

Network Rail

Strategic Business Plan update

Move towards a 7 day railway

April 2008

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EXECUTIVE SUMMARY

The last decade has seen a change to travel patterns with an increase in demand for weekend and off peak travel and the need to supply regular train services over all 7 days of the week. Our current strategy of undertaking long possessions of the line at weekends to undertake all types of engineering work is no longer acceptable.

Independent studies have shown that the revenue loss through the disruption to weekend passenger services is significant and also the rail freight industry reports that there would be an increase in freight revenue if services could operate on 7 days a week.

It has been assessed that by the end of Control Period 4 (CP4) there could be additional revenue of £105 million per annum (based on £58 million for passenger operators and £47 million gross for freight operators). We would need to invest in infrastructure enhancements and new methods of undertaking work to realise these benefits and there would be increases in operational costs. We propose to spend £336 million during CP4 in investing in infrastructure and operational costs to enable the move towards a 7 day railway timetable on certain routes and a further £50 million in developing processes for faster isolations. This investment would improve the forecast passenger Network Availability KPI (NAKPI) by 7.5% and would mean that by the end of CP4 the 7 day railway concepts would have been introduced across a number of key routes.

We would use the forecast savings from schedule 4 to offset our investment on the 7 day railway and are therefore seeking a discretionary fund of £300 million during CP4 to be used towards implementing the 7 day railway as originally proposed in the October 2007 Strategic Business Plan submission.

Figure 1 Cost benefit table – Summary of 8 routes with a positive business case (£ million)

7 Day Railway Route Section	incremental revenue	incremental engineering costs		infrastructure enhancement costs	Passenger impact on Availability KPI	
		recurring	one-off		base case	7 Day Railway
England & Wales	106.6	108.9	228.0	133.0	0.80	0.74
Scotland	-	-	-	-		

7 DAY RAILWAY PROPOSAL

The rail industry is experiencing changes in demand for travel on both weekdays and at weekends. Historically the train service in the UK operates a full service on the five traditional working days of the week. At the weekend the timetable is designed around a reduced level of service as we have traditionally reserved weekends, particularly Sunday mornings, for engineering work that requires longer access periods. This results in disrupted rail travel with a heavy reliance on bus substitution and some service cancellations. This pattern of access is a result of a historically lower demand for weekend travel. As the demand for rail travel has grown, particularly outside the bounds of the traditional five working day week, this has become less acceptable to our customers and we are proposing to address this in CP4.

Demand for rail has increased considerably over the last few decades due to social and demographic changes. The traditional view of Sunday as a 'day of rest' has been altered by changes such as the relaxation of Sunday trading laws. This has seen the demand profile for Sunday travel more closely match a Saturday as people are becoming more geographically mobile on Sundays. However, despite their similar demand profiles, the rail industry has not responded to this and Saturdays account for 8.5% of the day trip market while Sundays have only 3.3% due to the services they offer ('Estimated Revenue Report', Arup and Partners, October 2007). This is exacerbated by the reduced number of services that are planned to operate on a Sunday. This creates a small window of opportunity to take advantage of the rapidly increasing Sunday market. The industry needs to take advantage of the potential market share that Sunday could gain by offering a frequent and reliable service.

We are also experiencing an increase in passenger demand for late evening services throughout the week, especially the flows out from major conurbations and there is overnight demand for services that serve airports. The freight sector is experiencing a growing demand for overnight freight especially on the deep sea container traffic and the flows to major retailers who operate a "just in time" policy and rely on an overnight transfer of goods.

Demand is forecast to grow by a further 40% over the next 10 years, with a significant proportion of this focussing on increased weekend and bank holiday travel. The industry needs to respond to the challenge and create extra capacity on the network, particularly at weekends. The analysis carried out by our passenger customers highlights a potential financial gain through the fare box as a result of moving towards a 7 day railway of £80 to £110 million per annum. The unreliable level of rail service at weekends continues to suppress demand. Even though the industry expects financial benefits above those quoted as passengers return to the railway, operators are not able to fully quantify the true extent of this demand. Therefore to retain confidence the analysis remains conservative and does not explore to the same extent the further financial possibilities such as extra journey generation.

The rail industry share of the weekend transport market is much lower than the weekday share. Rail is therefore not maximising its potential as a world class public service and business. This is becoming a real reputational issue the rail industry.

7 day railway objective for CP4

Network Rail aspires to run a railway that is not routinely disrupted by engineering work and that offers a consistent service up to seven days a week, when there is demand. Before we can implement a 7 day railway timetable we need to address the present issues hindering us running the working timetable (WTT). Only when we have achieved greater compliance with the base WTT can we justify further enhancements to the network.

We envisage CP4 as the 'transitional period' where a great deal of the necessary enhancements work can be undertaken to prepare our railway for increased availability. During CP3 we made significant progress in implementing a 7 day railway on the West Coast Mainline. This work will continue into CP4 and is included as part of the base plan. Based on the 7 day railway guiding principles, customer aspirations and the assessment of the costs of track installations, switches and crossing installations, signalling installations and other known asset types Network Rail are developing an indicative programme that will move towards meeting our customers' aspirations. The cost analysis detailed in the October 2007 Strategic Business Plan identified a proposed investment of £300 million for CP4.

There are several stages of implementation. The first of these is achieving a position where we are running a greater proportion of the working timetable (WTT) at weekends. This will create a strong basis on which to start implementing a 7 day railway in CP4.

We want to complete our engineering work in shorter, more regular possessions of 8 hours, and dramatically reduce the amount of longer all weekend possessions or blockades taken that impact upon the customer by disrupting planned services. CP3 saw a move towards longer possessions in order to deliver Network Rail cost efficiencies. However it did not take a whole industry cost benefit view, nor did it take into account the changes in social demographics and pressures of customer demand, which in turn, generate considerable industry financial benefits.

In order to understand how effectively we use the network and the level of access in conjunction with the ORR we have been developing a set of metrics known as the network availability KPI (NAKPI). This measure can be used to define the level of availability that will be delivered should we largely continue with the same access and engineering profile as in CP3 (the “business as usual” profile) looking at the impacts of efficiencies (the base case), and how this would change through implementing the 7 day railway concept.

7 day railway guiding principles

In order to maintain consistency of approach throughout Network Rail and the industry we have developed the following principles that describe the effect on the timetable, possessions and productivity as a result of 7 day railway implementation

- a demand led timetable that offers consistent services on each of the 7 days a week:
 - designed to utilise the full railway network capacity between 0600 and 2200 hours; providing half capacity timetable operating between 2200-0600 with the other half available for engineering work. Trains will be timed to operate over slower of the 2 tracks on 4 track sections and over single line or via a diversionary route on 2 track sections. This does not actually deliver half capacity, but the demand for this period on average is estimated to be only 5% of the total demand;
 - permits later and earlier weekday trains where there is a demand;
 - operate under single line working at the start/end of service where demand does not allow an 8 hour two line possession;
 - operates as advertised with no bus substitution/cancellation of timetabled services;
 - targeted to operate 90% of the weekend WTT by end of December 2008;
 - NAKPI used to measure current availability and measure improvement as we move towards a 7 day railway;
 - reservations open up to a year in advance to compete with other transport modes;
 - short term timetable alterations only in extreme situations; and sees a 7 day railway marketed confidently to restore faith in the railway;

- a possession access regime that minimises its impact on the customer. This will include:
 - phased reduction in the duration of weekend possessions during CP4: moving towards the ultimate goal of a maximum of 8 hours on routes where there is the demand;
 - making full use of existing infrastructure including bi-directional signalling to increase the use of SLW;
 - a through route to be available for strategic freight by use of SLW and “fit for purpose” strategic freight diversions;
 - longer possessions will be available on routes with low demand for early and late services;
 - occasional long weekend possessions and blockades only under exceptional circumstances for complex work;
 - weekday all-line possessions during the no trains period and where there is a demand to provide a train path then SLW will be used to enable the train to operate;
 - provides more access for engineering work;

- increasing the productivity and efficiency of engineering work through:-

- improving the productivity in the 8 hour window by adopting a modular approach to engineering work;
 - adoption of “lean manufacturing” techniques to eliminate downtime and ineffective working;
 - proactive approach to maintaining assets to achieve a high level of asset performance;
 - improving the working time available in the 8 hour window by faster isolations;
 - streamlining of processes and procedures;
-
- adjusting the operational capability and configuration of the network to make the above possible will:
 - involve extra infrastructure needed to operate the desired service; and
 - extra cost from working in a slightly less efficient way that meets the needs of the market;

Network Rail is committed to these principles. CP4 will be a ‘transitional period’ where it is our objective to transform the railway from a traditional five day a week service to one which meets the demand that exists on all seven days of the week on selected routes and in so doing make a significant contribution to meeting the further demand that is forecast over the coming years.

APPROACH

The 7 day railway proposals in the Strategic Business Plan described the concept fully but noted that some items were work in progress and that they would be addressed in this April 2008 refresh of the Strategic Business Plan. We have agreed with the ORR and other industry stakeholders that it is sensible to fully cover five aspects of the 7 day railway. They are benefits, cost (and therefore overall financial business case), the effect on measurable availability of the network, deliverability and an example of how the industry funding mechanisms may work.

We are undertaking a route by route analysis in order to build up our implementation plans for the 7 day railway. We identified a number of criteria that are required for the successful implementation of the 7 day railway and using these criteria we identified 18 routes for analysis as possible 7 day railway routes. We defined these as the tranche 1 routes (see section on deliverability). For these routes we are analysing the likely revenue benefits, the incremental costs to our maintenance, renewals and enhancements works of undertaking the planned volumes of work in CP4 in the 7 day railway access compared to the base case access. We are undertaking timetable modelling to understand where the existing route infrastructure constrains the implementation of the 7 day railway timetable and identifying the possible infrastructure enhancements required to remove these constraints.

It is planned to introduce a major change for December 2008 timetable on the West Coast Main line and this will provide an increase in services on weekdays and enable reliable weekend services to operate. We have assumed that this will meet the 7 day railway demands on the route throughout the control period and that the costs of undertaking work within the access regimes available under this timetable have been included in our base case plan.

At the request of the Industry 7 day railway working group we have looked at 2 routes in more detail, the ECML and the GEML, for this refresh of the Strategic Business Plan. We have also produced high level costs and revenue forecasts for the remaining 16 routes and undertaken a route by route business case evaluation for each of these routes. This shows a positive business case on 8 of the routes based on the current cost and revenue projections. We will continue to refine these figures and for each route we are developing "Route Remits" that describe the route characteristics and the specific requirements for the 7 day railway. We include the draft remits for the ECML (Appendix A) and GEML (Appendix B) in this document and are continuing to develop remits for the remaining routes in consultation with the operators and with input from our territory delivery teams.

In partnership with the ORR we have commissioned Steer Davies Gleave to develop the NAKPI and intend to use this as an output measure for the move towards a 7 day railway. The forecasting metrics for this KPI require further refinement and we present the current trends and forecasts in the section of this document on availability. We also provide a supporting document provided by Steer Davies Gleave (Network Availability KPI) that provides detail on the methodology and assumptions for the metrics we are using.

BENEFITS

We believe the long term industry revenue increase as a result of implementing the 7 day railway to be between £200 million and £400 million per annum, based on the forecasts provided by ATOC and the freight operators.

Passenger operators

The lower bound of this estimate is the most conservative estimate which includes only aspects for which the effect can be quantified. The effects that are known or believed to occur that cannot be quantified accurately (e.g. there are not good models to estimate the modal shift from one form of transport to another or the generation of entirely new demand) are estimated to establish the higher bound number.

ATOC commissioned ARUP to undertake a study of the potential revenue for passenger train operators.

The work is based on the assertion that Sundays have become more like Saturdays for a number of reasons:-

- changes in Sunday licensing and shopping hours; and

- increased sporting fixtures, increased road congestion and car parking costs on Sunday.

ARUP examined the Sunday rail travel market, which is dominated by visiting friends & relations and days out, and had also looked at the overall Sunday travel market. Road usage data suggests the Sunday travel market is comparable to Saturday, although car occupancy is higher on Sundays (1.9 compared to 1.5 on weekdays).

Two approaches were taken to estimate revenue effect, both based on comparing Saturday and Sunday markets. The Saturday benchmark method uses National Travel Survey data to estimate additional mileage by market segment. This gave an estimate of £132 million p.a. with a range of £100 million-£150 million. The segmentation matrix method is a refinement of this, which allows assumptions to vary between rail service groups (London & South East etc). This method gave an estimate of £106million p.a. with a range of £80 million to £110 million. Even though the Operators claim this to be a conservative estimate, Arup believe it to be the most reliable. The Virgin West Coast figure agrees with the SSSG revenue estimate. These approaches were back checked by direct comparison of estimated Saturday and Sunday revenue from LENNON which suggested a revenue potential of £118 million p.a. at current prices.

The ARUP report disaggregated this revenue by train operator and we have used this to apportion the revenue across the 18 routes that we are analysing for tranche 1.

Figure 2 Additional Passenger Revenue – total CP4 for tranche 1 routes (£ million)

Possible Tranche 1 routes	Estimated additional passenger revenue
East Coast Main Line	42.3
London to South Wales	14.2
(London) Swindon to Bristol	8.2
Midland Main Line	15.3
Great Eastern Main Line	16.7
Didcot to Birmingham	3.1
Bristol to Birmingham	3.0
Birmingham to York/Doncaster	1.6
(Waterloo) Woking to Portsmouth	1.9
Waterloo to Weymouth	6.6
London to Brighton	6.1
London to Stansted	2.9
Chiltern Lines	2.3
Victoria to Swanley to Dover	2.4
Charing Cross to Orpington to Folkestone	3.6
Glasgow to Edinburgh	1.6
Transpennine	1.9
South Humberside Heavy Freight route	0.1
Total	133.8

There are additional effects not included in the results above including:

- trip generation, i.e. new trips made as a result of improved rail services;
- trips generated on other days estimated at around £20million; additional revenue from improvement in overall perception of rail services; and
- additional benefits from reduced road congestion of around £63 million p.a.

Freight operators

Application of 7 day railway for freight customers varies from that of passenger operators particularly in geographical scope. However, the principles remain unchanged. It is Network Rail's intention to accommodate the forecast freight growth and minimise the disruption to the freight customers.

Additionally, the 7 day railway business case is supported by the extra revenue forecast for freight customers. The report prepared for EWS and Freightliner by MDS Transmodal Limited estimates the 7 day railway would allow the freight industry to accommodate the projected growth and would raise long run rail freight industry earnings by approximately £200 million p.a.. This would still hold even if all cost savings are passed on to customers (in the short run 7 day railway is set to bring additional £105 million in freight revenue). Following advice from the freight operators we have assumed that the net revenue benefit is 15% of the total freight revenue. We have undertaken a sensitivity analysis on the 15% figure which shows that varying this figure will not affect the overall business case.

All operators

Network Rail believes that there is a 'network effect' that should be taken into account in implementing the 7 day railway. The rail network in the UK has a significant number of inter-dependencies where one route is used for many purposes and changes to that route can positively affect many operators. It is possible to make changes to attract revenue for a passenger operator and make very small further changes to simplify freight operations and the ease of engineering works. Each of the pieces of work should be maximised in this way as opposed to applying a narrow single operator revenue focused approach. This requires that Network Rail is given flexibility to achieve this network effect according to strict pre-determined criteria.

A suggested set of criteria are:

- each implementation including network effect benefits is covered by an increase in revenue from at least one operator;
- adjacent routes with improved business cases as a result of the majority of the cost being met by another are considered; and
- each scheme has a defined start and end point with clear objectives, funding, revenue projections and timescales

COSTS

We have estimated the costs of moving towards a 7 day railway in CP4. Circumstances will change and our plans will continue to evolve and we are further developing and refining our cost projections.

ATOC have confirmed that there will be no overall increase in costs to the passenger train operators as a result of the introduction of the 7 day railway concepts. The freight operators have advised that they will incur incremental costs of 85% to 90% of the additional freight revenue forecast.

We have estimated the costs changes for each of the tranche 1 routes for undertaking maintenance and renewals work under the 7 day railway possession access arrangements. These costs take account changes in the number and length of possessions as well as changes to processes and methodology required to deliver the CP4 volumes under 7 day railway conditions. These are over and above the efficiencies in our base case.

We have also provided an estimate of the costs of the infrastructure enhancements required on the routes to enable a 7 day railway timetable to operate.

Appendix C details a full schedule of our forecast costs by asset group for renewals (broken down by asset group), maintenance and the route infrastructure enhancements required to introduce a 7 day railway timetable.

Figure 3 Total 7 day railway costs for all 18 routes analysed for tranche 1 (£ million)

7 Day Railway Route Section	2009/10	2010/11	2011/12	2012/13	2013/14	Total
East Coast Main Line	0.1	0.1	48.7	23.7	34.0	106.6
London to South Wales	0.5	1.6	28.3	12.4	25.1	67.9
(London) Swindon to Bristol	0.2	0.7	7.5	3.8	6.9	19.0
Midland Main Line	0.2	0.9	6.0	29.5	11.8	48.3
Great Eastern Main Line	0.7	0.7	15.1	35.6	25.0	77.1
Didcot to Birmingham	2.6	7.9	6.4	14.0	5.4	36.3
Bristol to Birmingham	0.1	0.4	2.9	16.2	12.4	32.0
Birmingham to York/Doncaster	0.1	0.2	0.9	6.0	3.5	10.8
(Waterloo) Woking to Portsmouth	0.2	0.9	1.9	10.8	4.8	18.7
Waterloo to Weymouth	0.6	0.9	3.9	15.2	7.8	28.3
London to Brighton	0.2	0.2	1.5	4.2	17.4	23.5
London to Stansted	0.0	0.0	1.4	1.8	7.5	10.7
Chiltern Lines	0.0	0.0	2.3	3.0	19.1	24.5
Victoria to Swanley to Dover	0.1	0.1	2.0	3.4	21.1	26.7
Charing Cross to Orpington to Folkestone	0.2	0.1	5.0	6.7	22.2	34.2
Glasgow to Edinburgh	0.0	0.0	1.1	1.5	11.1	13.7
Transpennine	0.2	0.5	3.5	4.3	28.4	36.9
South Humberside Heavy Freight route	0.0	0.0	1.4	1.6	11.7	14.8
TOTAL	5.9	15.2	139.7	193.8	275.6	630.2

Based on the analysis to date we propose a discretionary fund of £300 million would enable us to move towards the 7 day railway. For this £300 million we propose to implement the 7 day railway on the East Coast Main Line for a cost of £106.6m and the Great Eastern Main Line of £77.1 million. The application of remainder of the £300 million across the proposed routes will be determined in partnership with our customers, funders and other stakeholders. Our current analysis as presented in this document shows that 8 routes have a positive business case and we believe that further refinements to our costs will result in the number of routes where we will implement a 7 day railway increasing. However we would only expect to go ahead with these works where the business case remains robust.

In addition to the cost of enhancing the chosen routes for a 7 day railway we also want to secure £ 50 million for work on the faster isolations.

AVAILABILITY

Network availability KPI

As explained in the SBP we have developed with ORR and the rest of the industry a measure of network availability. The aim is to measure the level of disruption to passengers and freight users caused by possessions that require alterations to rail services. We have developed a measure which takes into account the following:

- the location of the possessions;
- the length of the possessions;
- the time of day the possessions were taken;
- the number of people/operators likely to be affected; and
- the value of lost time as a result of disruption.

We have developed separate measures for the impact of disruptive possessions on passenger and freight operators. These measures were developed in consultation with ORR and operators, and sought to

maximise utilisation of existing data and systems. We have also developed a single overall measure of availability for inclusion in our balanced scorecard. Details of the definition of these measures (together with supporting diagnostic indicators) are included in the supporting document “Network Availability KPI” prepared by Steer Davies Gleave.

Before developing projections for CP4, we commissioned Steer Davies Gleave to calculate the level of availability (for both passenger and freight) for the last three years. This analysis suggests that the impact of possessions on passenger train operators has resulted in a deterioration of availability in recent years due to the scale of investment in the railway. However, the recently available historic data on the proposed new measure suggests that these measures require further review before they can be used with confidence. It should also be noted that, although these measures of availability appear to have decreased, we have still operated additional services on the railway through this period. Further discussion is therefore required with ORR and operators.

We have developed a projection for each network availability measure based on the activity volumes in the core plan, again supported by Steer Davies Gleave. This is subject to the same qualifications as the historic data. However, the analysis suggests that the availability measure will deteriorate during the first half of CP4, before improving for the remainder of CP4. This largely reflects on activity levels, particularly the large increases in enhancement spend over the first few years of CP4. The improvements in availability result from initiatives to deliver efficiency and other improvements, such as the introduction of modular switches and crossings. The passenger availability measure is consistent with our forecast of Schedule 4 costs for CP4.

We have also developed initial projections that reflect the improved availability expected to result from delivering the investment to support the move towards a seven day railway. This results in a small further improvement in the availability measure by the end of CP4. We would expect this to have a greater impact in the longer term. We also note that the additional services which we would expect to be operated as a result of these initiatives would not be reflected in the availability measure.

Development of NAKPIs

As different user groups have conflicting access requirements, it was agreed that a suite of KPIs was appropriate to monitor and encourage the minimisation of disruption to customers while preventing perverse behaviours. A further practical requirement of the KPIs was to maximise utilisation of existing data and systems and avoiding the creation of unnecessary data analysis around KPI productions. Steer Davies Gleave were commissioned to work with Network Rail and the ORR in the development of this suite and an industry workshop was held to gather the views of key stakeholders.

Three high level KPIs were produced to measure the impact of disruptive possessions – one for passenger operators, one for freight operators and a third to measure the impact on all operators.

- Passenger – Excess Passenger Journey Time weighted by Value of Time
 - This assesses the economic value of disruption for passengers caused by extended journey times and cancelled services. This measure is based very closely on the calculation of Schedule 4 payments.
- Freight – Track Kilometre Availability weighted by Freight Traffic Level
 - This assesses the proportion of the network available at any time to freight operators, weighted by typical freight movements.
- Unified – Revenue at Risk
 - This assesses the amount of operator (passenger and freight) revenue that is jeopardised as a result of disruptive engineering works.

For a more comprehensive definition of these metrics as well as the supporting diagnostic indicators see the supporting document “Network Availability KPI” prepared by Steer Davies Gleave.

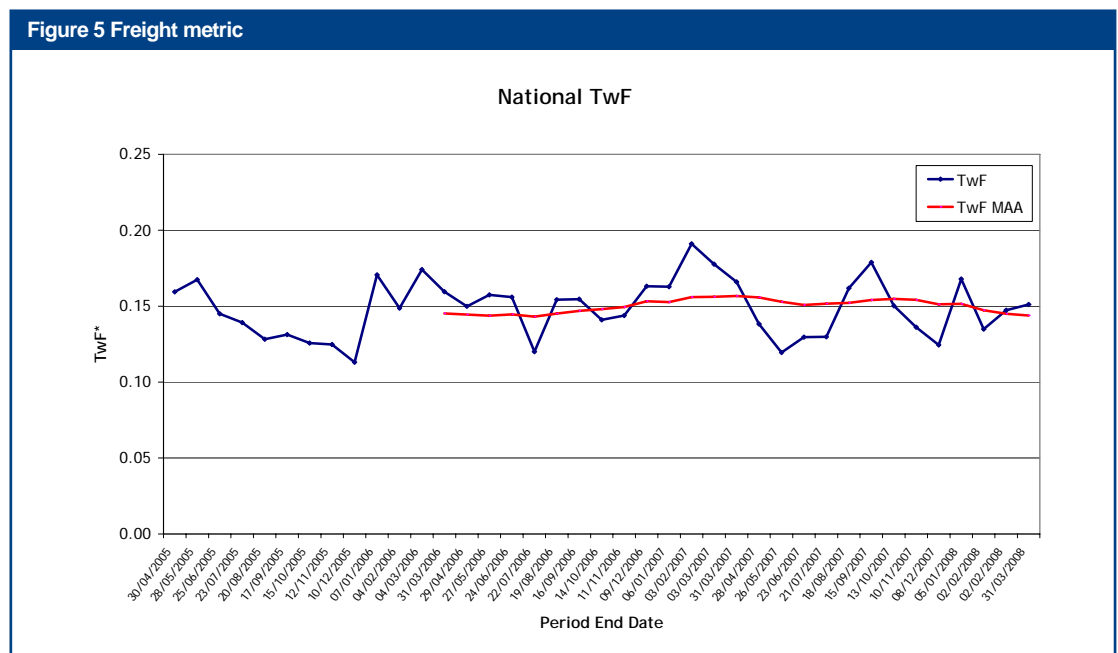
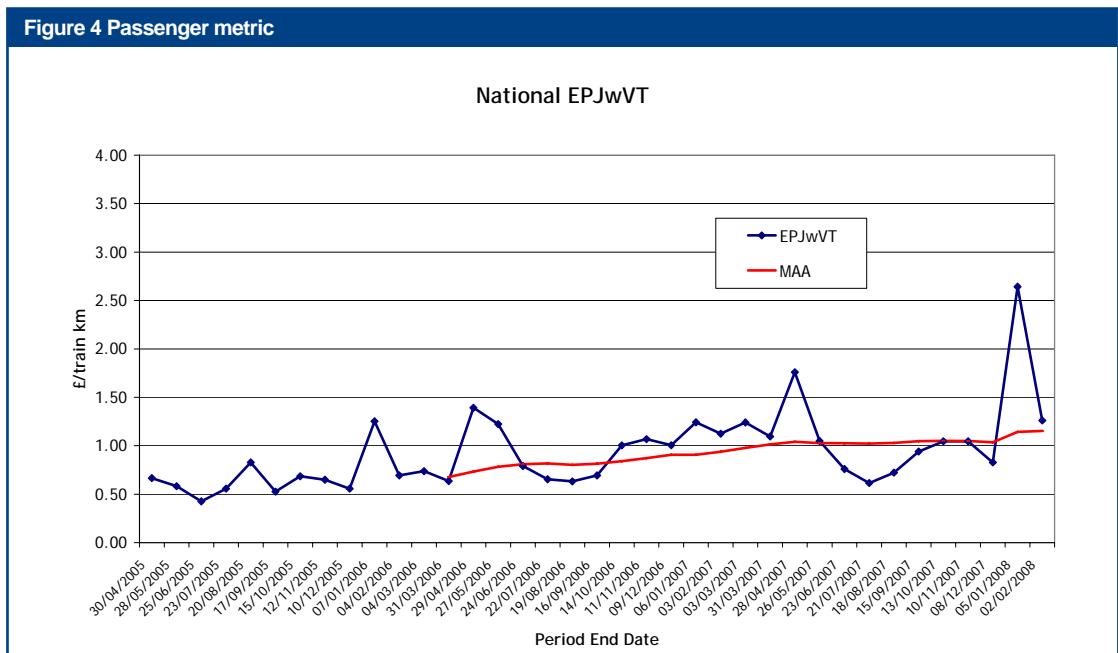
In order to track Network Rail’s progress towards a 7 day railway, the ORR agreed that Network Rail would be monitored on the first two metrics, passenger and freight, for CP4.

To measure this performance over CP4 it was necessary to create 3 forecasts for each availability measure.

- 1 Business as usual trajectory – which assumes that Network Rail continues taking possessions under the current strategy with the current delivery processes and methods
- 2 Baseline trajectory. – that takes account of the changes in methods and efficiencies in our base plan
- 3 7 day railway forecast – which assumes that Network Rail changes possessions strategy in line with 7 day railway principles

Historic Data

We have calculated the KPIs retrospectively for the past 3 years. The results, at a network level, are shown below (results have also been disaggregated by England/Wales and Scotland).



This analysis suggests that the impact of possessions on passenger train operators has resulted in a deterioration of availability in recent years due to the scale of investment in the railway. However, the recently available historic data on the proposed new measure suggests that these measures require

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further review before they can be used with confidence. It should also be noted that, although these measures of availability appear to have decreased, we have still operated additional services on the railway through this period.

Building the baseline forecast

We have developed baseline and 7 day railway forecasts for each of the Availability KPIs. We have tried to keep the approach simple and make the best use of what existing systems and data we currently have at our disposal. The baseline forecasts have been built up using projections of maintenance, renewals and enhancement expenditure in CP4 generated by the Infrastructure Cost Model. The impact of this is the forecasts are largely dependent on these spend profiles and, in particular, the large increases in enhancement expenditure over the first few years of CP4. This can especially be seen in the freight metric. A key risk here would be any under spend in any of these areas would most likely have a significant impact on the KPIs. The forecasts are based on the following assumptions:

- the volume of disruptive possessions is proportional to the cost of the work undertaken, whether it be maintenance, renewals or enhancements;
- current processes for taking possessions will not change and their impact will remain unchanged;
- freight and passenger travel patterns represented in ACTRAFF and Moira are consistent with today's travel patterns and indeed travel patterns in CP4.

The forecast for the passenger metric is consistent with Network Rail's forecast for Schedule 4 for CP4.

We envisage that in future that we will continue to be under significant cost pressure and that there will be a very significant requirement to enhance the network. As a result the adverse trend in availability is likely to continue and possibly deteriorate. This situation is likely to be unacceptable to our stakeholders, customers and end users. Action of the kind described in the '7 day railway' is necessary.

Building the 7 day railway forecast

The 7 day railway forecasts have been created using a similar approach by overlaying the baseline forecasts with assumptions which describe the impact of the 7 day railway on possessions. For renewals and enhancement activities we have created a number of scenarios by asset type, describing how the number of different duration possessions would be most likely to change when applying 7 day railway principles. The impact of maintenance on network availability is driven by the move to a half capacity railway overnight which will give a more consistent overnight possession strategy and reduce weekend possessions.

It is assumed that the split between disruptive and non-disruptive possessions will remain unchanged for possessions of differing duration. For the passenger metric it is also assumed that the relationship between possession duration and extended journey time/cancellation minutes remains unchanged.

The incremental impact on the passenger and freight KPIs has been forecasted assuming that the 7 day railway is implemented on the 8 routes that show a positive business case. These routes are

East Coast Mainline
Great Eastern Mainline
London to Swindon to Bristol
Midland Mainline
Bristol to Birmingham
Waterloo to Weymouth
London to Stansted
South Humberside Freight

The graphs following graphs show the forecast availability for the passenger, freight and combined metrics.

- Black line – the forecast moving annual average assuming no change to the current efficiencies (i.e. business as usual)
- Blue Line – historic moving annual average (MAA) and forecast moving annual average assuming including the efficiencies included in our base plan
- Red line – the overlay for the 8 routes that show a positive business case for the 7 day railway

Figure 6 Passenger metric with 7 day railway overlays

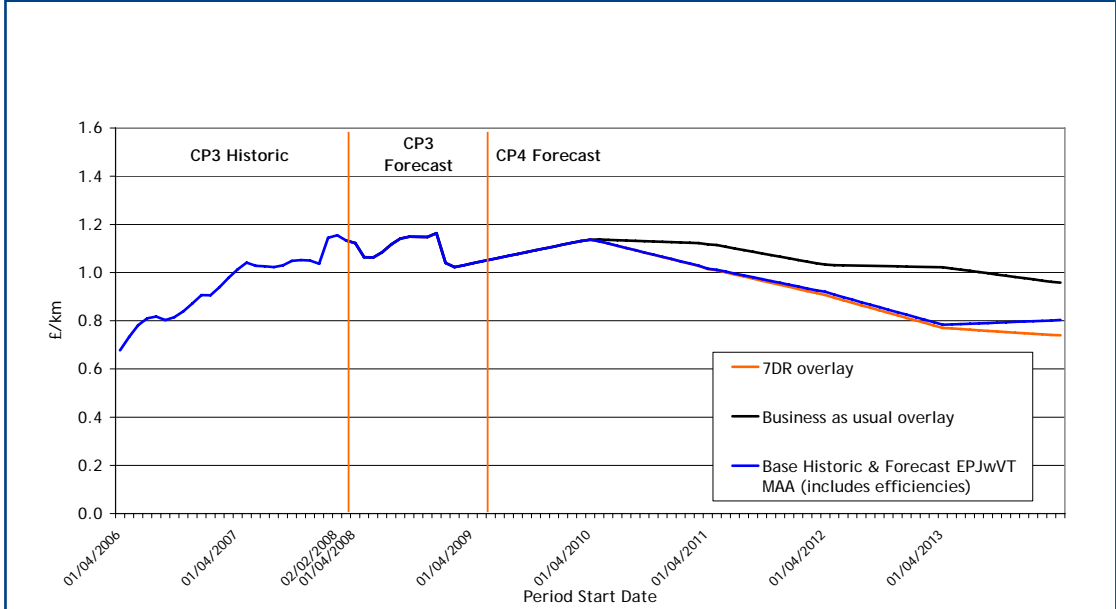
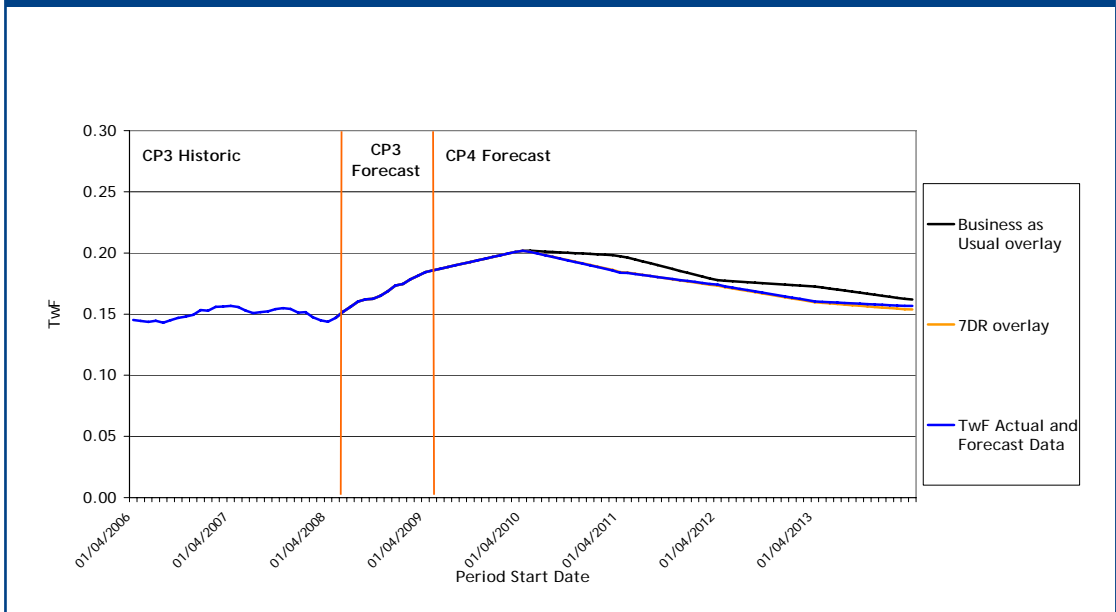
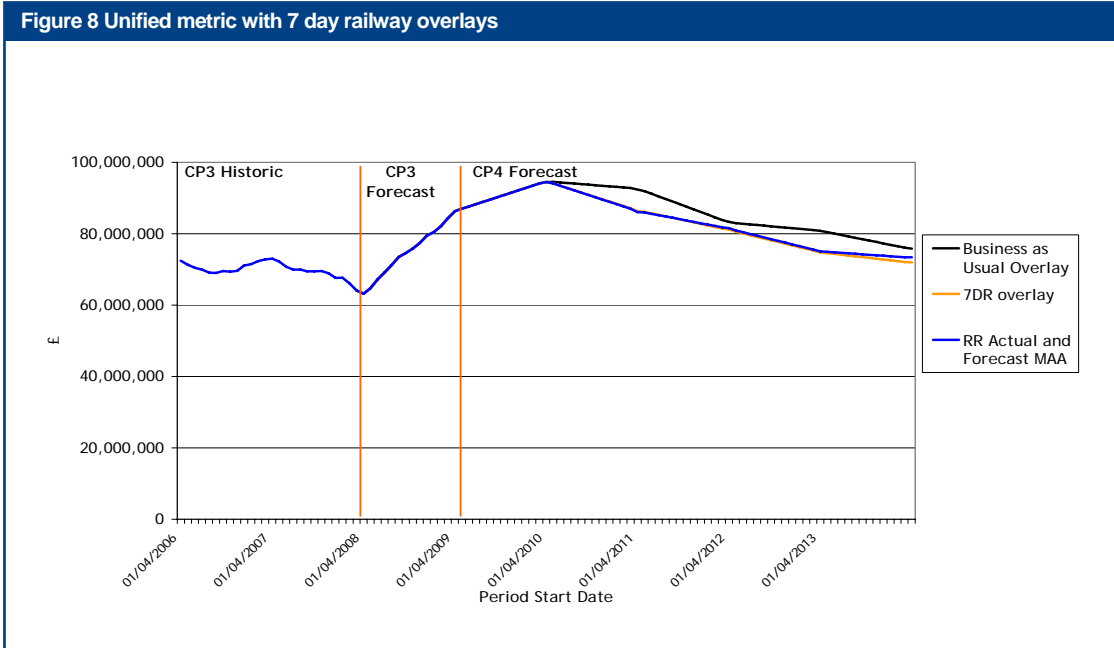


Figure 7 Freight metric with 7 day railway overlays





These forecasts require further review before they can be used with confidence.

The graphs show that the availability measure will deteriorate during the first half of CP4, before improving for the remainder of CP4. This largely reflects on activity levels, particularly the large increases in enhancement spend over the first few years of CP4. The improvements in availability result from initiatives to deliver efficiency and other improvements, such as the introduction of modular switches and crossings. They also show the impact of the very disruptive work that took place over the Christmas/new year period and the effect at the end of 2008 when this is no longer in the MAA.

The following 3 graphs separate out the impact of the enhancement programme. The green line shows the forecast with enhancements excluded and clearly demonstrates the significant improvements in availability that are being forecast as a result of our initiatives to deliver efficiencies and other improvements in the delivery of our core maintenance and renewal works.

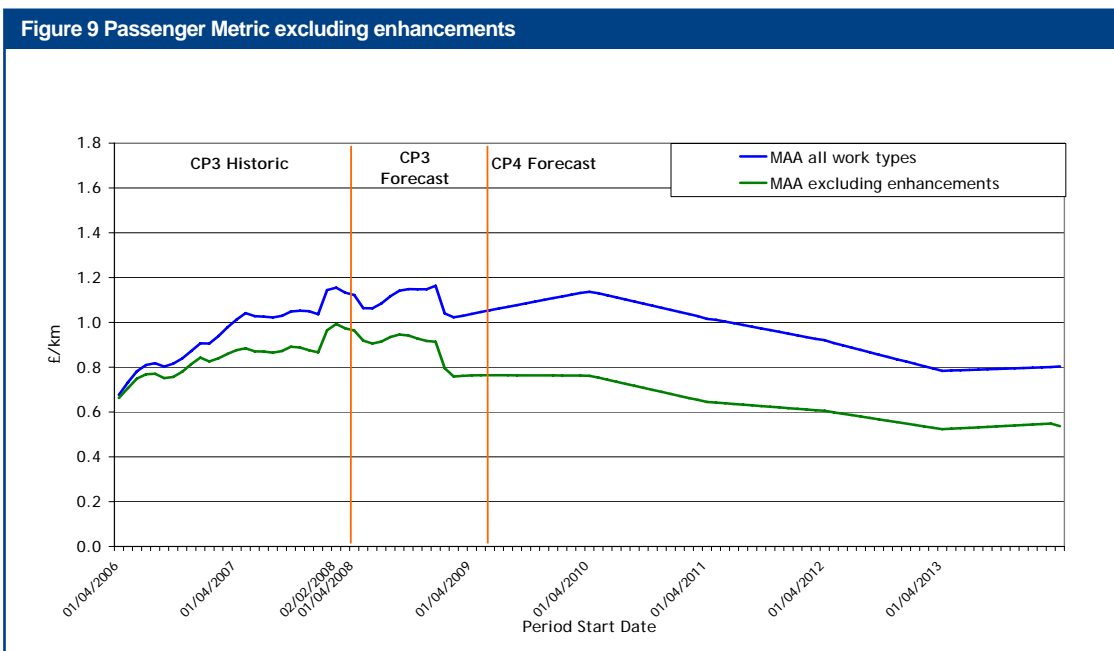


Figure 10 Freight Metric excluding enhancements

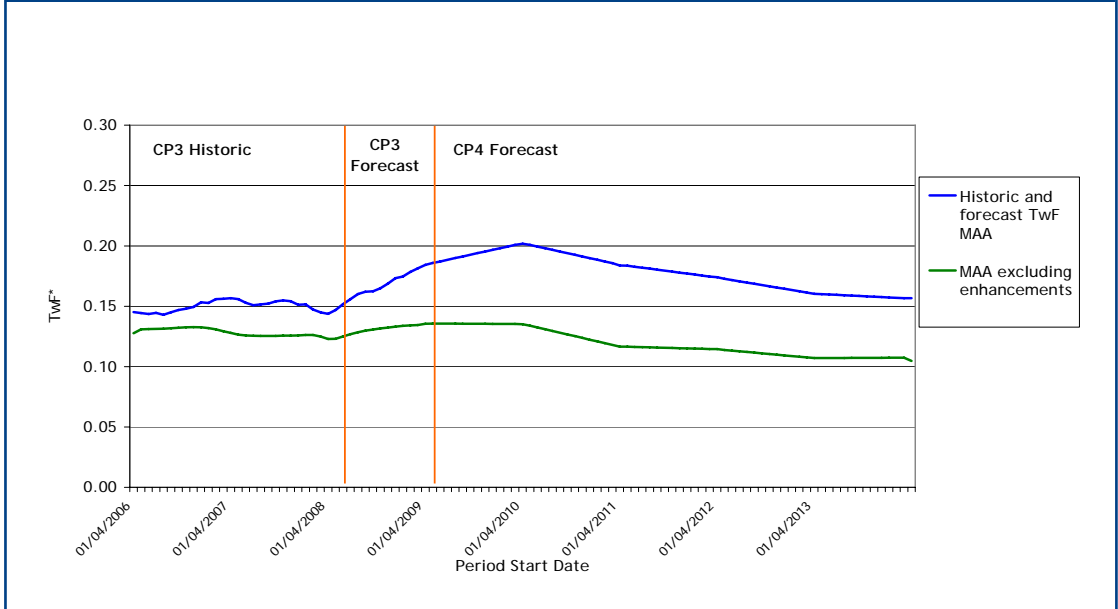
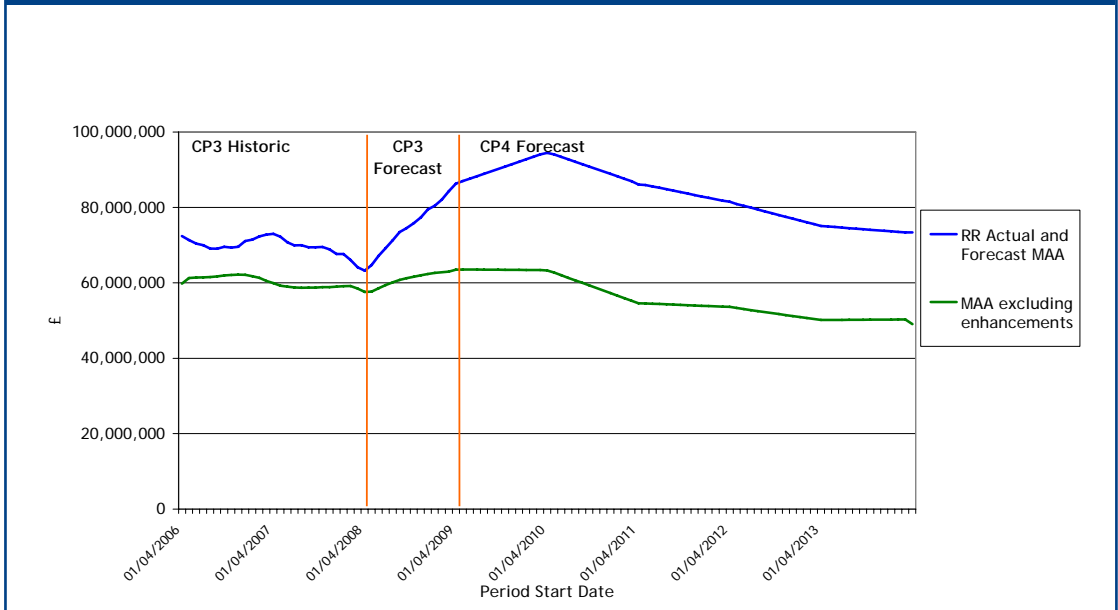


Figure 11 Unified Metric excluding enhancements



DELIVERABILITY

The long term strategy is to roll out the 7 day railway concept in all areas where there is a sufficient demand from passengers (and TOCS and FOCS) such that the revenue from additional services that can be operated will cover any extra cost. There will be some routes which will not justify the whole 7 day railway rollout due to insufficient demand, however, as a minimum, we should operate the current timetable reliably on these routes in order to keep passenger disruption to a minimum.

Disaggregation of the network

Roll out of the 7 day railway has already begun in CP3 on the West Coast Main Line (WCML) with the reduced access strategy and enhanced timetable (particularly at the weekend) in place from December 2008. Implementation of the 7 day railway in CP4 will ultimately take a phased route by route approach. A

Figure 12 Potential 7 day railway routes



'critical to quality' matrix was used to drive out the criteria for determining which routes are suitable for implementation. Remits are being developed for each of these routes to capture the specific 7 day railway requirements of each route and are being reviewed and adjusted through consultation with our customers to incorporate specific customer needs. From that list of potential routes the industry agreed that we should initially focussed on the East Coast Mainline (ECML) and the Great Eastern Mainline (GEML). These two route remits have been developed in more detail to identify the necessary route enhancements and exact nature of any preparatory work needed for a 7 day railway. Network Rail propose to progress with the implementation of the 7 day railway on these two routes initially. Our high level analysis of the remaining tranche one routes has identified a further 6 routes that have a positive business case. These are (London) Swindon to Bristol, Midland Mainline, Bristol to Birmingham, Waterloo to Weymouth, London to Stansted and South Humberside Freight. However this is subject to further analysis to confirm those routes that have a positive business case which we will then consider for

implementation during CP4. The analysis has not taken into account the non-financial socio-economic benefits that the implementation of a 7 day railway would bring.

In accordance with the 7 day railway analysis of the primary intercity routes, the current regimes on secondary routes will also be reviewed and amended to closely meet the current demand. Efficiencies can be made on rural and branch lines by undertaking heavy work in times of low demand and deploying resources to routes where access is critical.

Previous demand analysis (Efficient Engineering Access) produced a strong business case in favour of restricting the majority of possessions to 8 hours and making sure services operate up to 7 days a week on this type of route.

The desired balance between the timetable and engineering access on a given route will be determined by the demand for services.

Infrastructure Investment

To assess the impact of 7 day railway on each of the 18 routes we have taken a detailed bottom up approach by asset type. For each of the main assets we are developing baseline possession plans and the cost of delivering the work in accordance with current standard processes. We are working with the asset teams to develop how the possession plans could be altered if the 7 day railway were to be implemented, whilst ensuring planned volumes are still delivered. We are at the same time assessing what impact these changes will have on the costs. Infrastructure Investment have produced a detailed cost and possession assessment report detailing their requirements for the base case and the 7 day railway. Please see the supporting report from Infrastructure Investment on "Cost and Possession Assessment"

The £35 million development costs shown in the report on "Coast and Possession Assessment" for 8/200 development have been excluded from the 7 day railway analysis as we intend to undertake this

Move towards a 7 day railway

development work in partnership with our contracting agents and assume that the costs will be recovered through the contractors leasing and hire charges.

Maintenance

Using a bottom up approach we have modelled what work needs to take place to ensure that worker safety is maintained, what needs to happen to raise possession productivity and what additional resource is required to deliver all our maintenance work under a 7 day railway possession regime. This analysis is being carried out on a generic basis for different types of network (e.g. non-electrified or electrified, number of tracks, track configuration). The impact on the maintenance costs for the each of the tranche 1 routes is calculated by extrapolating this analysis. The modelling has been verified by comparison with the specific scope and costs from the WCML EEA / Dec '08 timetable work and from the world class work being implemented on the Edinburgh and Glasgow route.

As the 7 day railway approach is based on no increase in daytime traffic levels above that assumed in the base case traffic and no significant increase in traffic volume (and hence in track category) the initiatives to meet the above objectives from a maintenance perspective have been classified in three groups: accessibility / improving staff protection, improving maintenance efficiency and deploying additional resources for specific jobs.

Accessibility / Improving Staff Protection

The items in this category cover the providing refuges to remove Red Zone Prohibitions, providing 'temporary' fencing to separate people from trains running on lines adjacent to the work, and warning systems which will facilitate Red Zone working and may be used to provide warnings in connection with adjacent line working.

Additionally provision has been made for use of protected vehicles such as the Robel 69.50 Mobile Maintenance Unit (MMU), seen here in use on the ÖBB. The plant NST are investigating the best way of achieving similar protection without the requirements for locomotives.

Figure 13 Robel mobile maintenance unit



Maintainability / improving maintenance efficiency

The items in this category are investments and improvements to enable the best advantage to be taken of the more limited track access available. They include enhancing physical access to the infrastructure, provision of fixed lighting at key junctions and major access points, means to accelerate protection from trains and isolations from the electrification system, both OLE and third rail.

Maintenance activity will also be better targeted by expanding the use of reliability centred maintenance informed through extending the deployment of remote condition monitoring being installed as part of the 'intelligent infrastructure' programme which is only intended to cover 50% of the affected assets. Additional condition monitoring will be installed on points, power supplies, axle counters and points heaters.

A key opportunity to enable the installation of large S&C maintenance parts in short possessions and to ensure that it is safely handled is the deployment of a number of the Fasetta type 8101 switch handling machines.

Figure 14 Fasetta switch handling machines



Additional Resources

After the improved working arrangements have been implemented there will still be activities which may not be undertaken in the constrained access; this will then require deploying additional resources to ensure the given volumes of activity are completed.

One of the key activities most effected by constraining access across the network is the ability to tamp complex S&C layouts. There is a corporate strategy to move the mix of tampers available for maintenance and renewal work by introducing new 'top end universal' tampers and ceasing to use plain line machines over 20 years old. This strategy does not provide any additional capacity needed with the more constrained access as the 7 day railway is introduced. An additional 20 machines are expected to be needed although a further 10 of the oldest machines in the national fleet will then not be needed. Further new tampers will not be available until towards the end of the control period and this is a significant risk to the introduction of the 7 day railway. The use of 'tandem tamping' will be extended with the S&C tampers working together. This not only enables layouts to be tamped in the constrained access but also delivers a higher quality and more durable result in the track.

Additional staff will be required where key activities are constrained by the change in access. This has been provided for incrementally in each of the scenarios used for the modelling. A key enabler to changing working patterns in the move towards the 7 day railway is the introduction of standardised terms and conditions with additional flexibility on the rostering of staff during midweek nights and at weekends, but this has a cost.

Maintenance Implementation plans

Modelling has generated indicative scopes and costs for implementation. By its nature this is an inexact statement of what is required. Each route will have a different mix of enabling works required, the biggest influence on the impact of maintenance will be the change in access which will depend on the current limitations and what the service demand is in moving towards the 7 day railway. In particular the availability of diversionary routes to support midweek and Saturday night / Sunday morning access is fundamental. 7 day railway is only one of the World Class workstreams and introducing the 7 day railway will require further works in the 'highly reliable' and 'easily maintained' workstreams which have been included as supplementary items.

Full detail for each route will be developed as the changes to the timetable are developed. Where availability of critical resources remains limited, such as for S&C tampers, then additional access as Registered Items or Outside Rules of the Route will need to be retained until the additional resources are

available. At this stage costing has been based on the additional machines being available for use when required.

The phase one of 7 day railway implementation for freight is about minimising the disruption and establishing consistent patterns for key freight paths. Currently Network Rail's cyclic maintenance possessions disrupt freight services. That is because the different regime for types of maintenance (e.g. some activities are planned to operate once during a 4 week period and some once during a 5 week period etc) creates a very complex pattern with a large number of permutations. The combination of these different requirements results in a multiplicity of diversionary routes, which, because of their short term nature, are unmanageable and unpredictable. Each of these diversions requires the freight companies to provide suitable resources at short notice as well as impacting the quality of planning and increasing costs. It is also been identified as a key reputational issue for Network Rail which is being addressed through the 7 day railway programme.

The solution that Network Rail has proposed is based around bringing midweek maintenance work cycles to 1 in 6 (once every 6 weeks) or 1 in 3 strategies on key freight routes. This will allow creating of 6 rolling timetables with the objective of 1-2 diversionary routes for the key freight services, reduce short term planning and enable consistent long term planning. The geographical scope of the national roll out includes all routes (excl. Sussex and Kent), with the main assumption of close Network Rail cooperation with the freight operators.

The learning points of the phase one (which is scheduled to be delivered by December 2008) are then to be consulted with the freight community in order to develop next stages of the freight 7 day railway.

Faster isolations

The goal of the project is to reduce the time taken to take an electrical isolation on the electrified network from approximately 1 hour to 5 minutes. The scope of the project is to implement the faster isolation solution where expenditure can be justified. The project will develop a solution for both overhead line and conductor rail areas.

The project is still in early stages and a final solution has not yet been selected or developed. However, a potential solution would be to install remotely controlled switches. Other potential options may include a review of the efficiency of the existing Rule Book process (Electrified Lines Instructions) or using enhanced functionality from the new Central Master Station SCADA system if and when this can be made available.

The main benefit of faster isolation will be to significantly improve the productivity of any work requiring isolation in areas where access to the track is limited.

Based on the option to install earthing switches every single track kilometres, a total cost of £50 million is estimated.

FUNDING

Given the potential revenue and other benefits, based on our analysis there is a strong business case for providing incremental funding for the delivery of the 7 day railway. We have recommended a discretionary fund for £300 million be made available in the regulatory settlement for infrastructure enhancements and operational costs that are required to implement a 7 day railway. We have produced detailed plans for the GEML and ECML to account for £183.7 million of this £300 million and commit to implement the 7 day railway on these routes during CP4. However it is important that there remains an element of flexibility on the remaining funds so that the greatest industry benefit can be obtained from these funds. The precise plans will need to evolve in the light of further discussion with operators at a local level taking account of the ability to deliver renewals/enhancements and operate additional rolling stock/crew as well as changes in market conditions and the varying willingness to embrace change and adopt new processes.

This 7 day railway discretionary fund would require the establishment of criteria from which funds may be drawn down, similar to NRDF. It is important to consider the programme implementation from a network whole point of view where benefits that accrue as a direct consequence of an investment generate benefits to another party. For example investment in bi directional signalling will provide a better passenger service on a Sunday afternoon may also facilitate a better night time freight timetable.

The forecast improvements in the passenger NAKPI between the base case and the 7 day railway forecast would result in a reduction in our schedule 4 costs. We estimate this to be £18 million for the control period and this will be used to reduce the funding requirement from the £336 million in our current analysis towards the £300 million we are seeking.

In order to deliver our planned work volumes within the shorter duration possession opportunities available when operating a 7 day railway we wish to secure £50 million for developing and implementing the means to achieve a faster isolations.

Figure 15 30 years NPV (£million) and BCR ratio for 8 routes with a positive business case

7 Day Railway Route Section	30yr NPV	30yr BCR
East Coast Main Line	360.3	2.2
(London) Swindon to Bristol	64.3	1.7
Midland Main Line	151.0	2.2
Great Eastern Main Line	46.9	1.3
Bristol to Birmingham	23.6	1.1
Waterloo to Weymouth	45.1	1.5
London to Stansted	18.7	1.6
South Humberside Heavy Freight route	5.9	1.2
TOTAL	715.7	1.7

FURTHER APPLICATION

The implementation of the move towards 7 day railway and the realisation of the estimated benefits introduces a significant challenge to a wider railway industry. The project is heavily dependent on both Network Rail delivering promised efficiencies in maintenance, operations and renewals, and operators realising the projected revenue.

The 7 day railway revenue will be affected by external factors and market forces, as it is revenue that to a large extent has to be won from other modes of transport. It will be a test whether the industry can win back the customers who left disappointed by the previous quality of the weekend services. That is why the communication, image building and effective marketing will have a great impact on the overall business case of the 7 day railway.

It is also important to understand the industry reality during and beyond the CP4. With the forecast growth to both passenger and freight traffic and increased volume of enhancement activities the overall demand for the track access will be higher than ever before.

The above factors will require the whole industry to operate, maintain, renew and enhance the railway in a customer-friendly mode. To be able to achieve this, Network Rail and operators will have to co-operate closer than ever before.

The specific areas which are likely to become critical factors to the success of the 7 day railway are the ability to integrate and simplify the planning to reduce the waste of the resources (e.g. track access); change management process and the extent to which the industry can accelerate the effective implementation of changes to its processes; and the development of effective communication channels.

Appendix A ECML Route Remit 2

Route statistics

Figure 1 Route statistics		
Route Description	East Coast Main Line	
Route Detail	Kings Cross to Edinburgh/Leeds	
Route Operators	NXEC, FCC, EWS, Freightliner Group, First GB Railfreight, DRS, Northern Rail, Hull Trains, CrossCountry, First Keolis Transpennine Express, East	
Strategic Route sub sections	8.01	Kings Cross - Peterborough
	8.03	Hertford Loop
	8.04	Peterborough - Doncaster
	8.05	Doncaster - Holbeck W Jcn
	8.06	Doncaster - Colton Jcn
	8.07	Colton Jcn - Northallerton
	8.08	Northallerton - Newcastle
	8.09	Newcastle - Border
	8.1	Border - Edinburgh

Current Infrastructure and access arrangements

Figure 2 Current infrastructure and access arrangements

Route Configuration	<p>4 track: Kings Cross to Digswell Woolmer to Huntington Fletton to Stoke Colton to Northallerton York to Northallerton</p> <p>3 track: Huntingdon to Connington North</p> <p>2 track: Digswell to Woolmer Connington to Fletton Stoke to Doncaster Doncaster to Leeds Doncaster to Colton Northallerton to Newcastle Newcastle to Edinburgh</p>
Electrification	25KV OLE
Signalling	<p>Mainly IECC some mechanical signalling in Scotland No Axle counters</p>
BI-DI / SIMBIDS	<p>Bi-Di Innerwick to Grantshouse Simbids Berwick-Newcastle -Northallerton</p>
Diversiory Routes	<p>Newcastle-Edinburg via Carlisle and Carstairs Newcastle/Darlington blocked - All services via the Sunderland Coast Durham – Northallerton blocked diversion via Ferryhill and Eaglescliffe Colton/Doncaster blocked – Passenger trains via Leeds/Wakefield. Freight to go via Church Fenton/ Knottingley/Shaftholme to Doncaster Doncaster/Peterborough blocked – Divert via Gainsborough/Lincoln/Spalding - Note this has limited opening hours due to number of manned crossings and signal boxes. Peterborough – Hitchin diversion via March Ely and Cambridge Long distance freight possible to use any of the following diversion routes (depend on origins/destinations):- West Line - (Newcastle to Carlisle) Settle and Carlisle - (Leeds / Settle / Kirby Stephen to Carlisle) or (Leeds / Settle Jn / Carnforth) Littleborough - Leeds / Todmorden / Littleborough / Manchester Diggle - Leeds / Huddersfield / Diggle / Stalybridge / Manchester Chinley - Sheffield / Dore / Chinley / Manchester</p>
No diversionary route	Darlington/York blocked – No diversion Route
Current Access	<p>South of Peterborough: Disruptive weekend access 1 in 6 between Kings Cross and Hitchin Currently a lot of all weekend possessions in 2007/08 and 2008/09 where line will be shut at Hitchin Kings Cross to New Barnet needs to have 24 hour access due to having both Hornsey and Bounds Green depots.</p>

Current Access Regime summary of Rules of the Route

Figure 3 Current access regime

ECM1		Week Nights			Saturday Night			Sunday Night		
Section	Tracks	Availability	Duration (hours)	Action	Availability	Duration (hours)	Action	Availability	Duration (hours)	Action
Kings Cross to Digswell	4	all weeks	6	WEAVE	all weeks	9	Block 2 of 4	all weeks	5.5	Block 2 of 4
		or	4 wpa	All Line Block						
		or	8 wpa	Fast line Block						
Digswell to Woolmer Green	2	8 wpa	5.5	Single Line Working	all weeks	3.45	All Line Block	all weeks	-	None Available
Woolmer Green to Hitchen	4	9 wpa	7.5	Block Fast	all weeks	7	WEAVE	all weeks	7	WEAVE
		or	5 wpa	Block Slows						
Hitchen to Huntingdon	4	all weeks	6	All Line Block	all weeks	7	All Line Block	all weeks	7	WEAVE
Huntingdon to Holme	3	4 wpa	6	Slow Line Block	all weeks	7	All Line Block	all weeks	-	None Available
Holme to Peterborough	2	all weeks	-	None Available	all weeks	6	All line Block	all weeks	-	None Available
Peterborough to Stoke	4	all weeks	5.5	Block 2 of 4	all weeks	11	All Line Block	all weeks	5.5	All Line Block
Stoke to Doncaster	2	all weeks	5.5	Block 1 of 2	all weeks	11	All Line Block	all weeks	5.5	All Line Block
Doncaster to Colton Jct	2	9 wpa	8	Block 1 of 2	all weeks	10	All Line Block	all weeks	6	All line Block
Colton Jct to York	4	18 wpa	8	WEAVE	all weeks	9	WEAVE	all weeks	8	WEAVE
York to Northallerton	4	18 wpa	8	WEAVE	all weeks	9	All Line Block	all weeks	8	WEAVE
Northallerton to Newcastle	2	9 wpa	6.5	SLW (SIMBIDS)	all weeks	8.5	All Line Block	all weeks	6.5	SLW (SIMBIDS)
Newcastle to Berwick Upon Tweed	2	all weeks	7	SLW (SIMBIDS)	all weeks	11	All Line Block	all weeks	6.5	All Line Block
Berwick Upon Tweed to Edinburgh	2	all weeks	7	SLW	all weeks	12	All Line Block	all weeks	7	All Line Block
		and	1 in 3	All Line Block						
Doncaster to Leeds	2	all weeks	5	SLW	all weeks	9	All Line Block	all weeks	5.5	SLW
Leeds to York	2	9 wpa	5.5	All Line Block	all weeks	-	None Available	all weeks	-	None Available

SBP Baseline submission

CP4 Renewals and Enhancement proposals

The following include plans which may impact upon the implementation of the 7 day railway and are over and above the steady state like for like asset renewals

Figure 4 Renewals and Enhancement proposals

Date	Detail
2008/2009	Newcastle to Heaton additional isolation sections
2009/2010	Hitchin resignalling Shaftholme Jn S&C renewal, Hitchin/Cambridge S&C renewal, Benton Jn S&C renewal
2012	Hertford Loop capacity improvements
2012	Doncaster to Loversall Jn capacity improvements
2014	Shaftholme Jn remodelling
2014	Hitchin Grade separation
2013/2014	Doncaster to Edinburgh gauge improvements
2015	Kings Cross to Peterborough and Cambridge ThamesLink upgrade

Maintenance in SBP base case

Maintenance Strategy

Maintenance Improvement Initiatives

- Depot Improvement Programme (DIP)
- Peterborough Depot August 2009
- Maintenance Reorganisation

Infrastructure Investment Base Case

Possession hours

We have developed our base case plans based on the following strategy for incrementally reducing the “normal” weekend disruptive possession hours.

Figure 5 Base case possession hours

Year	P/L	S&C
2009/10	30 hours	54 hours and 37 hours
2010/11	30 hours	37 hours and 8 hours
2011/12	24 hours	37 hours and 8 hours
2012/13	16 hours	37 hours and 8 hours
2013/14	16 hours	37 hours and 8 hours

High Output Strategy

- High Output system 3 currently used on ECML and will remain there for CP4
- System 4 being procured for use on West Coast main Line and will utilised on East Coast North when no access on West Coast Main Line. TRS system 4 planned to operate between York and Northallerton from January 2011.

Proposed Access Requirements

There is a need to integrate with West Coast Main Line access regime in particular over weekend closures so as to maintain a through route from London to Scotland.

Incremental requirements above base case for 7 day railway

Operators Aspirations

NXEC

Run base SO & SuO timetable on most weekends. An amended SO/SuO timetable would be acceptable on Bank Holiday weekends. In 1993 route had major possessions 5/6 weekends a year, now around 30 a year. Earlier arrivals into London on Sunday mornings. By 2011 need 4 TPH south of Doncaster due to forecast demand

First Capital Connect

GN: Greater attention needed to managements of long range Major Possessions Strategy. Some experiments to reintroduce SLW have taken place. Must maintain a service (by any operator) from London to Cambridge

Northern Trains

Run consistent services on a Sunday.

Freightliner (FL)

Aspirations for at least 24/7 running on Doncaster to Wraaby via Scunthorpe, Wraaby to Gainsborough via Brigg and Wraaby to Gainborough via Lincoln. However they do recognise that there will be occasions when east of Wraaby Jn will have to be blocked. This will better help them serve Immingham when possessions are taken. Freight proposed to re-implement "Merry go round" services which would increase both traffic capacity and green zone access as all trains would be right road running. First Transpennine: Manchester and Leeds services are critical. 24/7 access to Manchester airport, which currently has overnight buses 1 week in 6.

CrossCountry

To run as per the weekday timetable with a later start up on Sunday.

Hull Trains

Run base timetable at weekends. Subject to ORR approval 5 return Sunday paths from May 2008.

Operations

7DR Timetable development

On the ECML, the section between King's Cross and Stoke Jn is largely four-track, with the exception of the flyover at Welwyn and the section between Huntingdon and Peterborough. Little bi-directional signalling is provided with the exception of the approaches to King's Cross. On the four-track sections, this is not a significant issue, but neither of the two-track sections have any bi-directional signalling.

There are several junctions which do not permit all the moves that would be necessary to allow sections between to be taken under possession while retaining full access to adjacent lines. The most notable are Digswell and Woolmer Green, a consequence of which is that closure of either of the two tracks over the Welwyn Viaduct would involve an extended stretch of wrong-line running – for example, closure of the Up Main would require Up trains to run wrong-line between Welwyn Garden City and Hitchin (approximately 15 minutes running time), although Down trains could avoid conflict by running on the Down Slow with the exception of the Welwyn Viaduct stretch.

The Capacity Utilisation Index (CUI) is generally low except between King's Cross and Alexandra Palace, where there are a large number of moves between 22:00 and midnight. Nonetheless, the four-track nature of this section combined with good junction layouts and the paired-by-direction arrangement mean that only small pathing allowances would be required to timetable this section for two track operation.

North of Stoke Jn, the alignment is predominantly two-track as far as Colton Jn south of York. Frequent crossovers are provided, but there is no bi-directional signalling so half-capacity working would need to be by means of SLW.

North of Doncaster, crossovers are often not provided in both orientations, hence there area number of sections with reduced access – for example closure of the Down line between Joan Croft Jn and Temple Hirst Jn would require Down trains to run wrong line between Joan Croft and Hambleton Jns (approximately 17 minutes running time at 50 mph).

Normal CUI is low between the periods of 22:00 and 06:00, but the lack of bi-directional signalling means that “worst case” CUI is around 50% over most sections. North of Doncaster, worst case CUI is up to 80% and the lack of crossovers would mean that this could be over 100% once the need to run over more than one section is taken into account.

Between Colton Jn and Northallerton, the alignment is four-track and CUI is generally low overnight. North of Northallerton the alignment is predominantly two-track. Frequent crossovers are provided together with SIMBIDS signalling. CUI is fairly low but there are regular freight paths throughout the night.

Not all junctions have crossovers in both orientations; hence there are a number of sections with reduced access. The most notable is between Turnsdale Jn and Durham, a section of approximately 7 ¼ miles, with no facing crossover provided at Turnsdale Jn. Worst case CUI over this section is over 100%. North of Newcastle, CUI is very low overnight and no particular issues were identified here.

Station and signal box opening hours

Edinburgh Station staffed 24 hours

Possessions

TOP introduction

Not in current plan so not before 2010

Faster Isolations

Programme being formulated

Axle counter reset

Not applicable

Possession hours

We have developed our 7 day railway plans based on the following strategy for incrementally reducing the “normal” weekend disruptive possession hours

Figure 6 7 day railway possession hours		
Year	P/L	S&C
2009/10	30 hours	54 hours and 37 hours
2010/11	30 hours	37 hours and 8 hours
2011/12	24 hours	37 hours and 8 hours
2012/13	16 hours	37 hours and 8 hours
2013/14	8 hours	37 hours and 8 hours

Enhancement and Operational Requirements for 7 day Railway

Sections where SLW will be required to operate

- Huntingdon – Fletton
- Stoke – Loversall
- Doncaster –Leeds
- Northallerton - Newcastle - Edinburgh

The following enhancement projects are required to enable the introduction of a 7 day railway timetable and access regime:-

Figure 7 SLW enabling projects

Scheme	Estimate £m
Rationalisation of OLE to make isolation coincident with SLW between Edinburgh and Berwick	1.3
2 additional crossovers between Durham and Tursdale to increase SIMBIDs capacity	5.3
Provide 2 additional facing crossovers at Thirsk and Tollerton	5.3
OLE rationalisation York to Colton Junction	3.4
Independent OLE feed to Neville Hill depots	3.4
Wire Hare Park crossover	0.9
Provide signal box control for Ground Frame crossovers between Doncaster and Stoke (8 pairs of crossovers involved)	3.9
Bi directional signalling from Fletton to Connington (69m 12ch to 75m 02ch)	11.9
Main to main crossover at Hitchin	2.9
OLE feeds to Hornsey and Bounds Green	6.8
Additional signal at Bowes Park Up line	0.2
Total direct costs	45.2

Maintenance

Additional one off costs of £28 million and recurring costs totalling £21 million

Infrastructure Investment

Additional costs of £12.5 million

Availability forecast

The following graphs show the forecast availability for the East Coast Main Line

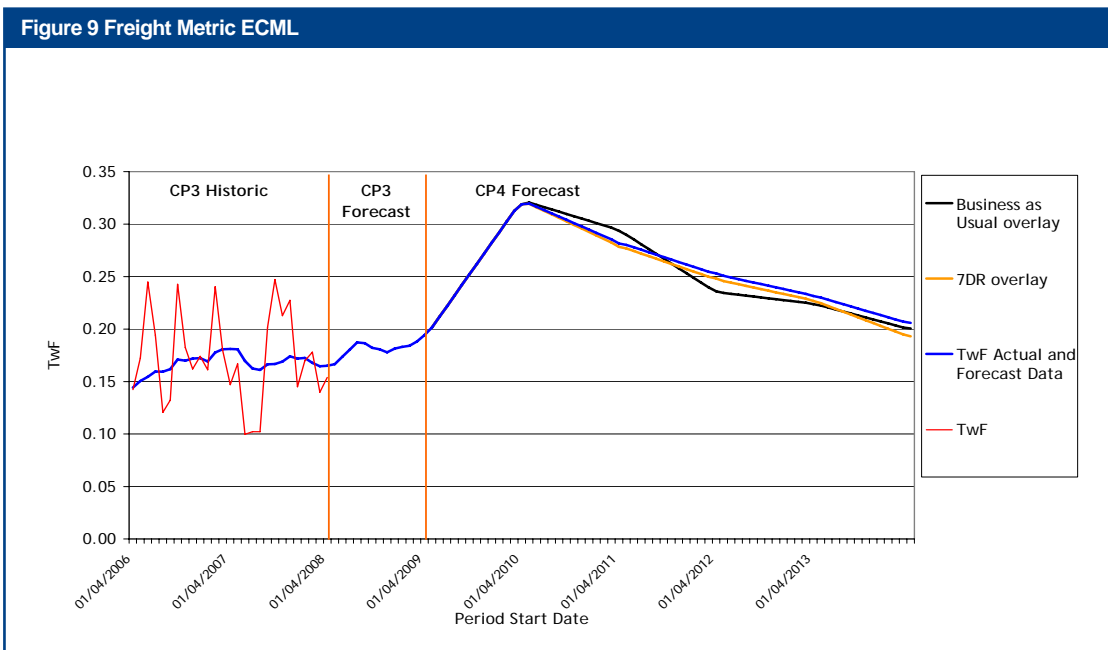
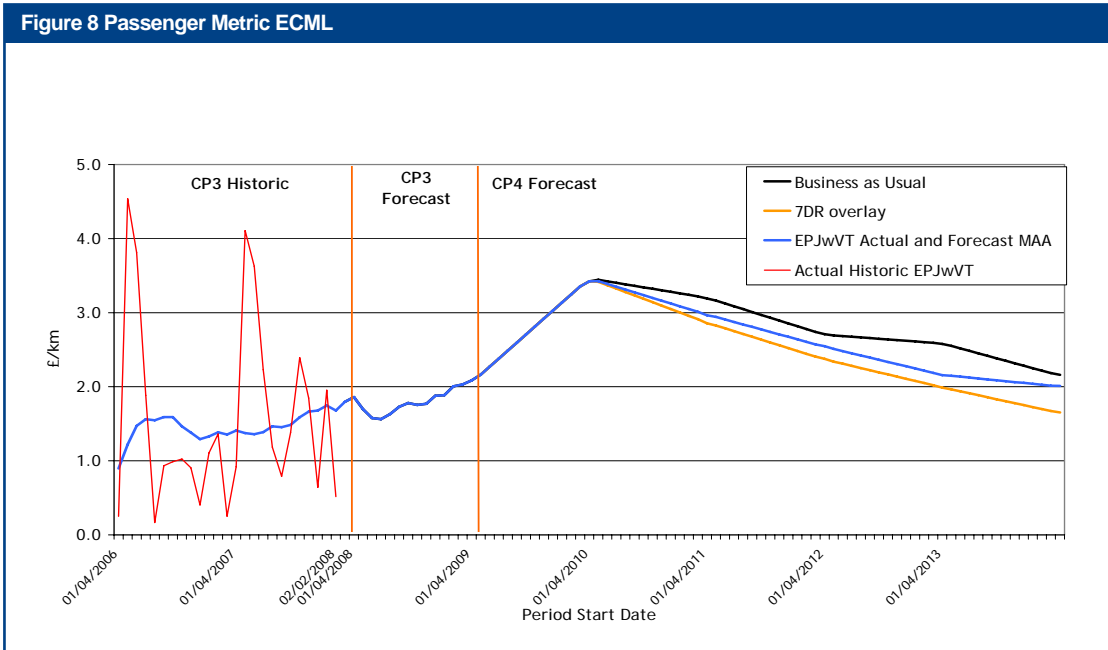
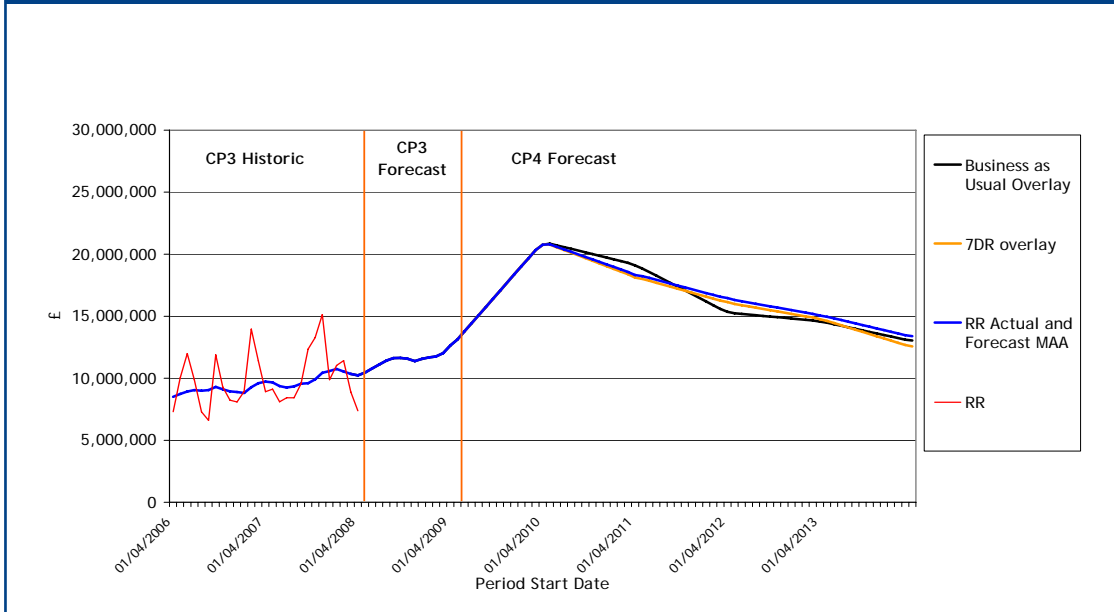


Figure 10 Unified metric ECML



Appendix B GEML - Route Remit 15

Route statistics

Figure 1 Route statistics

Route Description	Great Eastern Main Line
Route Detail	London Liverpool Street to Norwich
Route Operators	National Express, Freightliner, EWS, DRS, GBRf
Strategic Route sub	7.01 Liverpool Street - Shenfield 7.02 Shenfield - Ipswich 7.03 Ipswich - Norwich

Current Infrastructure and access arrangements

Figure 2 Current infrastructure and access arrangements

Route Configuration	4 track railway London-Shenfield 2 track railway Shenfield to Norwich
Electrification	25kv OLE
Signalling	TCB. IECC controlled London to Marks Tey NX controlled Marks Tey to Norwich
BI-DI / SIMBIDS	BIDI: Shenfield - Marks Tey currently Marks Tey – Colchester Bi Di from 2009 SIMBIDS: n/a
Diversiónary Routes	London-Cambridge-Norwich
Current Access	North of Shenfield SLW/Bi Di 2 track timetable on 4 track sections

Current Access Regime summary of Rules of the Route

Figure 3 Current access regime

GEML		Week Nights			Saturday Night			Sunday Night		
Section	Tracks	Availability	Duration (hours)	Action	Availability	Duration (hours)	Action	Availability	Duration (hours)	Action
Liverpool Street to Shenfield	4	all weeks	5	Block 2 of 4	all weeks	15	Block 2 of 4	all weeks	17	2 of 4 Block
Shenfield to Marks Tey	2	all weeks	5.5	1 section of SIMBIDS	all weeks	7	All Line Block	all weeks	6	All Line Block
		or	all weeks	3	2 sections of SIMBIDS					
Marks Tey to Colchester	2	all weeks	3	SLW	all weeks	7.5	All Line Block	all weeks	5	All Line Block
	2	all weeks	5	SLW	all weeks	8	All Line Block	all weeks	2	SLW
Colchester to Norwich	and							all weeks	3	All Line Block

SBP Baseline submission

CP4 Renewals and Enhancement proposals

The following include plans which may impact upon the implementation of the 7 day railway and are over and above the steady state like for like asset renewals

Figure 4 Renewals and enhancement proposals

Date	Detail
2008/9	Marks Tey to Colchester bi directional signalling
2009/10	Colchester to Clacton resignalling
2008/9	Clacton S&C
2008/9	Manningtree South S&C

Maintenance in SBP base case

Maintenance Strategy

Maintenance Improvement Initiatives

- Depot Improvement Programme (DIP) – Tottenham Period 11 2008/9
- Maintenance Reorganisation

Infrastructure Investment Base Case

Possession Hours

We have developed our base case plans based on the following strategy for incrementally reducing the “normal” weekend disruptive possession hours.

Figure 5 Base case possession hours

Year	P/L	S&C
2009/10	30 hours	54 hours and 37 hours
2010/11	30 hours	37 hours and 8 hours
2011/12	24 hours	37 hours and 8 hours
2012/13	16 hours	37 hours and 8 hours
2013/14	16 hours	37 hours and 8 hours

High Output Strategy

- Not planned to be utilised on this route

Incremental requirements above base case for 7 day railway

Operators Aspirations

National Express East Anglia

Run booked Sunday service. Improved Sunday service on Metro/Southend/InterCity route. Stansted Express key priority & agreed revised strategy from Dec 2007

Operations

7DR Timetable development

On the GEML, the section between Liverpool Street and Shenfield is largely four-track. Bi-directional signalling is not provided, but on the four-track sections, this is not a significant issue. There are several junctions which do not permit all the moves that would be necessary to allow sections between to be taken under possession while retaining full access to adjacent lines, but again the four-track alignment means that this will not be a significant issue.

CUI is fairly high, especially between Stratford and Forest Gate where there are substantial freight flows, and the mix of passenger and freight traffic means that some pathing allowances would be required to timetable this section for two track operation.

North of Shenfield, the alignment is predominantly two-track. Several crossovers (both orientations) are provided together with SIMBIDS signalling as far as Marks Tey. North of Marks Tey, SLW would be required. Some of the sections between crossovers are lengthy – in particular Ingatestone to Chelmsford and Manningtree to Halifax Jn. CUI is fairly low but there are regular freight paths throughout the night.

North of Haughley there is very little night time traffic and no particular issues were identified here, although there are few crossovers to permit SLW.

There are certain key locations where operating in half capacity mode would appear to be problematic. Those specifically identified are:-

- Stratford to Forest Gate
- Ingatestone to Chelmsford
- Manningtree to Halifax Jn

Further timetable studies are taking place on these 3 areas. Manningtree to Halifax Jn would benefit from the proposed increased bi di between Colchester and Haughley Jn.

The purpose of this phase of the study was to determine whether all of the required trains can be pathed through the affected section of railway within the time period 22:00 to 06:00, and if so, how much pathing time and other allowances need to be added to achieve a conflict-free timetable.

The following assumptions were made:-

- The studies were based on the RailSys models used for the line-of-route capacity assessment.
- For each test case, one line (or two on a four-track railway) was selected for possession and all trains were routed via the other line(s), as follows:
 - Stratford to Forest Gate – Up/Down Electric shut (all trains run on Up/Down Main)
 - Ingatestone to Chelmsford – Up Main shut (hence SIMBIDS on Down Main between Church Lane crossovers and Chelmsford)
 - Manningtree to Halifax Jn – Up Line shut (hence SLW on Down Line between Manningtree North Jn and Ipswich Halifax Jn)
 - Wrong-line moves under SLW are limited to 50 mph with a stop at the start of the section to receive pilotman instructions, it has been assumed that overall control of the possession site is by signaller and hence no further stops are required.
 - SIMBIDS moves are limited to the appropriate local speed restriction

- A 200m stretch of 20 mph running is included (in both directions) to simulate passing of a work site
- Trains have been re-timed as necessary so as to avoid any conflicts of the affected section
- No attempt has been made to remove conflicts that occur elsewhere as a consequence of the re-timing

Diversions routes

Timetable analysis identified that the Felixtowe-Nuneaton corridor needs better provision of crossovers and bi-directional working facilities as a key diversionary route.

Station and signal box opening hours

All signalling locations are manned 24/7.

Liverpool street station is currently closed during the night, but last services depart at c0150 and first services around 0330.

Possessions

TOP introduction

Not in current plan so not before 2010

Faster Isolations

Programme being formulated

Axle counter reset

Not applicable

Possession Hours

We have developed our 7 day railway plans based on the following strategy for incrementally reducing the “normal” weekend disruptive possession hours

Figure 6 7 day railway possession hours

Year	P/L	S&C
2009/10	30 hours	54 hours and 37 hours
2010/11	30 hours	37 hours and 8 hours
2011/12	24 hours	37 hours and 8 hours
2012/13	16 hours	37 hours and 8 hours
2013/14	8 hours	37 hours and 8 hours

Enhancement and Operational Requirements for 7 day railway

Additional Sections where SLW is required operate

North of Marks Tey SLW would be required

The following projects would enable this:-

- Additional Bi Di signalling from Colchester to Haughley Jn, possibly beyond to Norwich.
- Access to 4 tracks LST-Shenfield on Sunday. Concern about reduced flexibility at Shenfield. Bi-di already heavily used Shenfield-Marks Tey by freight. WA layouts inflexible & bi-di sought

Infrastructure enhancement schemes and costs

Figure 7 Enhancement costs

Scheme	£m
A new Junction at Romford to take trains from the electrics to the down main until Gidea Park.	7.639
A new facing crossover London side of Romford	2.908
2 new crossovers at Romford country end and re-commission the down goods line	5.273
Bring the signals at Romford Station back to the London side on both the Down main and Down electric	1.085
A facing crossover countryside of Manor Park to take trains down to up electric,	2.908
At Stratford provide full Bi Di for up passenger avoiding lines and back onto up main	1.356
Double Bow Junction (additional 2 crossovers) to allow parallel moves.	5.273
London end of Shenfield station provide an additional crossover to allow direct moves from the down main to platform 4	3.179
Arbour Lane, country side of Chelmsford trailing crossover.	3.179
Facing and trailing crossover country end at Motts Lane.	2.908
Additional crossover London side of Colchester South Junction.	2.908
Bi-directional signalling from Colchester to Haughley Junction	4.873
Additional trailing crossover at Cowgreen	2.908
Facing crossover at Flordon	2.908
grand total	49.304

Note the figure for bi directional signalling is the incremental cost of installing bi-directional signalling when renewals are being undertaken.

Maintenance

Additional one off costs of £10.4 million and recurring costs totalling £3.3 million

Infrastructure Investment

Additional costs of £14.0 million

Availability forecast

The following graphs show the forecast availability for Great Eastern Main Line

This graph for the passenger metric is sensitive to individual events and shows the impact of the long planned possession between Liverpool Street and Shenfield during the Christmas 2007 period. The steep fall in December 2008 occurs when the MAA no longer contains the impact of the December 2007 possessions.

The freight and unified metrics are influenced by the high level of enhancement works on the route.

Figure 8 Passenger metric GEML

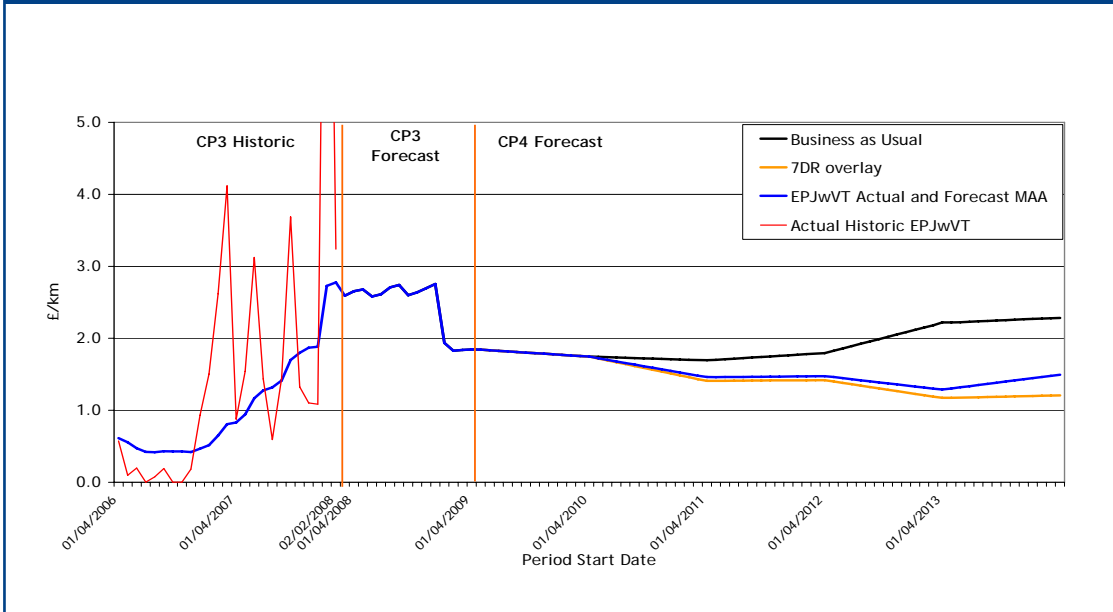
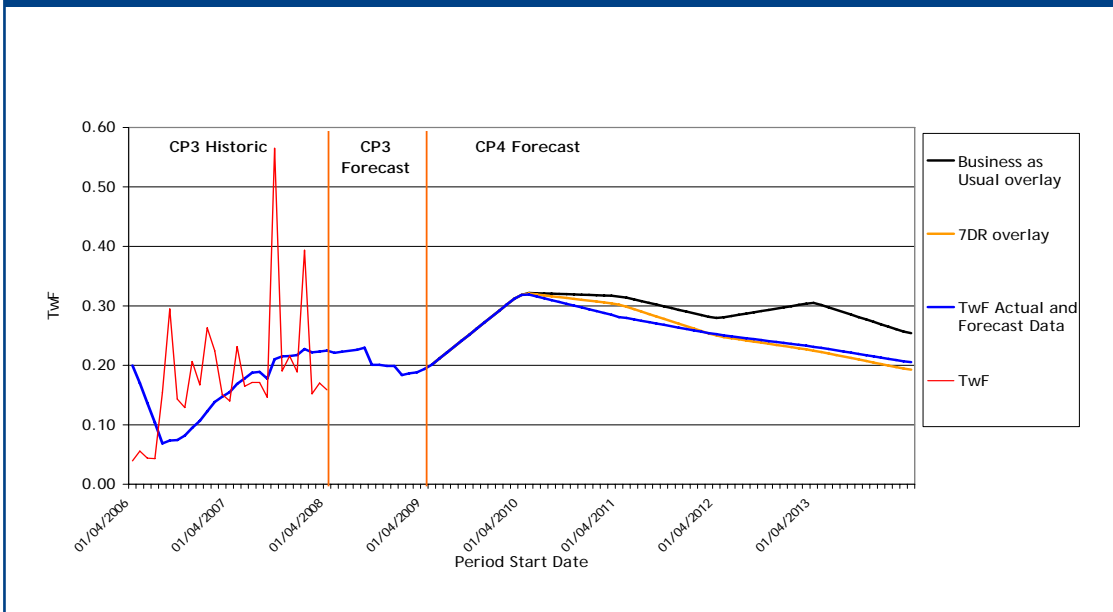
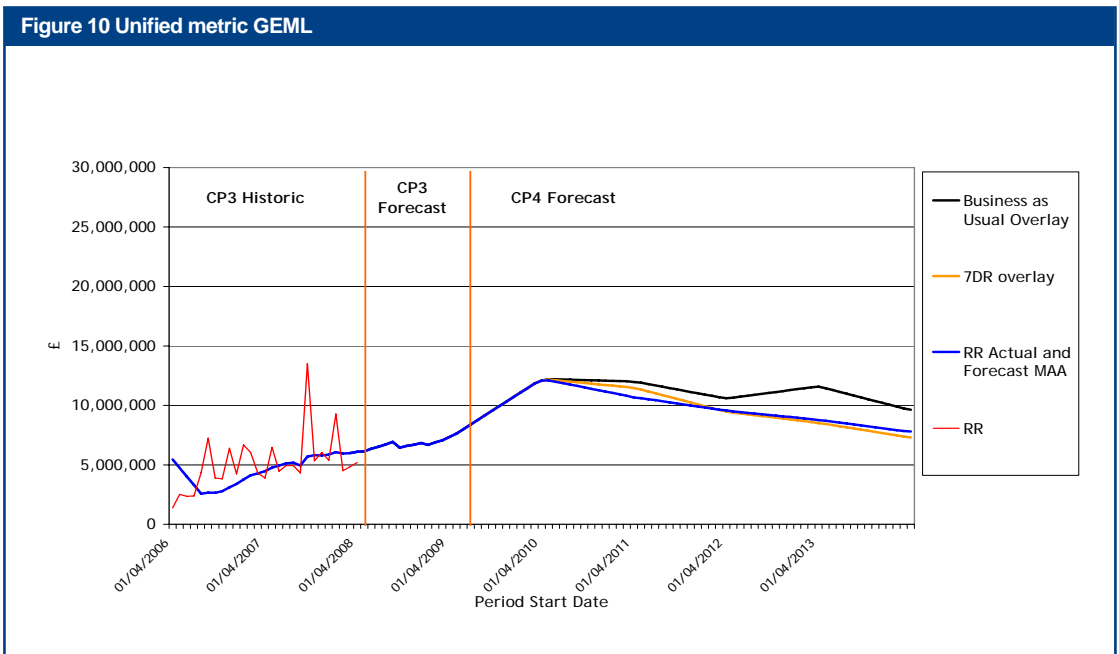


Figure 9 Freight metric GEML





Appendix C Cost and revenue analysis

Figure 1 Revenue benefit 7 day railway for all tranche 1 routes (£ million)

7 Day Railway Route Section	2009/10	2010/11	2011/12	2012/13	2013/14	Total
East Coast Main Line	0.0	0.6	1.3	17.0	26.8	45.7
London to South Wales	0.0	0.2	0.9	5.6	8.5	15.2
(London) Swindon to Bristol	0.0	0.2	0.2	3.1	5.4	8.9
Midland Main Line	0.0	0.3	0.7	6.0	10.1	17.1
Great Eastern Main Line	0.0	0.1	1.5	4.3	12.6	18.5
Didcot to Birmingham	0.0	0.1	0.2	1.5	2.6	4.4
Bristol to Birmingham	0.0	0.1	0.2	1.5	2.2	3.9
Birmingham to York/Doncaster	0.0	0.1	0.1	0.5	1.5	2.2
(Waterloo) Woking to Portsmouth	0.0	0.0	0.1	0.7	1.1	2.0
Waterloo to Weymouth	0.0	0.2	0.3	2.3	4.5	7.2
London to Brighton	0.0	0.1	0.2	2.3	3.5	6.2
London to Stansted	0.0	0.1	0.1	1.4	1.5	3.1
Chiltern Lines	0.0	0.0	0.1	0.8	1.6	2.5
Victoria to Swanley to Dover	0.0	0.1	0.1	1.3	1.2	2.7
Charing Cross to Orpington to Folkestone	0.0	0.1	0.2	1.6	2.3	4.2
Glasgow to Edinburgh	0.0	0.0	0.1	0.6	0.9	1.7
Transpennine	0.0	0.0	0.1	1.1	1.9	3.1
South Humberside Heavy Freight route	0.0	0.0	0.1	0.6	1.4	2.1
TOTAL	0.0	2.2	6.4	52.4	89.5	150.5

Figure 2 Total 7 day railway recurring costs for all tranche 1 routes (£ million)

7 Day Railway Route Section	2009/10	2010/11	2011/12	2012/13	2013/14	Total
East Coast Main Line	0.1	0.1	7.1	10.2	15.9	33.4
London to South Wales	0.5	1.6	6.3	8.9	20.6	37.8
(London) Swindon to Bristol	0.2	0.7	1.7	2.8	5.7	11.1
Midland Main Line	0.2	0.9	2.0	6.0	6.6	15.7
Great Eastern Main Line	0.7	0.7	0.3	10.4	5.3	17.3
Didcot to Birmingham	2.6	7.9	4.8	2.8	3.2	21.3
Bristol to Birmingham	0.1	0.4	1.0	3.4	9.8	14.7
Birmingham to York/Doncaster	0.1	0.2	0.4	1.3	2.8	4.7
(Waterloo) Woking to Portsmouth	0.2	0.9	0.7	1.8	3.3	6.9
Waterloo to Weymouth	0.6	0.9	2.1	3.7	5.4	12.6
London to Brighton	0.2	0.2	0.3	3.0	8.7	12.3
London to Stansted	0.0	0.0	0.0	0.4	1.7	2.1
Chiltern Lines	0.0	0.0	-0.1	0.6	3.9	4.4
Victoria to Swanley to Dover	0.1	0.1	0.1	1.5	3.5	5.3
Charing Cross to Orpington to Folkestone	0.2	0.1	0.2	1.9	4.8	7.3
Glasgow to Edinburgh	0.0	0.0	0.0	0.4	4.0	4.4
Transpennine	0.2	0.5	0.8	1.6	9.7	12.8
South Humberside Heavy Freight route	0.0	0.0	-0.1	0.1	2.0	1.9
TOTAL	5.9	15.2	27.4	60.8	116.7	226.1

Figure 3 Total 7 day railway one-off costs for all tranche 1 routes (£ million)

7 Day Railway Route Section	2009/10	2010/11	2011/12	2012/13	2013/14	Total
East Coast Main Line	0.0	0.0	41.5	13.6	18.1	73.2
London to South Wales	0.0	0.0	22.1	3.4	4.6	30.1
(London) Swindon to Bristol	0.0	0.0	5.8	0.9	1.3	8.0
Midland Main Line	0.0	0.0	3.9	23.5	5.2	32.6
Great Eastern Main Line	0.0	0.0	14.8	25.2	19.7	59.7
Didcot to Birmingham	0.0	0.0	1.6	11.2	2.2	15.0
Bristol to Birmingham	0.0	0.0	2.0	12.8	2.6	17.4
Birmingham to York/Doncaster	0.0	0.0	0.6	4.7	0.8	6.1
(Waterloo) Woking to Portsmouth	0.0	0.0	1.2	9.1	1.6	11.8
Waterloo to Weymouth	0.0	0.0	1.8	11.5	2.4	15.7
London to Brighton	0.0	0.0	1.2	1.2	8.8	11.2
London to Stansted	0.0	0.0	1.4	1.4	5.8	8.6
Chiltern Lines	0.0	0.0	2.4	2.4	15.2	20.0
Victoria to Swanley to Dover	0.0	0.0	1.9	1.9	17.6	21.4
Charing Cross to Orpington to Folkestone	0.0	0.0	4.8	4.8	17.4	26.9
Glasgow to Edinburgh	0.0	0.0	1.1	1.1	7.1	9.3
Transpennine	0.0	0.0	2.7	2.7	18.8	24.2
South Humberside Heavy Freight route	0.0	0.0	1.5	1.5	9.8	12.8
TOTAL	0.0	0.0	112.3	133.0	158.8	404.1

Figure 4 Total maintenance 7 day railway costs for all tranche 1 routes (£ million)

7 Day Railway Route Section	2009/10	2010/11	2011/12	2012/13	2013/14	Total
East Coast Main Line	0.0	0.0	35.0	7.0	7.0	49.0
London to South Wales	0.0	0.0	22.8	4.2	4.2	31.2
(London) Swindon to Bristol	0.0	0.0	5.6	0.8	0.8	7.2
Midland Main Line	0.0	0.0	0.0	21.6	2.0	23.6
Great Eastern Main Line	0.0	0.0	0.0	12.1	1.7	13.7
Didcot to Birmingham	0.0	0.0	0.0	11.2	1.6	12.8
Bristol to Birmingham	0.0	0.0	0.0	12.6	1.8	14.4
Birmingham to York/Doncaster	0.0	0.0	0.0	4.7	0.6	5.3
(Waterloo) Woking to Portsmouth	0.0	0.0	0.0	8.4	0.5	8.9
Waterloo to Weymouth	0.0	0.0	0.0	11.8	2.1	13.8
London to Brighton	0.0	0.0	0.0	0.0	7.8	7.8
London to Stansted	0.0	0.0	0.0	0.0	4.6	4.6
Chiltern Lines	0.0	0.0	0.0	0.0	14.0	14.0
Victoria to Swanley to Dover	0.0	0.0	0.0	0.0	15.0	15.0
Charing Cross to Orpington to Folkestone	0.0	0.0	0.0	0.0	11.9	11.9
Glasgow to Edinburgh	0.0	0.0	0.0	0.0	8.4	8.4
Transpennine	0.0	0.0	0.0	0.0	17.7	17.7
South Humberside Heavy Freight route	0.0	0.0	0.0	0.0	9.0	9.0
TOTAL	0.0	0.0	63.4	94.3	110.7	268.4

Figure 5 Maintenance 7 day railway costs (recurring) for all tranche 1 routes (£ million)

7 Day Railway Route Section	2009/10	2010/11	2011/12	2012/13	2013/14	Total
East Coast Main Line	0.0	0.0	7.0	7.0	7.0	21.0
London to South Wales	0.0	0.0	4.2	4.2	4.2	12.5
(London) Swindon to Bristol	0.0	0.0	0.8	0.8	0.8	2.4
Midland Main Line	0.0	0.0	0.0	2.0	2.0	4.1
Great Eastern Main Line	0.0	0.0	0.0	1.7	1.7	3.3
Didcot to Birmingham	0.0	0.0	0.0	1.6	1.6	3.3
Bristol to Birmingham	0.0	0.0	0.0	1.8	1.8	3.5
Birmingham to York/Doncaster	0.0	0.0	0.0	0.6	0.6	1.2
(Waterloo) Woking to Portsmouth	0.0	0.0	0.0	0.5	0.5	1.0
Waterloo to Weymouth	0.0	0.0	0.0	2.1	2.1	4.1
London to Brighton	0.0	0.0	0.0	0.0	0.7	0.7
London to Stansted	0.0	0.0	0.0	0.0	0.7	0.7
Chiltern Lines	0.0	0.0	0.0	0.0	2.0	2.0
Victoria to Swanley to Dover	0.0	0.0	0.0	0.0	0.0	0.0
Charing Cross to Orpington to Folkestone	0.0	0.0	0.0	0.0	0.9	0.9
Glasgow to Edinburgh	0.0	0.0	0.0	0.0	2.8	2.8
Transpennine	0.0	0.0	0.0	0.0	2.6	2.6
South Humberside Heavy Freight route	0.0	0.0	0.0	0.0	1.3	1.3
TOTAL	0.0	0.0	12.0	22.2	33.1	67.2

Figure 6 Maintenance 7 day railway costs (one-Off) for all tranche 1 routes (£ million)

7 Day Railway Route Section	2009/10	2010/11	2011/12	2012/13	2013/14	Total
East Coast Main Line	0.0	0.0	28.0	0.0	0.0	28.0
London to South Wales	0.0	0.0	18.6	0.0	0.0	18.6
(London) Swindon to Bristol	0.0	0.0	4.8	0.0	0.0	4.8
Midland Main Line	0.0	0.0	0.0	19.5	0.0	19.5
Great Eastern Main Line	0.0	0.0	0.0	10.4	0.0	10.4
Didcot to Birmingham	0.0	0.0	0.0	9.5	0.0	9.5
Bristol to Birmingham	0.0	0.0	0.0	10.8	0.0	10.8
Birmingham to York/Doncaster	0.0	0.0	0.0	4.1	0.0	4.1
(Waterloo) Woking to Portsmouth	0.0	0.0	0.0	7.9	0.0	7.9
Waterloo to Weymouth	0.0	0.0	0.0	9.7	0.0	9.7
London to Brighton	0.0	0.0	0.0	0.0	7.2	7.2
London to Stansted	0.0	0.0	0.0	0.0	3.9	3.9
Chiltern Lines	0.0	0.0	0.0	0.0	12.0	12.0
Victoria to Swanley to Dover	0.0	0.0	0.0	0.0	15.1	15.1
Charing Cross to Orpington to Folkestone	0.0	0.0	0.0	0.0	11.0	11.0
Glasgow to Edinburgh	0.0	0.0	0.0	0.0	5.6	5.6
Transpennine	0.0	0.0	0.0	0.0	15.2	15.2
South Humberside Heavy Freight route	0.0	0.0	0.0	0.0	7.7	7.7
TOTAL	0.0	0.0	51.4	72.1	77.6	201.1

Figure 7 Infrastructure enhancement 7 day railway costs for all tranche 1 routes (£ million)

7 Day Railway Route Section	2009/10	2010/11	2011/12	2012/13	2013/14	Total
East Coast Main Line	0.0	0.0	13.6	13.6	18.1	45.2
London to South Wales	0.0	0.0	3.4	3.4	4.6	11.5
(London) Swindon to Bristol	0.0	0.0	0.9	0.9	1.3	3.2
Midland Main Line	0.0	0.0	3.9	3.9	5.2	13.1
Great Eastern Main Line	0.0	0.0	14.8	14.8	19.7	49.3
Didcot to Birmingham	0.0	0.0	1.6	1.6	2.2	5.5
Bristol to Birmingham	0.0	0.0	2.0	2.0	2.6	6.5
Birmingham to York/Doncaster	0.0	0.0	0.6	0.6	0.8	1.9
(Waterloo) Woking to Portsmouth	0.0	0.0	1.2	1.2	1.6	3.9
Waterloo to Weymouth	0.0	0.0	1.8	1.8	2.4	6.0
London to Brighton	0.0	0.0	1.2	1.2	1.6	4.0
London to Stansted	0.0	0.0	1.4	1.4	1.9	4.7
Chiltern Lines	0.0	0.0	2.4	2.4	3.2	8.1
Victoria to Swanley to Dover	0.0	0.0	1.9	1.9	2.5	6.4
Charing Cross to Orpington to Folkestone	0.0	0.0	4.8	4.8	6.4	15.9
Glasgow to Edinburgh	0.0	0.0	1.1	1.1	1.5	3.7
Transpennine	0.0	0.0	2.7	2.7	3.6	9.0
South Humberside Heavy Freight route	0.0	0.0	1.5	1.5	2.0	5.1
TOTAL	0.0	0.0	60.9	60.9	81.2	203.0

Figure 8 Civils renewals 7 day railway costs for all tranche 1 routes (£ million)

7 Day Railway Route Section	2009/10	2010/11	2011/12	2012/13	2013/14	Total
East Coast Main Line	0.0	0.0	0.0	1.6	3.2	4.8
London to South Wales	0.0	0.0	0.0	1.0	1.9	2.9
(London) Swindon to Bristol	0.0	0.0	0.0	0.4	0.7	1.1
Midland Main Line	0.0	0.0	0.0	1.1	2.2	3.3
Great Eastern Main Line	0.0	0.0	0.0	0.6	1.2	1.7
Didcot to Birmingham	0.0	0.0	0.0	0.4	0.8	1.1
Bristol to Birmingham	0.0	0.0	0.0	0.3	0.5	0.8
Birmingham to York/Doncaster	0.0	0.0	0.0	0.6	1.1	1.7
(Waterloo) Woking to Portsmouth	0.0	0.0	0.0	0.4	0.8	1.2
Waterloo to Weymouth	0.0	0.0	0.0	0.8	1.5	2.3
London to Brighton	0.0	0.0	0.0	0.6	1.2	1.8
London to Stansted	0.0	0.0	0.0	0.3	0.5	0.8
Chiltern Lines	0.0	0.0	0.0	0.5	0.9	1.4
Victoria to Swanley to Dover	0.0	0.0	0.0	0.5	1.0	1.6
Charing Cross to Orpington to Folkestone	0.0	0.0	0.0	0.6	1.1	1.7
Glasgow to Edinburgh	0.0	0.0	0.0	0.3	0.7	1.0
Transpennine	0.0	0.0	0.0	0.6	1.2	1.8
South Humberside Heavy Freight route	0.0	0.0	0.0	0.1	0.2	0.4
TOTAL	0.0	0.0	0.0	10.4	20.8	31.3

Figure 9 Signalling renewals 7 day railway costs for all tranche 1 routes (£ million)

7 Day Railway Route Section	2009/10	2010/11	2011/12	2012/13	2013/14	Total
East Coast Main Line	0.1	0.1	0.4	1.6	0.1	2.3
London to South Wales	0.5	1.5	2.2	3.7	7.5	15.3
(London) Swindon to Bristol	0.2	0.7	1.0	1.6	3.2	6.6
Midland Main Line	0.2	0.8	2.2	2.9	0.6	6.6
Great Eastern Main Line	0.7	0.7	0.3	0.0	0.0	1.7
Didcot to Birmingham	2.6	7.9	4.8	0.8	0.7	16.7
Bristol to Birmingham	0.1	0.4	1.0	1.3	0.3	3.1
Birmingham to York/Doncaster	0.1	0.1	0.4	0.1	0.0	0.8
(Waterloo) Woking to Portsmouth	0.2	0.9	0.7	0.3	0.0	2.2
Waterloo to Weymouth	0.6	0.9	2.2	0.8	0.0	4.4
London to Brighton	0.2	0.2	0.3	1.4	3.3	5.4
London to Stansted	0.0	0.0	0.0	0.1	0.1	0.2
Chiltern Lines	0.0	0.0	0.0	0.1	0.1	0.2
Victoria to Swanley to Dover	0.1	0.1	0.2	0.6	0.8	1.8
Charing Cross to Orpington to Folkestone	0.2	0.1	0.4	1.3	1.8	3.8
Glasgow to Edinburgh	0.0	0.0	0.0	0.0	0.0	0.0
Transpennine	0.2	0.5	0.9	1.0	5.1	7.7
South Humberside Heavy Freight route	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	5.7	14.9	17.0	17.6	23.6	78.8

Figure 10 Track renewals 7 day railway costs for all tranche 1 routes (£ million)

7 Day Railway Route Section	2009/10	2010/11	2011/12	2012/13	2013/14	Total
East Coast Main Line	0.0	0.0	0.0	0.0	4.9	4.9
London to South Wales	0.0	0.0	0.0	0.0	6.6	6.6
(London) Swindon to Bristol	0.0	0.0	0.0	0.0	0.6	0.6
Midland Main Line	0.0	0.0	0.0	0.0	1.4	1.4
Great Eastern Main Line	0.0	0.0	0.0	0.0	2.1	2.1
Didcot to Birmingham	0.0	0.0	0.0	0.0	0.0	0.0
Bristol to Birmingham	0.0	0.0	0.0	0.0	7.0	7.0
Birmingham to York/Doncaster	0.0	0.0	0.0	0.0	0.9	0.9
(Waterloo) Woking to Portsmouth	0.0	0.0	0.0	0.0	0.3	0.3
Waterloo to Weymouth	0.0	0.0	0.0	0.0	1.3	1.3
London to Brighton	0.0	0.0	0.0	0.0	0.5	0.5
London to Stansted	0.0	0.0	0.0	0.0	0.3	0.3
Chiltern Lines	0.0	0.0	0.0	0.0	0.4	0.4
Victoria to Swanley to Dover	0.0	0.0	0.0	0.0	0.8	0.8
Charing Cross to Orpington to Folkestone	0.0	0.0	0.0	0.0	0.6	0.6
Glasgow to Edinburgh	0.0	0.0	0.0	0.0	0.3	0.3
Transpennine	0.0	0.0	0.0	0.0	0.6	0.6
South Humberside Heavy Freight route	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	0.0	0.0	0.0	0.0	28.8	28.8

Figure 11 Electrification & plant renewals 7 day railway costs for all Tranche 1 routes

7 Day Railway Route Section	2009/10	2010/11	2011/12	2012/13	2013/14	Total
East Coast Main Line	0	0	0	0	0	0
London to South Wales	0	0	0	0	0	0
(London) Swindon to Bristol	0	0	0	0	0	0
Midland Main Line	0	0	0	0	0	0
Great Eastern Main Line	0	0	0	8.1	0	8.1
Didcot to Birmingham	0	0	0	0	0	0
Bristol to Birmingham	0	0	0	0	0	0
Birmingham to York/Doncaster	0	0	0	0	0	0
(Waterloo) Woking to Portsmouth	0	0	0	0.5	1.4	1.9
Waterloo to Weymouth	0	0	0	0	0	0
London to Brighton	0	0	0	0.9	2.8	3.7
London to Stansted	0	0	0	0	0	0
Chiltern Lines	0	0	0	0	0	0
Victoria to Swanley to Dover	0	0	0	0.3	0.5	0.8
Charing Cross to Orpington to Folkestone	0	0	0	0	0	0
Glasgow to Edinburgh	0	0	0	0	0	0
Transpennine	0	0	0	0	0	0
South Humberside Heavy Freight route	0	0	0	0	0	0
TOTAL	0	0	0	9.8	4.7	14.5

Figure 12 Telecoms renewals 7 day railway costs for all tranche 1 routes (£ million)

7 Day Railway Route Section	2009/10	2010/11	2011/12	2012/13	2013/14	Total
East Coast Main Line	0.0	0.0	0.0	0.1	0.3	0.5
London to South Wales	0.0	0.0	0.0	0.2	0.3	0.5
(London) Swindon to Bristol	0.0	0.0	0.0	0.1	0.2	0.4
Midland Main Line	0.0	0.0	0.0	0.1	0.2	0.4
Great Eastern Main Line	0.0	0.0	0.0	0.1	0.2	0.4
Didcot to Birmingham	0.0	0.0	0.0	0.1	0.1	0.2
Bristol to Birmingham	0.0	0.0	0.0	0.1	0.1	0.2
Birmingham to York/Doncaster	0.0	0.0	0.0	0.1	0.1	0.2
(Waterloo) Woking to Portsmouth	0.0	0.0	0.0	0.1	0.1	0.3
Waterloo to Weymouth	0.0	0.0	0.0	0.1	0.4	0.5
London to Brighton	0.0	0.0	0.0	0.1	0.1	0.2
London to Stansted	0.0	0.0	0.0	0.1	0.1	0.2
Chiltern Lines	0.0	0.0	0.0	0.1	0.2	0.4
Victoria to Swanley to Dover	0.0	0.0	0.0	0.1	0.2	0.4
Charing Cross to Orpington to Folkestone	0.0	0.0	0.0	0.1	0.2	0.3
Glasgow to Edinburgh	0.0	0.0	0.0	0.1	0.1	0.3
Transpennine	0.0	0.0	0.0	0.0	0.1	0.2
South Humberside Heavy Freight route	0.0	0.0	0.0	0.1	0.2	0.3
TOTAL	0.2	0.3	0.3	1.6	3.4	5.8

Figure 13 Operational property 7 day railway costs for all tranche 1 routes (£ million)

7 Day Railway Route Section	2009/10	2010/11	2011/12	2012/13	2013/14	Total
East Coast Main Line	0.0	0.0	-0.3	-0.2	0.4	-0.1
London to South Wales	0.0	0.0	-0.1	-0.1	0.2	0.0
(London) Swindon to Bristol	0.0	0.0	-0.1	0.0	0.1	0.0
Midland Main Line	0.0	0.0	-0.1	-0.1	0.2	0.0
Great Eastern Main Line	0.0	0.0	-0.1	0.0	0.1	0.0
Didcot to Birmingham	0.0	0.0	-0.1	0.0	0.1	0.0
Bristol to Birmingham	0.0	0.0	-0.1	0.0	0.1	0.0
Birmingham to York/Doncaster	0.0	0.0	0.0	0.0	0.0	0.0
(Waterloo) Woking to Portsmouth	0.0	0.0	0.0	0.0	0.0	0.0
Waterloo to Weymouth	0.0	0.0	-0.1	-0.1	0.1	0.0
London to Brighton	0.0	0.0	-0.1	0.0	0.1	0.0
London to Stansted	0.0	0.0	-0.1	0.0	0.1	0.0
Chiltern Lines	0.0	0.0	-0.1	-0.1	0.2	0.0
Victoria to Swanley to Dover	0.0	0.0	-0.1	0.0	0.1	0.0
Charing Cross to Orpington to Folkestone	0.0	0.0	-0.1	-0.1	0.2	0.0
Glasgow to Edinburgh	0.0	0.0	0.0	0.0	0.0	0.0
Transpennine	0.0	0.0	-0.1	0.0	0.1	0.0
South Humberside Heavy Freight route	0.0	0.0	-0.2	-0.1	0.2	0.0
TOTAL	0.0	0.1	-1.8	-0.9	2.3	-0.3

Appendix D NAKPI trajectory

Figure 1 NAKPI trajectory

	2009/10**	2010/11	2011/12	2012/13	2013/14
1-TwF Base MAA	0.20	0.18	0.17	0.16	0.16
1-TwF BasU MAA	0.20	0.20	0.18	0.17	0.16
1-TwF 7DR MAA	0.20	0.18	0.17	0.16	0.15
1-TwF excluding enhancements MAA	0.14	0.12	0.11	0.11	0.10
RR Base MAA	94,455,966	86,051,856	81,524,809	75,065,362	73,376,924
RR BasU MAA	94,455,966	92,353,893	83,278,570	80,822,100	75,831,940
RR 7DR MAA	94,462,443	86,273,537	81,165,682	74,787,578	71,984,063
RR excluding enhancements MAA	63,284,896	54,564,720	53,629,726	50,146,393	49,054,027
EPJwVT Base MAA	1.14	1.02	0.92	0.78	0.80
EPJwVT BasU MAA	1.14	1.12	1.03	1.02	0.96
EPJwVT 7DR MAA	1.14	1.01	0.91	0.77	0.74
EPJwVT excluding enhancements MAA	0.76	0.64	0.61	0.52	0.54
**Period 13 levels					