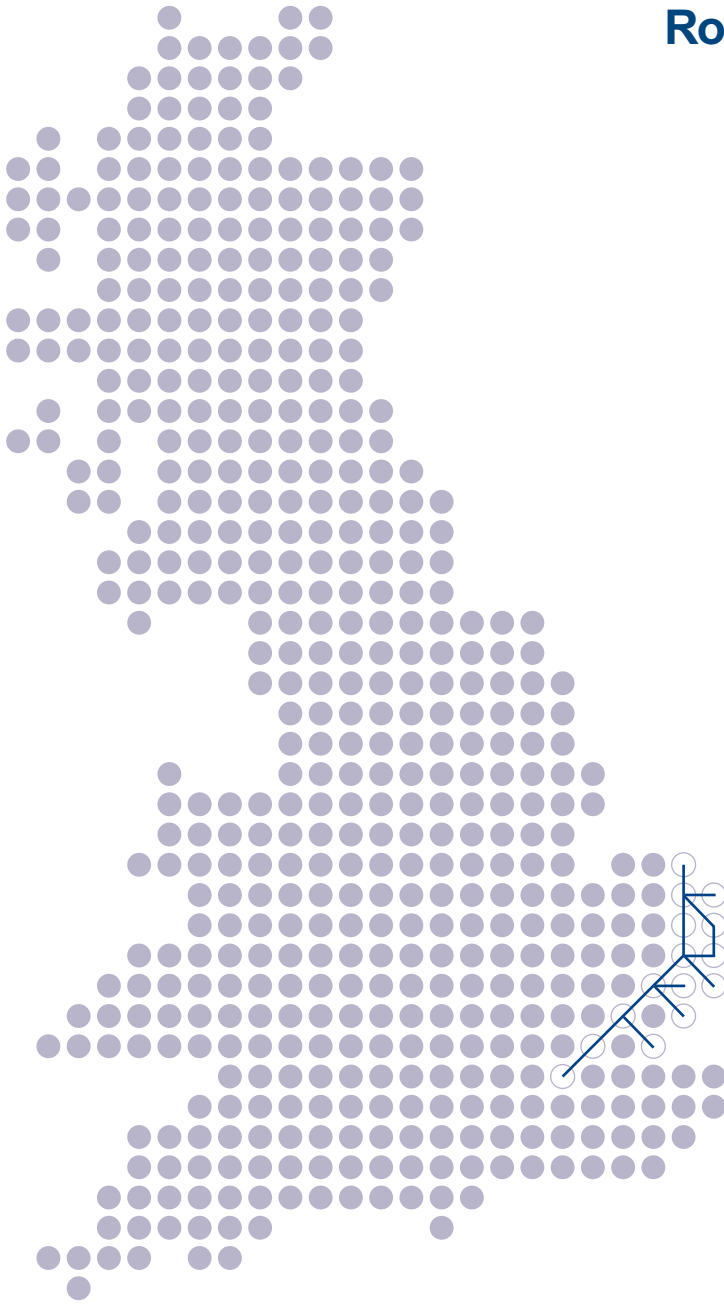
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Route 7 Great Eastern



Section 1: Today's railway

Route context

The Great Eastern Main Line (GEML) runs from London to Norwich and has a number of branches that serve the coastal resorts of Southend, Clacton-on-Sea, Walton-on-the-Naze, Felixstowe, Lowestoft, Great Yarmouth, Cromer and Sheringham, as well as the Norfolk Broads, the east coast ports (including Harwich and Felixstowe) and the lines to Braintree, Southminster, Sudbury and Upminster. The main line competes with the primary road network and rail services penetrate into the City of London.

The route serves one of the fastest growing regions in the country with densely populated areas at its southern end and some key locations along its length, including the Essex county town

of Chelmsford and the regional centres of Colchester, Ipswich and Norwich. The main markets are commuter travel to London, in particular to the City and Docklands, and business and leisure travellers. The route also provides the main artery for substantial freight traffic between the east coast ports of Felixstowe and Harwich and the rest of the country via London.

Along with the West Anglia and Thameside routes, the Great Eastern route is included in the Greater Anglia Route Utilisation Strategy (RUS), which was established by the Office of Rail Regulation on 18 February 2008. The GARUS covers the period to 2021, but also includes a longer term view of the strategy for meeting continued growth.

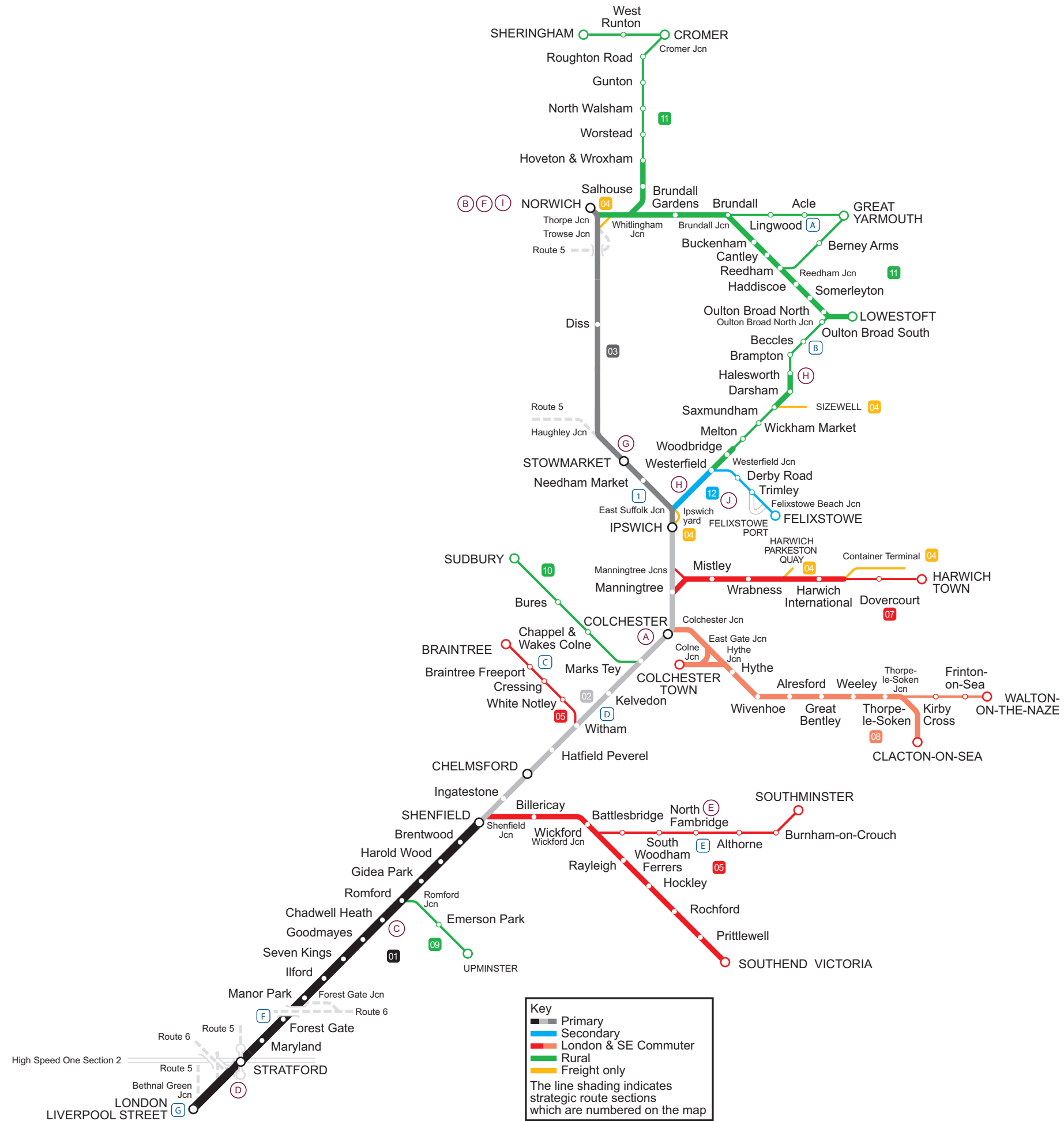
The Eastern Regional Planning Assessment (RPA), covering the period from 2011 to 2021, was published by the DfT on 16 February 2006. The RPA sets out scenarios of continuing growth in commuting to the centre of London and Docklands. However, the current network is already operating at or close to capacity in terms of train paths. The Greater Anglia RUS has looked at options and recommendations for accommodating future growth and its recommendations are discussed in this route plan.

Today's route

The principal elements of the Great Eastern route are described below. The relevant Strategic Route Section is shown in brackets:

- the main line from London to Norwich (07.01, 07.02 and 07.03);
- branches to Upminster (07.09), Southend Victoria and Southminster (07.05), Braintree (07.06), Colchester Town, Clacton-on-Sea and Walton-on-the-Naze (07.08) and Harwich Town (07.07); and
- the Sudbury branch (07.10), and the remaining branch lines in Norfolk and Suffolk (07.11), including the important freight route between Ipswich and the port of Felixstowe (07.12), which is the country's largest container port. There is also a short freight only branch to Sizewell Power Station (07.04).

Route 7 Great Eastern



Current passenger and freight demand

Passenger demand has grown steadily and strongly for years on this route, particularly into central London and Docklands. The number of people travelling into London in the morning peak increased by 3.4 percent between Autumn 2005 and 2006 and by another 4 percent by spring 2007. (This growth rate is about twice the annual average for similar trips around London.) Peak demand has increased particularly sharply on inner suburban services, which saw an increase of around 6 percent over the last six months alone. Off peak leisure travel – driven by successful marketing campaigns from the train operators and rail partnerships – has also experienced strong growth in demand.

Main line services parallel the A12 corridor southwards from Ipswich, which feeds the M25 around London and extends all the way down into the Docklands. Road traffic in and around London however is very congested at peak times and this means that the railway tends to be the first choice for commuters especially on the suburban network, which experiences strong patronage in the peak (60,000 passengers a day were recorded in the spring 2007 peak passenger counts).

Although the majority of the current demand is into Liverpool Street, a significant number of passengers interchange at Stratford with onward journeys via the underground Central and Jubilee Lines, Docklands Light Railway and the North London Line. Stratford is the gateway to the Docklands from the Great Eastern main line and employment in Docklands is expanding. Stratford itself is set to benefit from new development, and demand is set to grow.

The Freight Route Utilisation Strategy was published by Network Rail in March 2007 and established by the Office of Rail Regulation in May 2007. A key input to the strategy was a set of ten year demand forecasts that were developed and agreed by the industry through the RUS Stakeholder Management Group. Freight demand, especially intermodal deep sea containers from the port of Felixstowe is growing year on year by 4-5 percent. This demand will be further increased by the impending port developments at Felixstowe South (approved February 2006), and Bathside Bay, Harwich (approved March 2006), as well as the development of the deep sea London Gateway Port (Shell Haven) on the Thameside route (Route 6). This is further explored in the capability and capacity sections below. The Freight RUS predicted that Felixstowe could generate around 26 additional trains per day (over and above the 2004/05 base year), but that this figure could fall to around 18 trains per day if London Gateway Port is developed.

The London Gateway Port itself is forecast to generate around eight trains per day.

*Harwich Town has 1 tph peak connecting service to Liverpool Street at Manningtree.

Figure 1 Current train service level (trains per hour)

Station	tph to Liverpool Street
Ilford	15 peak/6 off peak
Gidea Park	14 peak/6 off peak
Shenfield	18 peak/6 off peak
Southend	7 peak/3 off peak
Southminster	1 peak/0 off peak (see table below)
Chelmsford	8 peak/5 off peak
Braintree	1 peak/1 off peak
Colchester Town	1 peak/0 off peak (see table below)
Clacton	4 peak/1 off peak
Harwich Town /International	1 peak*/1 off peak
Norwich	4 peak/2 off peak

Current services

Passenger services on the route are operated by National Express East Anglia (NXEA), with a small number of services into Liverpool Street operated by c2c. English Welsh and Scottish Railway (EWS), Freightliner, Direct Rail Services (DRS) and First GBRf operate freight services on the route.

Figure 1 contains the morning peak (08:00 to 09:00 arrivals) and off peak tph frequencies into Liverpool Street.

Figure 2 Current train service level (trains per hour)

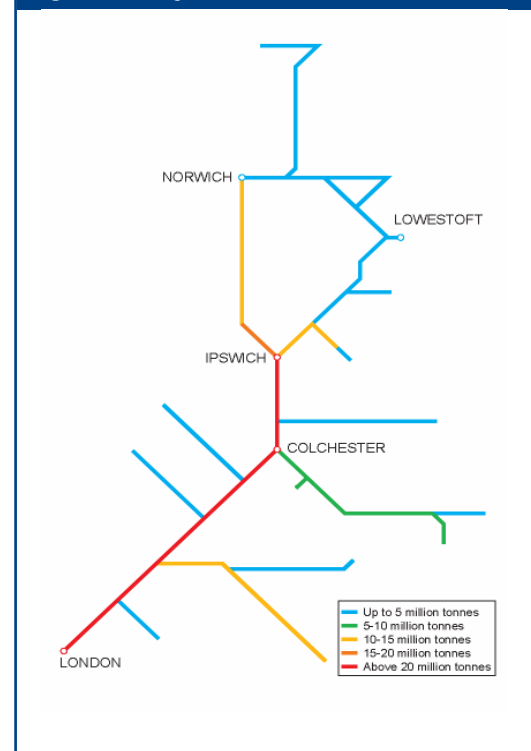
Regional/Rural Services	tph
Romford to Upminster	2
Southminster to Shenfield	1
Walton-on-the-Naze to Colchester via Colchester Town	1
Sudbury to Marks Tey	1
Harwich Town to Manningtree (terminates at Liverpool Street)	1
Ipswich (starts at Liverpool Street) to Peterborough	1 every 2 hours
Ipswich (starts at Liverpool Street) to Lowestoft	1 every 2 hours
Ipswich to Felixstowe	1
Ipswich to Cambridge	1
Norwich to Cambridge	1
Norwich to Liverpool/Nottingham	1
Norwich to Lowestoft/Great Yarmouth/Sheringham	1 to each destination

Figure 2 contains the trains per hour frequencies for the regional/rural services.

The route provides the main artery for long distance freight flows from the east coast ports of Felixstowe and Harwich to the rest of England via North London as well as varying volumes of freight to local terminals and yards, especially aggregates.

Figure 3 shows the total annual tonnage levels on the route.

Traffic volumes are summarised in Figure 4.

Figure 3 Tonnage**Figure 4** Current use

	Passenger	Freight	Total
Train km per year (millions)	21	2	22
Train tonne km per year (millions)	5,790	1,506	7,296

Current infrastructure capability

The following maps set out the capability of the current network.

Figure 5 Linespeed

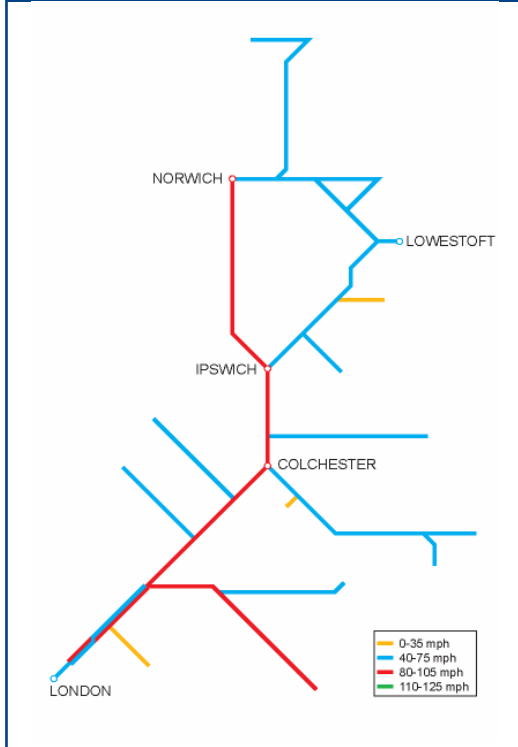


Figure 6 Electrification

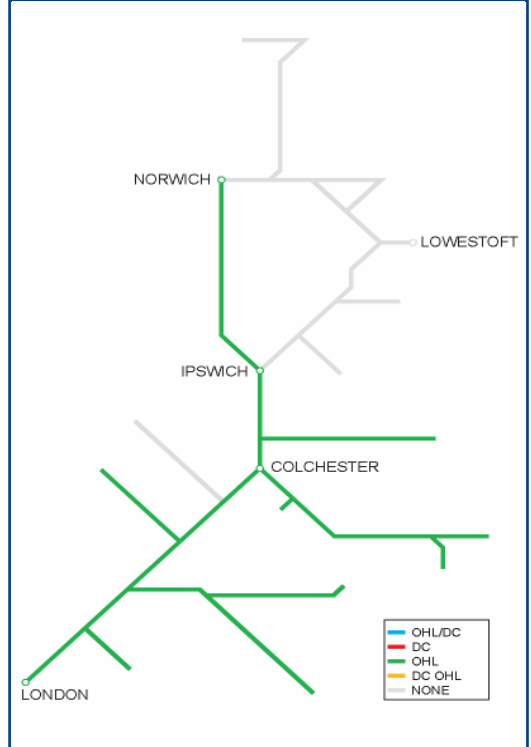


Figure 7 Route availability

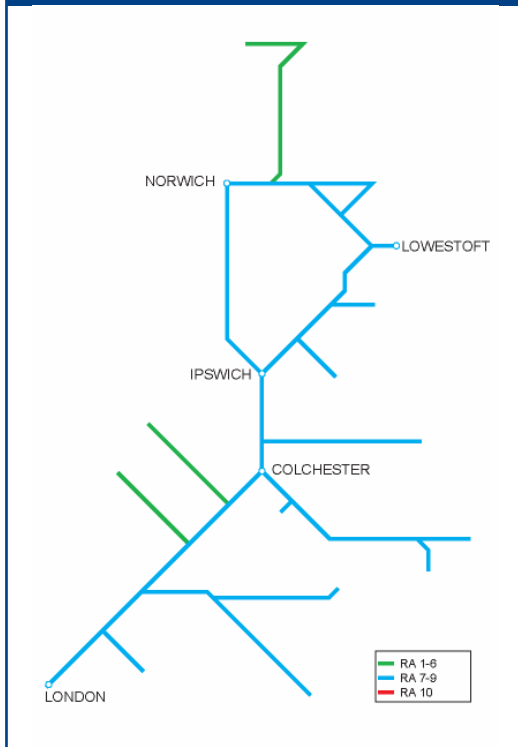
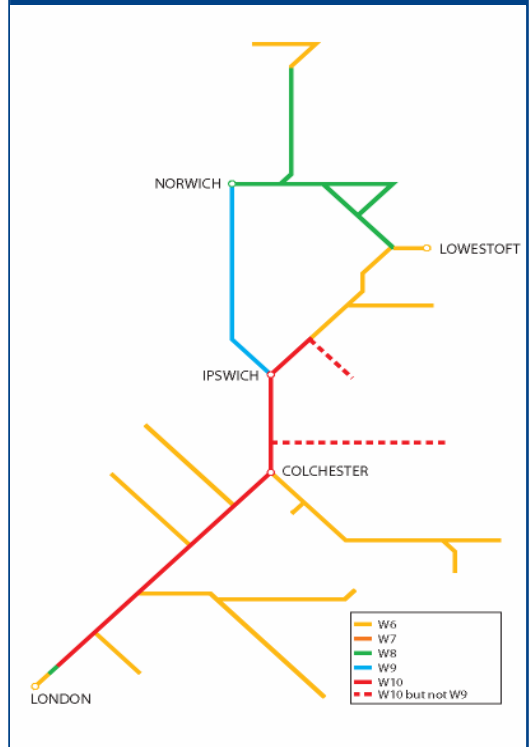


Figure 8 Gauge



Current capacity

The Great Eastern route is mainly two track and capacity is limited by the mixture of fast and stopping passenger and freight services, complex junctions, and station occupancy. Long single line sections on a number of the rural lines exacerbate these issues. There is a four track section inwards to London from Shenfield, which does allow some segregation between fast and stopping passenger services but even here the route is close to its capacity at peak times. Outside the peak the mix of current stopping patterns north of Shenfield and the growing number of freight trains from the Thameside route, which cross the Great Eastern on the flat between Forest Gate Junction and Stratford, use almost all of the available track capacity.

Key issues on the Great Eastern route are:

- a lack of alternative routes with W10 loading gauge capability to offer routes away from the Great Eastern for the predominantly intermodal freight traffic;
- the high volumes of freight traffic from Thameside, which has to weave across the Great Eastern route from the electric lines to the main lines on the flat between Forest Gate Junction and Stratford to access the North London Line;
- a lack of long freight loops between Haughley Junction and Stratford;
- the long single line Felixstowe Branch, which is a constraint to increasing traffic at the Port of Felixstowe;
- a mixture of fast and stopping services on the two track Great Eastern main line between Colchester and Shenfield;
- intensive platform utilisation and congestion on the throat at Liverpool Street station;
- the long single line track sections on the East Suffolk Line;
- the three track throat to Norwich station; and
- passenger capacity is an issue at Stratford station due to increasing passenger numbers at peak times and high levels of transfers to the underground and Docklands Light Railway.

Figure 9 shows the current train service level in key sections of the route.

Figure 9 Current train service level (peak trains per hour)

Route Section	tph
Norwich to Diss	4
Ipswich to Manningtree	5
Thorpe le Soken to Hythe	5
Colchester to Marks Tey	10
Braintree branch	1
Witham to Hatfield Peverel	11
Chelmsford to Ingatestone	13
Southend Victoria to Wickford	7
Wickford to Shenfield	8
Shenfield to Gidea Park (electric line)	7
Gidea Park to Romford (electric line)	14
Ilford to Stratford (electric line)	15
Shenfield to Stratford (main line)	20

Current performance

Figure 10 shows the current PPM for the main TOC running along the route.

The Public Performance Measure for NXEA below also includes the services that are operated on the West Anglia route.

As a result of the route operating at close to track capacity for most of the day, there are difficult performance issues. The current mix of fast and stopping services and intensity of the peak service means that when a problem occurs there is a knock on effect on following services that can quickly cause large amounts of reactionary delay for what might be initially a small specific incident.

Analysis of recent performance shows the main problems on the route to be track circuit failures, broken rail/track faults and point failures. The route also suffers badly from OLE problems and the inner suburban service has been affected by trespass incidents.

Figure 10 Current PPM MAA (2007/08)

TOC	MAA	As at period
National Express East Anglia	90.4%	12

Section 2: Tomorrow's railway

HLOS output requirements

Figure 11 Total demand to be accommodated by Strategic Route

Routes	Annual passenger km forecast in 2008/09 (millions)	Additional passenger km to be accommodated by 2013/14 (millions)
Great Eastern	2,775	319

Figure 12 Peak hour arrivals to be accommodated by Strategic Route

London Terminals	Peak three hours			High- peak hours		
	Forecast demand in 2008/09	Extra demand to be met by 2013/14	Maximum average load factor at end CP4 (%)	Forecast demand in 2008/09	Extra demand to be met by 2013/14	Maximum average load factor at end CP4 (%)
Blackfriars	21,900	3,500	67	11,200	1,200	76
Euston	23,800	3,400		10,600	1,600	
Fenchurch Street	26,000	2,500		13,900	1,600	
Kings Cross	18,300	2,300		8,000	1,100	
Liverpool Street	74,300	10,600		36,700	4,900	
London Bridge	127,600	12,600		65,200	7,800	
Marylebone	9,100	1,000		4,600	600	
Moorgate	13,000	700		7,400	400	
Paddington	24,100	2,900		11,500	1,400	
St. Pancras	25,900	10,900		13,100	5,700	
Victoria	58,700	5,300		29,300	2,800	
Waterloo	74,300	9,200		36,800	4,900	

Future demand

Passenger demand forecasts for the route predict underlying passenger growth at around the average rate for peak trips into London, at around 2 percent a year during CP4. This is significantly lower than the rates of increase in passenger numbers that have been experienced on the route in the last couple of years, but similar to the average over the last ten years. Crowding is becoming so severe on the route that demand forecasting models predict that around half of the background growth will be crowded off rail unless capacity is increased.

It is envisaged that increases in demand beyond those predicted will be generated by the redevelopment of Stratford, employment growth in Canary Wharf and, potentially, around Southend Airport. There is also the need to handle a significant temporary increase in passenger flows associated with The London Olympic Games and Paralympic Games (the Games) in 2012 and a permanent increase following the redevelopment of the site after the games.

The demand for freight paths is forecast to increase by 10-15 paths a day on the route by 2014/15. This increase is predicted primarily as a result of development of the East Coast container ports and London Gateway Port. The level of construction work scheduled over the next 10 years (including house building and the Games) will require an increase in the volume of aggregates hauled on the route and this has been taken into account in the industry forecasts contained in the Freight RUS.

Section 3: Proposed strategy

Figure 13 summaries the key milestones during CP4 in delivering the proposed strategy for the route. Further explanation of the key service changes and infrastructure enhancements are set out in the following sections.

Figure 13 Summary of proposed strategy milestones			
Implementation date	Service enhancement	Infrastructure enhancement	Expected output change
2009–2012	New rolling stock on the Norwich services	Works to allow new units to operate	Increased peak capacity
2010	Run three additional high peak trains on the GEML outer services, plus additional shoulder peak services	Lengthen Platform 10A (and provide freight loop) at Stratford and lengthen Fambridge loop so that two 12-car trains can pass	Increased peak capacity and improve freight regulation
2010	Allow all GE outer peak services to call at Stratford	Lengthen Platform 10A at Stratford	Increase peak capacity and improve access to Docklands
2010	Run two additional high peak services on the GE inner services, plus additional shoulder peak services	Turnback at Chadwell Heath	Increased peak capacity
2016	10-car trains on the GE inner services	Design for the operation of 10-car platform extensions	Increased peak capacity (now part of the Crossrail scheme)
2010	Hourly service on East Suffolk Line	Passing loop, plus linespeed improvements	Double service frequency
(ongoing until March 2017)	Crossrail services replace some inner suburban services by 2017	Crossrail construction and implementation	Additional capacity

Strategic direction

With the housing growth proposed in the East of England Draft Plan and the levels of employment predicted in the London Plan, together with the growth in the Haven ports, the route will need to accommodate high levels of passenger and freight growth. In common with other London commuter routes, particularly the West Anglia line, one of the routes' key functions is feeding workers into London to support the city's economy. London is a world-leading financial centre which makes a net contribution to the national economy and it is thus essential that the transport links are provided to facilitate this growth. To this end the strategy for the route over the next 10 years and beyond has been set through the Greater Anglia RUS. This document also contains a look forward to some of the longer term plans for the route.

In terms of dealing with freight growth the strategy has been set out in the Cross London RUS, Freight RUS and now the Greater Anglia RUS. These strategies describe the industry growth forecast and the strategy for dealing with the growth in traffic. On the Great Eastern Main Line, this strategy requires the two off peak freight paths per hour to be protected in future timetables. It also assumes that the growth in East Coast Ports traffic will be accommodated by modest increases in traffic on the GEML with the majority of the growth being routed cross country via an upgraded Ipswich – Ely – Peterborough – Nuneaton route.

To accommodate the high levels of growth in passenger demand on the Great Eastern route, additional peak services on both the inners and outers and train lengthening on the branches is proposed. This will require some infrastructure works including lengthened loops and the construction of a turnback. As demand rises on the inner services in the longer term train lengthening will require the construction of 10 car platforms, this now forms part of the Crossrail plans. More details can be found in the 'Long term opportunities' section below.

Future train service proposals

In order to meet rising demand along the route the following train service proposals have been developed in the Greater Anglia RUS:

Norwich services

To meet peak demand on these services higher capacity stock will be needed. This will require consideration of introducing EMUs in place of the intercity sets. These units could be long distance EMUs or the Inter-city IEP train.

This will require local modification to the berthing sidings at Crown Point and Ipswich and it is also assumed that additional overnight/inter-peak berthing will be provided at Orient Way.

Great Eastern outers

To meet forecast growth, extra services will be required and it is assumed in the RUS that this entails the operation of additional 12 car high peak services from Colchester Town, Chelmsford and Southend. It is also proposed that these additional trains will operate in eight car formations in the shoulder peak on the main line. On the Southend/Southminster line it is assumed that the Farnbridge loop is extended so that more 12 car trains can operate in the peak. In addition, calling more services at Stratford will enable the additional services to operate and this will also enable loads between services to be evened up.

The DfT Rolling Stock Plan assumes that the additional four car EMUs required will be cascaded from other routes. In the Greater Anglia RUS it is assumed that the berthing sidings would be re-opened at Harwich (Parkeston Quay) as Colchester is currently full.

Great Eastern inners

Two additional trains will be required to meet medium term growth. In the longer term (post CP4), 10-car operation is proposed, requiring platform lengthening.

It is assumed that the additional four car EMUs required would be cascaded from the West Anglia route. When 10-car operation comes in (in CP5) it is assumed that the fleet would be replaced with five car Crossrail compatible EMUs. It is assumed that the additional units would use the Crossrail planned sidings at Ilford and Gidea Park.

Cross country routes

On the cross country services some strengthening of peak trains radiating from the regional centres will be required. In addition, the option of making the Ipswich – Lowestoft and Ipswich – Peterborough services hourly has been examined in the Greater Anglia RUS. An hourly Ipswich–Lowestoft service is subject to funding and the results of a detailed assessment of level crossings along the route. An hourly Ipswich – Peterborough service would require a timetabling review after the proposed cross country capacity works have been undertaken.

Freight services

The following parts of the route are predicted to see the higher freight flows due to expansion at the east coast ports:

- Felixstowe port to Ipswich Yard (includes the whole of the Felixstowe branch and part of the East Suffolk Line between Westerfield and East Suffolk Junction);
- Bathside Bay to Manningtree Junctions (Harwich branch);
- Ipswich Yard to Stratford along the GEML; and
- Ipswich Yard to Haughley Junction (to access the ECML via the West Anglia cross country route – Route 5).

More detail on future services has been incorporated into the capacity section below.

Figure 14 indicates the forecast percentage change in tonnage to 2017.

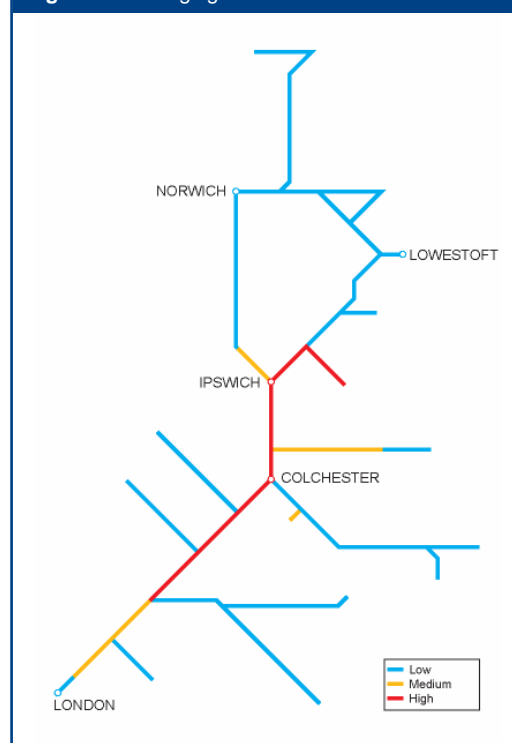
Future capability Gauge

The Freight RUS sets out the highest priority routes to be cleared for the transportation of 9'6" high containers on standard wagons (known as W10 gauge). Network Rail and the SRA carried out physical works to introduce W10 gauge freight traffic along the Great Eastern route from the east coast ports of Felixstowe and Harwich to the West Coast Main Line via Ipswich tunnel, Stratford and the North London Line (via Primrose Hill). These works, which were completed in September 2004, also opened up the route from Tilbury and North Thameside, via Forest Gate Junction and Stratford, to the W10 network.

The use of 9' 6" high containers is increasing and is predicted to account for the majority of current growth in the deep sea container market, however there is still no alternative route for the current W10 gauge freight traffic from the east coast ports and further expansion is proposed at both Felixstowe and Bathside Bay, which would bring increased W10 gauge traffic to the Great Eastern route. Also there is currently no alternative route for W10 and W9 gauge freight traffic from the Thameside route. This traffic will also increase as permission has recently been granted to develop the deep sea London Gateway Port at Shell Haven on the Thames Haven branch.

The West Anglia cross country route from Ipswich to the East Coast Main Line via Bury St Edmunds, Ely, March and Peterborough (part of Route 5) was identified by the SRA as one of the highest priority routes for upgrading, which has been partially secured through 'Section 106' planning commitments by port developers. Further development of the route is being carried out under the TIF programme, with funding secured for the gauging works across to Nuneaton. Further TIF funding will be sought to cover capacity

Figure 14 Tonnage growth



enhancements on the cross country route. The TIF programme is also funding the upgrading of the Barking to Willesden (via Gospel Oak) line (part of route 6) for Thameside freight traffic.

Linespeed

Modest improvements to linespeeds on some rural routes could give longer turn round margins at origin and destination stations, which would improve operation and performance as well as increasing demand. Improvements are currently being examined (in conjunction with the track renewals programme) on the East Suffolk Line and the Sudbury branch.

Tonnage

Increased demand for freight traffic to and from the east coast ports will cause much higher tonnages to be sustained across the Great Eastern route.

Train lengths

It is generally accepted that the practical approach to continued growth is the incremental lengthening of trains, especially as this solution is flexible, caters for the wide range of different growth scenarios and makes better use of scarce and high value paths.

Most of the outer suburban and main line Great Eastern stations can already accommodate 12-car EMUs and loco hauled rolling stock of up to nine coaches plus a DVT. The inner suburban line stations with the exception of Shenfield and Stratford can only accommodate eight car

formations and it is proposed to extend these to 10 cars (which is compatible with Crossrail).

It is proposed to increase freight train capacity at Ipswich Yard by lengthening and remodelling the sidings.

Future capacity

The analysis being carried out for the Greater Anglia RUS has indicated that the options detailed below need to be considered for meeting growth. Longer term options are also considered. It should be noted that the options below cover capacity in the high peak hour, however, some strengthening of shoulder peak services will be required.

Great Eastern outers

The strategy for the GE outers recommends replacement of the inter-city loco hauled sets with long distance EMUs, together with the operation of three additional high peak services. To enable the additional services to operate and more trains to call at Stratford, it will require the extension of Platform 10A so that it can take 12-car trains.

Great Eastern inners

Two additional trains per peak hour will be required to meet medium term growth, requiring a new tumbuck at Chadwell Heath. In the longer term 10-car operation is required and this is now part of the Crossrail project. In the very long term 12-car operation could be considered in conjunction with Crossrail's long term plans.

Southend/Southminster services

In order to allow all trains to run at full length it is necessary to lengthen the loop at Fambridge (on the Southminster branch) so that 12-car trains can pass. Further interventions include calling more trains at Stratford to even up loadings and spreading the peak load into the shoulder peak.

Cross country routes

The option of making the Ipswich – Lowestoft service hourly will require the construction of a loop at or to the north of Beccles. Level Crossings are also being reviewed along the route to assess if modest speed increases may be possible. East Suffolk Junction also needs to be doubled, so that freight growth is not affected by these proposals.

With the expansion of Felixstowe and the development of Bathside Bay, the growth in deep sea maritime container traffic is key to the route. Gauge and capacity works between Felixstowe and South Yorkshire are being developed in conjunction with HPUK, and a TIF bid has been successfully submitted for W10 gauge clearance on the Peterborough – Nuneaton route. Capacity

enhancements on the Ipswich – Nuneaton route will be the subject of a variety of funding mechanisms potentially including Trans European Network and a subsequent TIF bid.

In conjunction with proposed capacity improvements, the development of the timetable for the cross country route includes the need to examine ways of increasing the frequency of the Ipswich – Peterborough service to hourly.

Other investment issues

We will continue to carry out regular reviews of the renewal workbanks with a view to identifying the opportunity for enhancements, particularly driven by the business needs of the operators (generally to be funded through NRDF and other means). In addition, these reviews consider the longer term needs of the route when specifying renewals, whether for power supply, capacity or line-speed.

Growth associated with works for the Games is, in part, being addressed by a range of third party schemes.

Discussion with the relevant train operator and the DfT around the detailed implementation plan, timing (linked with the release of rolling stock in particular) and specific timetable solutions related to the above passenger capacity proposals are now underway. It is therefore likely that variations to these proposals, including alternative timetabling solutions, may be developed as these discussions progress.

Figure 15 Forecast PPM MAA - CP4 plan

	2009/10	2010/11	2011/12	2012/13	2013/14
National Express East Anglia	91.8%	92.4%	93.1%	93.6%	94.0%

Figure 16 Forecast PPM MAA - proposed local commitments

	2009/10	2010/11	2011/12	2012/13	2013/14
National Express East Anglia	90.9%	91.5%	92.2%	92.7%	93.1%

Future performance

Figure 15 sets out the planned PPM for each train operator. Figure 16 sets out the trajectory we propose as local commitments with each operator. These are lower than planned given the need for flexibility in achieving the HLOS targets and to reflect the greater uncertainty and risk associated with projecting performance at a disaggregated level. Reasonable requirements will finally be established for CP4 in our 2009 Business Plan.

The delivery of improvements in train performance is one of Network Rail's key priorities. This is being progressed by ensuring that infrastructure and network management caused delays are systematically reduced. This is being addressed by the introduction of a fully integrated control centre for East Anglia, which is bringing benefits by improving communications, streamlining the decision making process and delivering an improved service to customers.

Broken rails/track faults and track circuit failures are being addressed by the renewal programmes and other improvements in performance are being achieved through Joint Performance Improvement Plans. Network Rail are also working with NXEA on the Challenge 91 performance improvement programme.

The Challenge 91 programme follows on from the Challenge 90 initiative and includes action plans, which have introduced regular infrastructure monitoring and improved reliability of the rolling stock, as well as monitoring/improving the level of right time departures.

Work also continues on the annual programmes of targeted performance improvement schemes across the route. Other improvement measures and initiatives include an improved possession strategy to maintain track circuits at key locations, fencing renewals to prevent trespass and vandalism and a rolling programme of tamping to improve track faults.

The programme of component replacement on the Overhead Line Equipment continues, however most of the OLE problems are caused by fixed termination equipment, much of which is of a very

old design, and needs to be seasonally re-tensioned according to the weather. The programme for the design and implementation of the renewal of the OLE between Liverpool St and Southend/Chelmsford is being developed with a view to completing the work before the games in 2012. Work in the Liverpool Street area was completed in December 2007.

As part of the Greater Anglia RUS work, junction margins and allowances are being examined, and the potential for timetable improvements explored.

National Express East Anglia

The performance of National Express East Anglia (previously known as 'one') is 90.4 percent and joint plans exist to improve performance to 91.2 percent by the end of March 2009. The JPIP is supported by the Challenge 91 initiatives which have been implemented by the TOC and our Anglia route this continues to focus on the elimination of small consistent problems which tend to drive down performance even on the good days.

The key performance issues and opportunities for this route have been identified to include:

- the need to accommodate more and longer freight trains associated with traffic growth from the ports of Felixstowe and Tilbury;
- the impact of the rolling stock cascade promoted by the HLOS capacity requirements;
- the need to improve the condition of the overhead line to reduce the need to impose heat related speed restrictions;
- focus on performance delivery for the Olympics;
- timetable review for the Great Eastern services;
- working with the TOC to minimise the impact on performance of overcrowding;
- autumn management;
- remote condition monitoring both on the infrastructure and on the fleet; and
- upgrade of signalling modules and work to isolate power problems to a single running line.

Network Rail and the TOC have drafted a Long Term Performance Plan and propose to continue to work on this during the Summer. Performance is forecast to reach 94.0 percent PPM by the end of 2013/14 however at present this is not fully backed

up by funded plans and the TOC therefore remains concerned by its deliverability although the figure is in line with its aspirations.

Other operators are CrossCountry and East Midlands trains, which only impact on the Great Eastern route between Trowse Junction and Norwich. The future performance section for CrossCountry can be found in the plans for Routes 8, 12, 13, 17, 18, 19 and 20; East Midlands trains can be found in the plan for Route 19.

Another operator on this route is c2c, which operates some late night trains out of Liverpool Street. The future performance section for c2c can be found in the plan for Route 6.

Engineering access

The high level of capacity utilisation on the route has meant that in the past there has been difficulty in gaining access for maintenance and renewals work. As a result a cyclic maintenance regime was introduced that allows weekend maintenance possessions on a twelve week cycle at key junctions and locations. Additionally Liverpool Street and Shenfield have weeknight possessions of varying frequencies and working time equivalent to seventeen 54-hour possessions per year is sustained in order to carry out the track renewals programme.

In conjunction with the operator, a Sunday service using only a two track railway between Bethnal Green and Shenfield was introduced, which allows us to take full possessions on sections of any two adjacent tracks of the four track section.

Although the introduction of cyclical access onto the Great Eastern route is delivering improved maintenance and performance in most places, the need to run increasing services to cater for rising demand in both passenger and freight and a corresponding desire for greater access for regular maintenance to address the resulting wear and tear on the assets may require a revision of the current regimes. Also Network Rail is continuing to work with operators on improving weeknight maintenance on the two-track Shenfield to Colchester section of the GEML, which will now benefit from bi-directional signalling throughout as this equipment is to be installed on the last remaining section between Marks Tey and Colchester.

In addition Network Rail is investigating the practicalities of:

- using the cross country route (when gauge cleared) to enable the GEML/NLL route and the cross country routes to be used as alternative routes for each other, so that one or the other could be blocked at nights/weekends to enable enhanced engineering access;
- undertaking more work for other disciplines in existing possessions planned for track renewals;
- taking long blockades rather than frequent smaller possessions; and
- looking at better use of high output equipment, so that once major renewals have been undertaken, the system can move towards becoming a '7 Day Railway'.

Long term opportunities and challenges

Network Rail anticipate that accommodating growth in commuting to central London and the Docklands will be a significant challenge on the route, especially when considering the continued developments around Stratford, including the interchange with the High Speed One line to the Channel Tunnel, the expanding DLR network and the Games in 2012. This combines with the east coast ports expansion and freight from London Gateway Port.

The proposals for meeting growth in CP4 are discussed above. In the longer term it is not feasible to operate additional outer and long distance services over the GEML without a prohibitively expensive capacity upgrade between Shenfield and Liverpool Street. It is therefore proposed to consider the scheme put forward in the London to Ipswich Multi-Modal (LOIS) Study. This scheme involved four-tracking between Colchester and Chelmsford and then building a new line across to the LUL Central Line and then running into the proposed Crossrail 2 alignment, thereby enabling additional outer services to operate.

On the GE inner services it is assumed that in CP5 10-car operation will be required to meet long term demand. This will enable the current Class 315 EMUs to be replaced by the 10-car Crossrail units. 10-car platform extensions will be required and/or selective door opening introduced where the cost of platform works would be prohibitive, and form part of Crossrail.

The Crossrail timetable is currently being developed and it is essential that it allows for freight growth. Mitigations, including the upgrade of the Gospel Oak to Barking route, must be in place to provide increased flexibility for freight services.

The Freight RUS examined the long term prospects for train lengthening, in order to increase capacity without using additional paths. This work concluded the future plans for route upgrade need to allow for lengthening loops and sidings (such as those at Ipswich yard) when resignalling work is carried out.

Many scenarios have been explored in the Greater Anglia RUS and very long term aspirations have been included in the text above.

A further important area, which was covered in the Greater Anglia RUS, is access to the network. The following areas were considered: station capacity, station facilities, car parking and new stations to serve developments.

Stations on the route with identified with capacity issues already have schemes in development to address the problem. Station facilities have been improved over the years and Network Rail and the operators will be working on station improvements using a number of funding mechanisms, including the National Station Improvement Programme.

Car park extensions have been proposed at a number of stations including Billericay, Diss, Manningtree, Marks Tey, Melton, Prittlewell, Stowmarket and Witham to improve access to the network. The Regional Spatial Strategy identified a number of developments on the edge of existing settlements and new stations are being considered to serve them, including those at Great Blakenham (to serve the Snoasis development north of Ipswich), Southend Airport and a station to serve a new development to the north-east of Chelmsford.

Enhancements to be completed by end of CP3

Figure 17 CP3 enhancements					
Implementation date	Project	Project description	Output change	Funding	GRIP stage
2007/09	Ⓐ Colchester – Marks Tey bi-directional signalling	Installation of bi-directional signalling between Colchester and Marks Tey	Improved maintenance access and performance	Network Rail Discretionary Fund	6
2007/08	Ⓑ Wiring the Royal Dock sidings at Norwich	Scheme to increase berthing capacity at Norwich station for electric rolling stock	Increased peak capacity/reduced empty stock mileage.	Network Rail Discretionary Fund	4

Proposed enhancements in CP4

Figure 18 Proposed enhancements in CP4

Implementation date	Project	Project description	Output change	Funding	GRIP stage
2009-13	Power supply upgrade	To provide power supply to support longer trains and additional services		Periodic Review 2008	1
2010	Ⓒ Chadwell Heath turnback	Construct turnback between the up and down E lines at Chadwell Heath	Improved capacity and performance	Periodic Review 2008	1
2010	Ⓓ Stratford Platform 10A	Extend Platform 10A to 12-car operation (plus incorporate a freight loop)	Improved capacity and better access to Docklands	ODA	6
2009-2012	Ⓔ New rolling stock on Norwich services	Works to enable new rolling stock to operate	Increased capacity	Periodic Review 2008	–
2012	Ⓔ Gauge clearance to W10 and initial capacity works	Gauge clearance and capacity improvements between Felixstowe and Nuneaton/South Yorkshire	Capacity and gauge improvement	Transport Innovation Fund	6
2013	Ⓕ Felixstowe to Ipswich Freight Upgrade	Doubling 4½ mile section of single-track line between Trimley and Derby Road on the Felixstowe branch line plus provision of three additional full length sidings at Ipswich Yard	Capacity improvement	Third party	4

NRDF candidate schemes in CP4

Figure 19 Candidate NRDF schemes in CP4

Implementation date	Project	Project description	Output change	Funding	GRIP stage
2010	Rural route level crossing works	Level crossing works to enable crossings to be closed/ linepeeds to be raised	Improved safety and performance	Network Rail Discretionary Fund	–
2010	Rural route speeds improvements	Track works to enable linepeeds to be raised	Improved performance and capacity	Network Rail Discretionary Fund	–
2010	Improve access to the network	Interchange and car parking	Increased ridership	Network Rail Discretionary Fund	–
2010	Motorise ground frames	Motorise ground frames to improve setting up SLW	Improve performance and safety	Network Rail Discretionary Fund	–
2010	Ⓔ North Farnbridge Loop	Lengthen the loop at North Farnbridge to allow 12-car trains to pass	Improve capacity	Network Rail Discretionary Fund	–
2010	Ⓕ East Suffolk Line improvements	Provision of loop and linespeed improvements for hourly service. Work in conjunction with (but separate to) ERTMS project.	Hourly service frequency and speed improvement	Network Rail Discretionary Fund	–
2010	Ⓖ Norwich performance	Improve signalling flexibility on the approaches to Norwich	Improve performance	Network Rail Discretionary Fund	–

Maintenance and renewals activity

Figure 20 shows the estimated maintenance and renewal costs and activity volumes.

The precise timing and scope of renewals will remain subject to review to enable us to meet our overall obligations as efficiently as possible consistent with the reasonable requirements of operators and other stakeholders.

It should be noted that in order to manage the deliverability of our Civils, Signalling & Electrification plans we have included an element of over planning in our work banks. As a consequence the sum of our route plans exceeds our plan for the network as a whole. It is likely that a small proportion of the activities in these areas will slip to subsequent years.

Figure 20 Summary of estimated maintenance & renewals and activity costs

£m (2006/07 prices)						Control Period Totals			
	2009/10	2010/11	2011/12	2012/13	2013/14	CP4	CP5	CP6	CP7
Maintenance expenditure									
Track	15	15	14	14	14	72	67	66	67
Signalling	7	6	6	6	6	31	28	27	27
Electrification	2	2	2	2	2	9	8	8	8
Telecoms	3	2	2	2	2	11	9	9	9
Plant and Machinery	1	1	1	1	1	3	3	3	3
Other (overheads / indirect)	11	10	10	10	10	51	46	44	44
Total	38	36	35	34	34	177	161	156	157
Renewals									
Track	41	31	33	30	31	166	80	85	82
Signalling	10	10	10	13	11	55	55	55	162
Civils	10	10	10	9	9	48	45	43	43
Operational Property	10	10	9	8	9	46	41	41	41
Electrification	32	41	25	4	5	107	40	39	12
Telecoms	9	7	7	4	7	33	13	17	14
Plant and Machinery	5	3	3	3	2	16	16	15	17
Total	118	112	97	72	75	472	289	295	369
Renewals Volumes									
Rail (KM)	50	50	50	51	50	250	115	76	96
Sleepers (KM)	42	42	42	42	42	208	90	113	114
Ballast (KM)	32	32	32	32	32	161	130	181	182
S&C Units	36	10	20	14	19	99	42	65	46
SEUs commissioned	140	0	21	0	86	247	188	18	1058

Appendix

Figure 21 Strategic route sections

Predominant aspect recorded (secondary aspects recorded in brackets). ELR is Engineers Line Reference, RA is Route Availability

SRS	SRS Name	ELR	Classification	Funding	Community Rail	Freight Gauge	RA	Speed	Electrification	Signalling Type	Signalling Headway (mins)	No of Tracks
07.01	Liverpool Street – Shenfield	LTN1	Primary	DfT	No	W10	8	90 (70)	25kv AC	TCB	2	4 (6)
07.02	Shenfield – Ipswich	LTN1	Primary	DfT	No	W10	8	100 (90)	25kv AC	TCB	3	2
07.03	Ipswich – Norwich	LTN1 (LTN2)	Primary	DfT	No	W9 (W8)	8	100	25kv AC	TCB	3	2
07.04	Freight Lines	various	Freight	DfT	No	W6 (W8)	various	various	various	various	OTIS	1
07.05	Shenfield – Southend Victoria/ Southminster	SSV (WIS)	London & SE	DfT	Yes	W6	7	80 (60)	25kv AC	TCB	3 (OTIS)	2 (1)
07.06	Braintree Branch	BRA	London & SE	DfT	No	W6	6	50	25kv AC	TCB	OTIS	1
07.07	Harwich Branch	MAH (NTE)	London & SE	DfT	No	W10	8	60 (45)	25kv AC	TCB	4 (OTIS)	2 (1)
07.08	Walton and Clacton Branches	COC (various)	London & SE	DfT	No	W6	7	75 (50)	25kv AC	TCB	4 (OTIS)	2 (1)
07.09	Romford – Upminster	ROU	Rural	DfT	No	W6	8	30	25kv AC	OTW	OTIS	1

Figure 21 Strategic route sections

Predominant aspect recorded (secondary aspects recorded in brackets). ELR is Engineers Line Reference, RA is Route Availability

SRS	SRS Name	ELR	Classification	Funding	Community Rail	Freight Gauge	RA	Speed	Electrification	Signalling Type	Signalling Headway (mins)	No of Tracks
07.10	Sudbury to Marks Tey	SUD	Rural	DfT	Yes	W6	6	50	None	OTW	OTIS	1
07.11	East Suffolk line and Norfolk Branches	various	Rural	DfT	Yes	W6 (W8)	7 (6)	various	None	RETB (various)	various	various
07.12	Felixstowe – Ipswich Yard	FEL (various)	Secondary	DfT	No	W10	7	50	None	TCB	OTIS (4)	1 (2)

Capacity and operational constraints

- A Acle: Passing loop length restricts capacity
- B Halesworth – Oulton Broad: Single track section with no passing loops
- C Braintree Branch: Single track section with no passing loops
- D Shenfield – Colchester: Intensively used track section almost at capacity
- E Southminster Branch: Single line with only one passing loop
- F Forest Gate – Stratford: Capacity constrained by a mix of passenger and freight trains
- G Liverpool Street – Bethnal Green: Lines almost at capacity

Potential strategic freight route would require an upgrade to this section

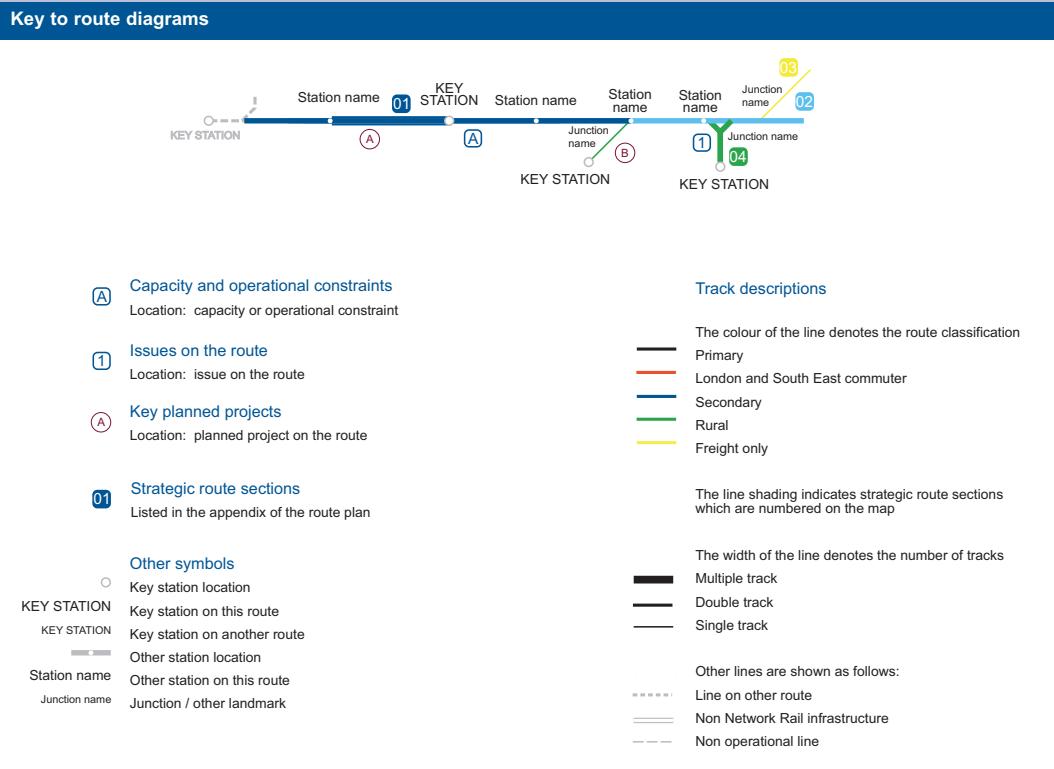
Other issues on the route

- Potential strategic freight route would require an upgrade to this section

Note

This Route Plan forms part of the April 2008 update of Network Rail's Strategic Business Plan. The Route Plan supersedes the version published on 1 November 2007.

Other documents in the Strategic Business Plan can be found on the Network Rail website www.networkrail.co.uk



GRIP stages

1	Output definition
2	Pre-feasibility
3	Option selection
4	Single option selection
5	Detailed design
6	Construction, test and commission
7	Scheme hand back
8	Project close out

**This Route Plan is part of a set.
To view or download the others
visit www.networkrail.co.uk**

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