Network Rail

Strategic Business Plan Update

Control Period 4

April 2008

Executive summary

In October 2007 Network Rail published its Strategic Business Plan (SBP) for Control Period 4 (CP4) which runs from April 2009 to March 2014. This document provides an update and further justification for elements of the SBP.

The Strategic Business Plan

The SBP was published against a background of strong growth, improving safety and sustained improvements across the whole industry. This presented a unique opportunity for continuing improvement in services for the benefit of passengers and freight users, our industry partners, taxpayers, the economy and the environment in which we live.

The SBP aimed to build on the industry's success over the last few years by challenging ourselves to become the best at everything we do. We said that we need to deliver world class infrastructure and operations, supported by the right processes and delivered by great people. Above all, the company as a whole needs to become more customer-focussed.

The SBP set out what Network Rail plans to do in CP4 consistent with an overall industry strategy and a longer term view of how the industry should meet the challenges of the future. This plan was based on extensive discussion with our industry partners and we were pleased that the SBP was generally well received. At the same time, however, we clearly recognised that there were aspects of our plans which required further development (such as our performance plans and our financing plans). We also recognised that we needed to continue to improve the way in which we work with our industry partners to deliver our plans for CP4 and to develop robust longer term plans for CP5 and beyond.

The SBP represented Network Rail's main submission to the Office of Rail Regulation's (ORR) periodic review of our access charges for CP4. It responded formally to specifications of the outputs which government (in England & Wales and in Scotland) wants to buy from the railway (the High Level Output Specifications, or HLOSs, and their corresponding Statements of Funds Available, or SOFAs).

Following the publication of the SBP, ORR published its initial assessment of the affordability of the governments' output specifications. It concluded that there was a high likelihood that these specifications could be delivered within the funds they had committed to the railways for the next control period. ORR noted that the SBP was a considerable improvement on earlier plans and that Network Rail had made good progress in a number of areas. It also expressed concern that some parts of the plan were not robust and these generally coincided with the areas which had been highlighted in our SBP as requiring further work. Of greater concern, however, ORR said that it believed Network Rail had significantly under-estimated the scope for it to improve efficiency in the next control period.

We welcome the fact that ORR seems to agree with much of our plan and we believe that this reflects progress made by the industry as a whole. However, following the publication of ORR's initial analysis, we expressed our concern to ORR about its efficiency assumptions. We clearly recognised the need for challenging assumptions, but we also emphasised the need for these assumptions to be realistic if we are to continue to succeed as an industry.

Since the SBP was published, the industry has continued to make progress on a number of fronts. In particular, demand growth has remained strong and punctuality is now approaching 90 per cent across Britain on a moving annual average basis for the first time for a decade. We have also worked closely with train operators and suppliers to develop and improve our plans. However, the engineering overruns at New Year further highlighted the scale of the challenge facing us to demonstrate that our plans are deliverable on-time, at an acceptable cost and without causing excessive disruption to passengers and freight users. We are being challenged to:

- deliver substantial improvements in efficiency on top of the progress we have achieved over the last few years;
- reach levels of punctuality which have never been seen before with more people and improved journey times;
- deliver several billion pounds of investment every year while continuing to operate an increasingly congested railway;
- operate an increasingly seven-day railway to create additional industry revenue and better services to users; and
- become more flexible in meeting the aspirations of our industry partners.

While these challenges are entirely understandable, they cannot be looked at in isolation and the overall package must be challenging but realistic. The update to our plans needs to be looked at in this context.

The SBP Update

This document aims to address the outstanding issues associated with the October 2007 SBP. In particular, it sets out our position in those areas which we acknowledged required further work or where this has become apparent from discussion with ORR and our industry partners. In other areas it provides further justification and evidence in support of the projections in our SBP. This document does not, however, aim to provide a full refresh of the SBP. It should therefore be read in conjunction with that plan and the supporting material which was presented with it.

The remainder of this summary highlights the key areas where we have developed or provided further justification for our plans under the following headings:

- our plans for delivering the HLOSs and other required outputs;
- potential investment to deliver non-HLOS outputs;
- our updated projections of our expenditure requirements over the next control period;
- the scope for improving efficiency and the deliverability of our plans;
- our financing plans and assumptions; and
- our revenue and financial projections.

The SBP included details of our plans for improving the safety of our workers and passengers. As a result of these plans, we indicated that we at least expect the industry to meet the HLOS safety outputs specified by the Secretary of State. Safety remains an over-riding priority for the business. We are particularly focussed on understanding the impact on risk arising from changes required to deliver the HLOS and providing the necessary assurance to ORR. This document does not therefore provide an extensive update on our plans in this area.

Plans for delivering HLOS outputs

The SBP and supporting documents set out in considerable detail our policies and strategies for delivering the HLOS outputs. ORR's initial assessment welcomed progress in a number of areas including the ongoing development of the Infrastructure Cost Model (ICM) and the closer working with train operators in some areas. There were clearly a number of areas where we had not provided sufficient evidence to justify our proposed plans. Equally, however, it is essential that we understand the basis of any adjustments which ORR plans to make in its draft conclusions so that we can understand the implications and how we might reprioritise our activities accordingly.

The main areas where we have done further work and updated our projections following the SBP are explained below:

- the budget for 2008/09 – the last year of this control period;
- changes in our core maintenance and renewal volumes for CP4;
- updated assessment of the cost of delivering the HLOS performance targets in England & Wales; and
- refinements to our plans for delivering the HLOS capacity enhancements.

The budget for 2008/09

- Our budget for the last year of CP3 reflects increases in the cost of track renewals and the West Coast Route Modernisation.
- Efficiency improvements elsewhere are generally in line with ORR's targets.
- Our delay minutes target for this year is worse than our previous stretch target but better than the ORR's CP3 target; and punctuality across Britain will shortly reach 90 per cent for the first time.

Since we published the SBP, we have developed our detailed budgets for 2008/09 and have updated our forecasts for this year. This has resulted in some changes to the forecasts included in the SBP.

Although we are continuing to reduce the costs of running the network, it is becoming increasingly difficult to achieve savings. Our projected operating costs and maintenance expenditure will be around £40 million higher for CP3 than we had previously published. This is largely due to the more restricted engineering access on the West Coast main line with the implementation of the new December 2008 timetable (which we had previously assumed would not have a major impact until the following year) and the impact of enhancements and increases in traffic.

For most asset categories, renewals expenditure is forecast to be broadly consistent with the SBP. However, we have increased track renewals expenditure in the final two years of CP3 by around £50 million as we are not confident that we will achieve the planned efficiency savings of 23 per cent by the end of CP3. The implications of this for CP4 are explained further below. We have carried out significant further work in updating the national telecoms programme and this has resulted in some reprofiling of our expenditure plans. We have also deferred

electrification and plant spend of £60 million to CP4 so that this can be delivered efficiently.

In the SBP, we included £225 million of incremental expenditure to deliver benefits in future control periods. This has been increased to £260 million mainly because we have brought forward investment from CP4 to enable engineering work to be carried out in the revised engineering access on the West Coast main line.

Finally, we have increased the projected cost of the West Coast Route Modernisation programme by £200 million compared to the SBP assumptions to enable delivery of the December 2008 timetable. This is consistent with the plan submitted to ORR in compliance with the provisional order published in February.

With regard to our output targets, the industry will achieve moving annual average punctuality levels of 90 per cent across Britain early in 2008/09. While we are currently ahead of ORR's delay minutes target for CP3, we will not achieve our own stretch target for 2007/08 or 2008/09. As a result we are revising our delay minutes forecast for 2008/09 to 8.9 million minutes. Although we clearly regret having to change our own target, the proposed target is still challenging and it is 200,000 minutes better than the ORR target which was set at the last review.

As a result of finalisation of our budget for the next year, we expect the level of debt to rise to nearly £22 billion by the end of the control period. This is consistent with our projections at the start of this control period.

CP4 expenditure requirements

- As a result of further work, we have reduced our projected CP4 expenditure requirements compared to the assumptions in our SBP.
- This is in spite of increasing difficulty in achieving year-on-year improvements in efficiency and reliability.

The main areas where we have reviewed our plans since the SBP are as follows:

- further work on stations and civil engineering has resulted in lower projected expenditure or quantification of the implications of further reductions;
- we have analysed the proposed discretionary investment and have reduced the CP4 funding required for this investment;
- we have incorporated our plans for overhead lines on the Great Eastern into our base plans;
- we have reduced our forecast for signalling minor works following further analysis;
- there are a number of other largely offsetting changes in our projections; and
- we have adjusted our efficiency assumptions for track renewals to recover the gap at the start of the control period as soon as practical.

Our SBP expenditure forecasts for franchised stations were based upon assumed asset volumes derived from samples from a number of stations. Although we used recently collected asset data to sense check our modelling assumptions, we could only make limited use of this data. We are now able to run our model using actual asset data for over 1,900 stations. As a result, we have found that some of our original volume assumptions were overstated, particularly for platforms and footbridges. We have also used this data to help re-assess the implications of our policies for activities and assets which were not previously modelled in detail. The result of this work is that we are now forecasting significantly lower steady state volume requirements and a reduction in CP4 spend of £115 million. We have also reviewed other elements of the operational property expenditure projections, resulting in an overall reduction in CP4 spend of £128 million.

The civil engineering expenditure forecast in the SBP was based upon a combination of policies that with careful management we believe can maintain asset condition at a realistic and deliverable profile of expenditure through CP4 and beyond. Our plan also takes account of increasingly severe weather conditions as reflected, for example, in recent flooding. If necessary, a reduction in these expenditure allowances would be possible, but there would be a cost (and possible deliverability issues) in later control periods. Although we have not provided for such a reduction in this update, we have provided further analysis of the implications of these choices.

When we published our very early views of the requirements for CP4 in June 2006 we argued that the lowest whole-life cost solution in relation to renewal of the overhead line on the Great Eastern was to accelerate renewal significantly compared to earlier plans. However, this was excluded from the ORR assessment and was therefore included as an enhancement option in the SBP. It has become increasingly clear that this should be part of our base plans and we have therefore included this in our core renewals

for this update. This increases our CP4 renewal projections by £87 million compared to the SBP. We are working with operators on similar plans for the East Coast but this is less well advanced and has therefore been included as an enhancement option.

Since publishing the SBP, we have reviewed our signalling minor works forecasts by analysing our bottom-up workbanks for minor works for the years 2007/08 and 2008/09. The analysis suggests we are planning to deliver a significantly lower level of minor works activity in those years than the CP4 forecast included in the SBP. We consider that the ongoing levels of activity should be broadly consistent with 2007/08 and 2008/09 and that this should be sufficient to support the programme of resignalling set out in the SBP. We have therefore reduced the level of minor works activity by around £96 million over CP4.

The SBP included additional investment of £885 million which was referred to as "discretionary". Since the SBP we have done considerable further analysis of this investment and the amount which we have included in this update has been reduced to a net cost of £74 million. This remaining amount represents the net cost of items which are fundamental to the delivery of our plans for CP4 and where the benefits are therefore embedded in our projections for improved efficiency and performance. This includes, for example, the investment in modular switches and crossings. It also includes the remainder of our planned investment to enable us to maintain the West Coast Main Line with the more limited access that will be available after 2008 and we have netted off the reduction in future costs as a result of this investment.

Some additional investment may be required depending on policy choices to be made by government or ORR and this is discussed further below. In addition, we have proposed an approach to ORR which would enable us to make further investment where this pays for itself (albeit potentially over longer than a control period).

Since we published the SBP, we have continued to review our projections in other areas and have responded to the ORR's review of our plan. As a result there are a number of areas where we have identified potential changes to the plan. We are conscious that the timescales for the 2008 periodic review are very tight and that ORR has asked us only to include changes that could have a material impact on our revenue requirements in CP4. We have therefore made very few changes to the plan. Those we have made include, for example, renewal of electrical connections to the grid in Scotland which we are required to pay for in CP4. In addition, further work in relation to track has identified a £58 million reduction in renewals expenditure offset by a £54 million increase in maintenance expenditure over the period.

In Scotland, we have increased maintenance and operating costs by £22 million as a result of enhancements to the network. We had not included these costs in the SBP as we assumed that the costs were funded separately and we rolled forward the CP3 costs. Further work is required to verify these costs and check that offsetting variable track access charges have been taken into account.

In restricting the adjustments to the SBP, we have not included a number of potential changes to the plan. These include, for example, the risk of an increase in the cost of fitment in train cabs of ERTMS signalling equipment and reduction of expenditure on footbridges within civils renewals. However, we will need to keep under review how we can best deliver the overall outputs with the available resources across the business as a whole.

As noted above, we expect to start the control period with higher unit costs for track renewals than was assumed when we produced the SBP. We have assumed that we will recover this gap by the end of CP4 but it is not realistic to assume that this can be achieved in the first year. We have therefore assumed that the gap is removed through additional efficiency improvements in this area equal to one per cent per year over five years. This increases our expenditure compared to the SBP by £72 million, which results in an overall increase in track renewals of £14 million when taking into account the reduced activity described above. Obviously this represents a major further challenge, particularly given that a large part of the cost of track renewals is materials (much of which is already contracted for at competitive market prices) and we have already assumed a significant "stretch" on top of our detailed efficiency plans. We may need to achieve the equivalent efficiencies elsewhere in the business and we will be developing our plans over the remainder of this year.

The net effect of these changes is to reduce our projections of aggregate operating, maintenance and renewals expenditure by £800 million over CP4.

We have also increased Schedule 4 costs by £427 million, as a result of the revised charges. This is offset by an equivalent increase in revenue to train operators.

HLOS performance improvements

- We have worked extensively with train operators on our joint plans for improving performance over CP4.
- As a result, the projected cost of meeting the HLOS performance requirement has been reduced since the SBP.

In the SBP, we set out our plans to deliver punctuality of 92.6 per cent in England & Wales and 92 per cent in Scotland by the end of CP4. Our plan was based on the improvements in the underlying drivers of performance, including improved asset reliability as a result of the underlying asset policies. However, we concluded that our asset policies would only support delivery of 91.6 per cent PPM in England & Wales. As a result we included a provisional allowance of £400 million to achieve the HLOS output. We indicated that further analysis was required and ORR confirmed that this was the case.

In Scotland we remain of the view that the HLOS performance requirement of 92 per cent can be achieved without additional investment. However, this will need to be reviewed as we develop the timetables arising from the major enhancements which are planned for Scotland.

Since publication of the SBP, we have continued to work with train operators to improve our performance projections. We have also carried out significant further analysis to assess the performance improvement that will be achieved for each of the key drivers. We then updated our assessment of the incremental investment required to achieve the HLOS outputs.

We have made further progress in developing longer term plans for each train operator. We have discussed the underlying assumptions with each train operator and have updated our assumptions where appropriate. The development of these plans has been carried out alongside the development of the 2008/09 joint performance improvement plans (JPIPs), which underpin our forecast of 90.6 per cent punctuality by the end of CP3. We will continue to improve these plans through the rest of 2008/09.

As a result of this further analysis, we have concluded that we will achieve greater improvements in asset reliability than assumed in the SBP, improving punctuality by 0.1 per cent. In addition, we have now assumed that train operators will be able deliver a further 0.1 per cent improvement in punctuality on top of the targets included in franchise commitments. We believe that our core plan will therefore achieve 91.8 per cent PPM by the end of CP4. To achieve this improvement, we will need to reduce Network Rail delay by 1.9 million minutes to 7.0 million minutes. Our internal benchmarking analysis shows that this is equivalent to improving the average delivery unit to the best current levels by the end CP4.

We have also developed a model that enables us to assess more effectively the value of alternative options for delivering further improvements in performance. We have consulted train operators in identifying these options. This has resulted, for example, in the inclusion of investment relating to the National Fleet Reliability Improvement Programme (NFRIP). We have also carried out further work to assess the extent to which we require additional investment to achieve the very significant reductions in significant lateness and cancellations. As a result, we have revised our bottom up assessment of the additional investment required to deliver the HLOS outputs in England & Wales from £400 million to £250 million.

Our plan includes projections of punctuality for each train operator. We recognise that the projections included in our 2009 Business Plan will become reasonable requirements for CP4. As this significantly reduces our flexibility to achieve the regulatory sector targets, our forecasts for the individual train operator targets total less than the sector targets.

Since we published the SBP, the Rail Freight Operators' Association (RFOA) has proposed development of a new freight performance measure. It has also proposed significant improvements in this freight performance measure during CP4. We welcome these proposals and we agree with RFOA on the principles for this measure. We are therefore developing plans for its implementation. We do not, however, believe we can achieve the level of improvement proposed by RFOA and our projection is for a delay minutes improvement of around 25 per cent during CP4. This will be achieved with the funding already identified.

The net effect of these changes is to reduce our projected expenditure in CP4 by £150 million compared to the assumptions in our SBP. This is split between maintenance and investment.

HLOS capacity enhancements

- The enhancement projects required to deliver additional capacity in CP4 have been developed further since the SBP.
- We are starting to deliver the early stages of many of these projects.
- We have worked closely with government and operators on their rolling stock plans.
- With freight operators we have now defined what the Strategic Freight Network should look like and have identified our initial priorities for delivering this.

Since publishing our SBP in October, we have been refining the proposed strategies to deliver the HLOS capacity metrics to take account of continued discussions with train operators, DfT, Transport Scotland and ORR. We have also taken account of further progress with the programme of Route Utilisation Strategies (RUSs), and ongoing work on the development of the proposed projects.

In England & Wales, DfT announced its rolling stock plan at the end of January and we are now engaged in trilateral discussions with train operators and DfT to establish the impact of these proposals on the strategies in the SBP. These discussions are continuing and we are not yet in a position to understand the full impact of these proposals. Discussions with a number of operators have identified refinements to the proposed strategies to make better use of the proposed rolling stock and these have led to minor changes to the proposed infrastructure enhancements.

In the October SBP we did not include proposals to address the depot and stabling requirements since these needed to be assessed in the light of the rolling stock procurement and cascade plans. This remains uncertain but we have made a high level assessment of the funding requirement for additional depot and stabling capacity.

The SBP also excluded some potential investments in car parks. We remain of the view that these investments should generally be capable of being funded through the incremental revenues which they generate. This is also an area where we would hope that operators would be able to deliver the relevant works themselves. We are keen to help facilitate appropriate investment in this area where the payback is longer than the franchise period.

We have continued to progress the specified enhancement projects through our development process, improving our definition of outputs, scope, cost, risk and deliverability. Most importantly, we have concluded a regulatory protocol which enables us to proceed with delivery of the Thameslink Programme. The projected expenditure on the Thameslink Programme in CP4 has increased as a result of the acceleration of some works.

We continue to work closely with DfT on the procurement of the new Inter-City Express Programme (IEP) and the associated changes to the infrastructure. DfT has also announced further funding for Birmingham New Street. Substantial progress has been made with our plans for the Reading station area and the industry processes require that we should begin to define the access requirements for this major project. The plans for Stafford remain subject to further development and the necessary planning consents.

We are very pleased with progress on the National Stations Improvement Programme. Detailed plans have been developed through joint Network Rail and train operator Local Delivery Groups (LDGs). We are keen to progress the delivery of these schemes while still seeking to maximise the potential financial contributions from other sources. Our vision is that these LDGs should take increasing responsibility at a local level for prioritising and integrating our joint work at stations. We are also keen to facilitate delivery of the required works by train operators where possible.

In Scotland, we have continued to develop the major projects in close liaison with Transport Scotland. In particular, ORR is close to establishing terms for delivery of the Airdrie to Bathgate scheme. We have also agreed the focus of our proposed development work for further enhancements under Tier 3 of the Scottish HLOS.

We have worked closely with freight operators and others on the development of the Strategic Freight Network (SFN). We have defined the proposed network in terms of core trunk routes, diversionary routes gauge cleared to W10/W12 and other core diversionary routes. Against this background we have proposed the priority schemes for implementation in CP4.

The SBP priced major projects and the portfolio of smaller projects based on P80 cost estimates. This represents the estimate at which there is an 80 per cent probability that the actual cost will be less than this. We highlighted the importance of an appropriate allocation of risk and we have proposed an approach which shares the risk while still providing an incentive to improve efficiency. When ORR has reached a conclusion on the appropriate approach we will need to review the proposed approach to risk in these schemes.

The net effect of these changes is to increase our expenditure projections for CP4 (although as noted above this is largely due to acceleration of Thameslink expenditure). In addition, however, we have excluded any expenditure from our base expenditure projections unless it is required to deliver the HLOS outputs. The base enhancement expenditure required to deliver these outputs is therefore around £1 billion less than the total shown in our SBP.

Potential non-HLOS investment

This update identifies separately those items of expenditure identified as not being strictly necessary to deliver the HLOS outputs but which we have included in our proposed plans for other reasons. We have provided for additional expenditure of £1,295 million on these optional items as described below.

Efficient Engineering Access (EEA)

- Continuing to improve the railway requires sufficient engineering access to do necessary work but we are committed to doing this in a way which avoids unnecessary disruption to users.
- Working with operators we have defined in more detail what could be done to achieve more of a seven day railway.
- We have proposed funding in CP4 to begin delivering this and we hope to work with operators to prioritise investment where it delivers the greatest benefit to users.

We seek to plan our work in a way which avoids unnecessary disruption to rail users. We will work closely with train operators in developing our plans and communicating these to users.

As explained in the SBP we have developed with ORR and the rest of the industry a measure of network availability. Since the SBP we have evaluated the likely trend in this measure of availability given our base plans as explained above. This takes account of the engineering access required to deliver the high volume of renewal and enhancement over the next few years. It also takes account of improvements in our processes and the impact of changes such as the introduction of modular switches and crossings.

The potential revenue and other benefits from making the network available more of the time so that we can operate an increasingly seven day railway have been identified in conjunction with train operators. These benefits are effectively incremental over and above the assumptions underlying the HLOSs and SOFAs. We believe that there is therefore a good case for providing incremental funding in this area through the periodic review.

Since the SBP Network Rail has been working extensively with train operators on a phased approach to development and delivery which concentrates initially on those routes which will deliver the greatest benefit in terms of meeting customer demand and generating extra revenue. We have focussed particularly on the East Coast main line (ECML) and Great Eastern main line (GEML) where we have sought to identify the five main areas of benefit, cost, deliverability, availability and funding.

We have also identified other key routes for detailed analysis on which we will focus our further efforts on in CP4. For these routes, we have established the likely revenue benefits with ATOC and the freight companies and we have a good understanding of the costs of implementation and methods of delivery.

We now have bottom-up estimates of the likely cost of delivering the changes to the routes referred to above. However, further work is required on these costs and to confirm the priorities over the next control period. In the SBP Network Rail suggested a fund of £300 million be made available for enhancements and operational costs to the network that are not identified in the base case for CP4. We have increased this by £50 million to reflect the proposed investment to facilitate faster electrical isolations which was previously included in discretionary investment.

It is important that there remains an element of flexibility on the use of these funds so that the greatest value can be obtained. We would want to work closely with train operators on the development and delivery of these plans. They would therefore need to evolve in the light of further discussion at a local level, and taking into

account of the ability to deliver investments and operate additional rolling stock/crew. If this broad approach is accepted we will need to develop criteria to control how and when funds may be drawn down, similar to the Network Rail Discretionary Fund (NRDF).

In parallel with these developments, we have focussed strongly on increasing the percentage of the weekend working timetable which runs as planned. In addition, we have worked closely with freight operators on our approach to maintenance so that we plan a smaller number of well understood diversionary routes on a cyclical basis.

Non-HLOS investments

- We have identified those elements of our plans which are not strictly required to achieve the governnments' output specifications.
- These optional investments would deliver additional industry revenue and wider economic benefits which should be taken into account in assessing their affordability.

Our SBP included schemes that are not necessary to deliver the HLOS outputs and are unlikely to be affordable within the income which was assumed for Network Rail in the SOFA for England & Wales. These schemes stimulate greater patronage and revenue to the industry and, given the additional economic benefits, they have strong benefit to cost ratios and offer good value to money. In effect, they generate income and other benefits over and above the assumptions underlying the HLOS and SOFA. Since the SBP we have worked with our industry partners and stakeholders to quantify the additional benefits associated with schemes and have submitted business cases for each of them.

The potential expenditure in this area amounts to £945 million and falls into the following categories:

- capacity and performance schemes (£227 million);
- journey time improvements (£140 million);
- enhancement linked to renewal (£159 million);
- funding of longer term development work (£240 million); and
- policy choices and other options (£179 million).

Examples of the capacity and performance schemes include the North Cotswold re-doubling scheme and improvements to the overhead line on the East Coast. These schemes clearly contribute to HLOS outputs such as reliability improvements and wider customer benefits such as journey time improvements. They would also improve the relative attractiveness of rail, stimulating additional patronage and revenue to the industry in and beyond CP4. They do not, however, appear to be justified as the cheapest way of delivering the HLOS outputs.

The enhancements linked to renewal, such as Redhill re-modelling, provide one-off opportunities to enhance the functionality of the railway in a cost-effective way when renewing key parts of the network. These schemes clearly contribute to improved service and/or performance outputs and delivering the same outputs at a later date would cost substantially more as well as causing greater disruption.

The journey time improvements contribute to the delivery of longer term rail and wider economic strategies as set out in the rail white paper and the Eddington Review, for instance by improving the connectivity between regional centres through journey time improvements such as between Liverpool, Manchester and Leeds, and between Sheffield and London. The proposed schemes typically have very high benefit-cost ratios. They also generate significant incremental revenue for the industry over and above that which is assumed in the HLOS and SOFA.

With regard to funding of longer term development, we believe it is essential that the industry builds on the progress made recently. In particular, this will help to inform governments on the choices they will need to make on the outputs they want to buy from the railway.

In our view there is a strong case for funding at least some of these schemes as part of the periodic review. If not, we would still wish to progress these schemes and seek appropriate sources of funding in conjunction with our industry partners and other stakeholders.

These potential investments relate to England & Wales. The equivalent issues in Scotland are being taken forward with Transport Scotland as potential Tier 3 projects. Funding for delivery of these projects is not included in this plan except to the extent that this can be achieved through the ring-fenced fund.

The final category of optional expenditure depends upon policy choices by ORR or government. Depending on the outcome of these choices the associated costs may need to be funded as part of the review. These choices relate, for example, to the provision of GSM-R on

freight only lines and responsibility for renewal of customer information systems installed by operators over the last few years.

Expenditure projections

- Our projected expenditure requirements are slightly above the top end of the comparable range identified by ORR.
- This requires us to deliver very substantial efficiency improvements on top of what has been achieved in CP3.

Figures 1 and 2 show our updated projections of our required expenditure for England & Wales and Scotland respectively.

The ORR ranges shown in these tables explicitly exclude any investment to deliver outputs over and above the HLOS. By contrast the SBP column includes this additional expenditure. The SBP update column has been prepared on a consistent basis to the ORR numbers with the incremental expenditure to deliver these additional outputs shown separately at the bottom of the column.

Our latest projections are close to the top end of the range identified by ORR on a comparable basis. Although the proposed additional investments take our projected expenditure beyond the range identified by ORR, this would deliver additional industry revenue or wider economic value which would also need to be taken into account.

These projections are based on the same efficiency assumptions as were used in the SBP (subject to the adjustment explained above in relation to track renewals). The following section provides further analysis in support of these assumptions.

Efficiency and deliverability

In the SBP we confirmed that we expect broadly to have achieved the ORR efficiency targets for the current control period – although there are some areas such as track where this will not be the case partly due to changes in steel prices and changes in the mix of work. We also set ourselves what we consider to be extremely challenging but realistic targets to improve efficiency by 18 per cent in most areas over the next control period. This therefore amounts to an efficiency improvement of at least 42 per cent over ten years. We also noted that these efficiency improvements were expected to be offset partly by real input price increases, including increases in real wages resulting in net savings of 12.5 per cent over the control period.

Figure 1 England & Wales expenditure projections

£ million	ORR Low	ORR High	SBP	SBP update
Maintenance	3,810	4,250	4,356	4,406
Controllable opex	2,920	3,480	3,429	3,429
Non-controllable opex	1,460	1,930	1,690	1,649
Schedule 4 and 8	410	770	450	871
Renewals	7,770	10,030	11,002	10,260
Enhancements	5,670	7,400	8,353	7,328
Tax	0	0	70	68
Total expenditure	**22,040**	**27,860**	**29,350**	**28,011**
Optional investments	-	-	-	1,253
Total	**22,040**	**27,860**	**29,350**	**29,264**

Figure 2 Scotland expenditure projections

£ million	ORR Low	ORR High	SBP	SBP update
Maintenance	410	460	463	483
Controllable opex	290	350	342	348
Non-controllable opex	120	180	152	147
Schedule 4 and 8	50	90	50	56
Renewals	1,090	1,340	1,485	1,397
Enhancements	320	350	380	406
Tax	0	0	20	17
Total	**2,280**	**2,770**	**2,892**	**2,854**
Optional investments	-	-	-	42
Total	**2,280**	**2,770**	**2,892**	**2,896**

The SBP and supporting documents contained extensive detail in support of these targets. In particular, we provided considerable detail on our bottom up efficiency plans for maintenance and renewals. Our efficiency targets in these areas included an element of "stretch" over and above those savings which had been specifically identified. With regard to operating costs, we do not yet have detailed plans for how we will achieve the target savings set out in our plan but this is clearly a major priority for the next few months. The importance of this work is highlighted by the fact that we are targeting improvements in the early part of the next control period which are greater than we have achieved in the last few years.

As noted above, ORR concluded that we had underestimated the scope for efficiency improvement. In particular, ORR stated that its analysis to date indicated that Network Rail may be at least 30 per cent less efficient than the average of the European rail infrastructure managers covered by the UIC benchmark data. In summary, our response to this position is that:

- the scale of the gap between Network Rail and other infrastructure managers is overstated;
- regardless of the size of any gap, it is essential that ORR takes a view of the realistic pace of change over the next control period across all aspects of the business rather than setting efficiency targets based on some theoretically possible position; and
- it is also necessary to take account of the impact of real input price pressures.

These arguments are explained further below. Considerable additional information is contained in our SBP and supporting documents. We have also provided further evidence in support of this update.

It must also be recognised that there are substantial efficiencies embedded in the volume assumptions in our plans. By way of example, we have refined the balance between full and partial renewal of switches and crossings to help improve whole-life cost. Our efficiency assumptions are applied on top of these volume assumptions. In addition, it is likely that part of the "stretch" over and above our bottom-up efficiency plans will be achieved through further scope efficiencies which will change in the actual volume or mix of work delivered over CP4.

Efficiency benchmarking

- Improved use of internal and external benchmarking is crucial to the delivery of our own efficiency targets in CP4.
- Independent analysis of European benchmarks confirms that much of the difference in cost identified by ORR is attributable to factors outside our control or different stages in the investment lifecycle.
- Our existing plans would eliminate the remaining gap.

The SBP contained a high level analysis of the available international benchmarking evidence. Network Rail has been involved in this work for several years and we work closely with other railways to help drive improvements in our businesses. This evidence has also informed our efficiency assumptions for the next control period. We did, however, emphasise the need for caution in applying the results of benchmarking in a mechanistic way. In particular, we noted that we are currently addressing a legacy of many years of systematic under investment while a number of European countries are investing at unsustainably low levels.

Following the SBP we therefore commissioned BSL Consulting (which was responsible for much of the early work on European benchmarking through UIC) to analyse the reasons for the apparent cost differential between Network Rail and other European infrastructure managers covered by the UIC benchmarking data. BSL's analysis appears to confirm that:

- although Network Rail's renewal volumes are broadly in line with steady state, many other railways in the UIC benchmarking study are investing at substantially below steady state levels;
- the relative age (and hence condition and performance) of Network Rail's assets means that they require additional maintenance above steady state levels;
- other sources of additional cost include labour costs above the European average, loss of economies of scale from shorter work sites, the impact of the possessions regime which reduces effective work hours, and higher plant procurement costs due to different standards;
- the remaining gap is largely accounted for by Network Rail's efficiency targets for the next control period; and
- European average maintenance costs have changed by less than one per cent per year over the last ten years.

We believe that benchmarking against non-European countries is generally likely to be less useful. For example, we believe that the differences with US class 1 railroads are so fundamental that it is not realistic to make incremental adjustments. In particular, the lower frequency of trains allows a highly mechanised approach to maintenance and this, in turn, allows a more piecemeal approach to renewals. This is totally different to the situation in most of our network. However, there are clearly areas where we can continue to learn from these businesses.

Although we are increasingly looking to benchmark ourselves against other businesses, we have not updated our other benchmarking work specifically for the purposes of this update. Our previous analysis suggested that there is limited scope for cost reduction in several parts of the business but that there is more scope for improved effectiveness. This reinforces our view that further efficiency improvements will require fundamental changes in processes and the development of our people across the business. This is a key focus for our ongoing work and we will seek to learn from best practice elsewhere.

As well as benchmarking against other businesses, we expect internal benchmarking between different parts of our own business to provide a powerful source of efficiency improvement. ORR welcomed the progress we had made with regard to renewals benchmarking but it expressed concern about the lack of progress in maintenance benchmarking. We recognise that there are still some issues with data consistency and normalisation in this area. Despite this, however, this is perhaps the area where we are making the greatest progress in using benchmarking through league tables on many aspects of performance across our maintenance delivery units.

Realistic pace of change in CP4

- We do not dispute the fact that there is substantial scope for efficiency improvement.
- The issue is that the assumed pace of change must be realistic in the circumstances we face.
- Improvements in efficiency must be considered together with the other improvements we are seeking to deliver at the same time.

The SBP emphasised that, even if it is shown that we could theoretically improve efficiency by more than our current targets, it is clearly necessary to take a view on the realistic pace of change. ORR does not appear to have addressed this issue directly in its initial analysis and we assume the draft conclusions will do so.

Following the SBP we commissioned LECG to examine the available evidence and advise us on the implications for the rate of improvement in efficiency which could realistically be assumed in our circumstances. This analysis indicates that:

- the methodology used by ORR's consultants to identify a range of potential efficiency savings includes additional catch-up on top of the top end of the range of efficiency improvements observed elsewhere;
- this double counts the scope for catch-up since this is already included in the top end of the range from other industries;
- the consultants' analysis has used inappropriate comparator companies in assessing the scope for efficiency and the majority of appropriate comparator companies sit towards the bottom end of their range;
- regulators have tended not to adopt the top end of the range from top-down analysis;
- some regulators also have assumed that it takes longer than one control period to catch up an identified efficiency gap; and
- the consultants do not appear to take account of the scale of improvements in reliability or responsiveness to customer requirements which Network Rail is expected to achieve and this is more of a challenge than has typically been faced by other regulated businesses.

LECG's analysis indicates that the range of potential efficiency savings is between two and four per cent a year and that Network Rail's assumptions fall within this range. We believe that this provides further support for our view that the assumptions we included within the SBP are extremely challenging.

Real input prices

- Our plan takes account of likely increases in real input prices.
- But there is a risk that these prices will increase further and we need clarity on how this risk will be treated by ORR.

In the SBP we included our projection of real increases in input prices which we netted off our efficiency assumptions. We have continued to review our projections and LEK has prepared a further independent report updating its view of the likely trends. The update focussed on the potential impact of Crossrail and a number of potentially volatile costs.

LEK's updated analysis indicates that the forecast real input price inflation for CP4 has increased by around 0.1 per cent to 1.1 per cent per year. However, it also highlights the potential range of uncertainty around projections in some areas. In the light of the inevitable uncertainty in this area and the relatively small size of the change, we have made no adjustment to the SBP for this increase.

We clearly recognise the need for Network Rail to manage the risks in this area, for example through our work with suppliers. However, we do not believe it would be in the interests of our industry partners or funders if we were exposed to the full risk associated with variations in input prices. We have therefore written separately to ORR setting out our view on the appropriate regulatory treatment of uncertainty in this area.

The deliverability of our plans

- Detailed analysis of our plans confirms that they are deliverable but we will need to manage the resulting cost pressures.
- We will also need to work with operators to manage the disruption to users associated with major projects.

In our view, the efficiency and deliverability of our plans need to be considered together. This is partly because of the impact of the scale of the investment agenda on potential supply chain pressures discussed above. Moreover, the scale of the investment required in the railway increases the difficulty of achieving efficiency improvements at the same time.

An analysis of the capability of the business and our supply chain to support the delivery of the renewals and enhancements plans was initially carried out in advance of the SBP. A further assessment has been carried out to produce an updated deliverability report which reflects changes in our previous assumptions regarding Crossrail, the move towards a seven day railway and confirming the robustness of our previous analysis in light of lessons learned following events at New Year.

Our deliverability review has examined capabilities, competencies and expertise within Network Rail as well as our supply chain. We have focused particularly on areas where there are known resource constraints or rapid growth in volumes. We have also taken account of the impact of movements in the renewals and enhancements programme which have arisen since the publication of the SBP.

Following the Christmas and New Year overruns, we have implemented more rigorous scheduling, simplified progress reporting, strict decision points, more thorough management processes for blockades, changes to the project management process, and, an update of programme governance.

A key challenge is associated with the deliverability of electrification and plant works. Crossrail and other elements of the enhancements portfolio places major demands on our suppliers in this area. As a result, we are forecasting a steep ramp-up in planned activity in 2009/10. Although we concluded that this volume is deliverable there may be market pressures on our costs over and above those reflected in our efficiency projections.

As well as looking at the overall resource requirements in each area, we have examined each of our major projects in detail. Throughout the development work on these projects we have, focussed on developing plans which can be delivered in conjunction with the remainder of our plan. It should however be recognised that where schemes are at a relatively early stage in development there will be greater uncertainty about the precise timescales. We will also need some flexibility in working with operators to define the engineering access requirements associated with major projects in a way which avoids unnecessary disruption to users. In addition, a number of our planned schemes are subject to planning consents.

Financing plans and assumptions

- Network Rail must be able to finance its activities.
- We have provided a detailed financing plan to ORR and this will be discussed with the rating agencies.
- Precedents from other regulators and current market conditions imply a rate of return which is at least at the top end of the range assumed by ORR.
- This also requires an appropriate balance between risk and incentive associated with investment.

In October, we were in the process of developing our financing plans. The SBP was therefore primarily an expenditure plan rather than a full business plan. However, the SBP made explicit assumptions on the financial parameters and set

out the implications for our revenue requirements and financial ratios. Pending further consideration of these issues, the input assumptions adopted were in line with ORR's emerging views.

In the SBP, we confirmed that we were developing proposals for raising debt without a government guarantee. ORR has made it clear that it supports these proposals and that it believes the proposals represent value for money, although we understand that it will only make a final decision as part of its final conclusions on the periodic review.

Our financial projections indicate that we will be raising approximately £14 billion of additional debt over CP4. In order to do so, we will need to access the capital markets both in the UK and internationally, for which we will need a strong investment grade rating, particularly given current market conditions.

Accordingly, we have developed a full financing plan which we have submitted to ORR as part of this update. Clearly we may need to update the plan later in the year following discussion with the rating agencies and to reflect ORR's draft/final conclusions as well as possible changes in the financial markets.

The SBP assumed an allowed rate of return on the RAB equal to 4.5 per cent based on ORR's assumptions. In response to ORR's consultations, however, we highlighted the need for a rate of return which reflects Network Rail's cost of capital going forward as a standalone private sector business and consistent with the approach adopted by other regulators.

Our proposal to raise additional debt in CP4 without a government guarantee does not change the required rate of return implied by our proposed approach. However, it does make it more important that we get this right, since setting the return too low would mean that Network Rail is unable to finance its activities. As emphasised by ORR, setting an appropriate rate of return would create "hard budget constraint" which would further reinforce the company's existing incentives for efficiency and cost control.

Since October, there have been further relevant precedents from other regulators, including the Competition Commission, which have allowed us to refine our views on an appropriate cost of capital. There have also been significant changes in market conditions arising from the international credit crisis, which have increased the cost of capital.

We have submitted to ORR as part of this update a detailed analysis of the required rate of return based on an economic analysis, a financeability analysis and comparison with other utilities. In setting the rate of return for our updated SBP, we have assumed that:

- we finance all future railway investment through corporate debt without government guarantee;
- we pay a fee 0.5 per cent to government in return for the guarantee on existing debt, which we understand is in line with the assumption used by DfT in the SOFA;
- any amounts in excess of our financing costs and risk buffer go into the ring-fenced fund and reduce the amount of investment which needs to be financed by borrowing. This therefore reduces the RAB and future revenues; and
- our revenue will be profiled over CP4 to achieve broadly flat interest cover ratios.

The resulting annual rate of return over the control period averages 4.8 per cent. This is close to the top end of the range identified by ORR (4.7 per cent). However, it is lower than the return set for other utilities in recent regulatory reviews and reflects the benefit of our CLG structure and FIM arrangements associated with existing debt.

We have throughout this access charges review highlighted to ORR that we would be seeking a formal view from the rating agencies to inform our analysis of what rate of return we would require to allow us to finance our business. We have now commenced this process and will share the results with ORR, and implications they may have for our cost of capital, in due course .

The SBP assumed a risk-buffer of £250 million per annum. This was at the top end of the ORR conclusions. However, we emphasised that the manageability of the business with this level of risk-buffer is dependent on the regulatory treatment of risk. We have discussed this matter further with ORR but it has yet to reach firm conclusions. We have retained this assumption pending further clarification from ORR in response to our proposed approach.

The amortisation assumptions underlying the SBP were consistent with the approach applied at the last review. For the purposes of this update, however, we have adopted the approach used by ORR in its assessment of the SBP. This sets the level of amortisation based on a view of the steady state level of renewals. Our projections are based on the upper bound

assumptions used by ORR. Using lower amortisation would reduce the revenue requirement and increase the debt requirement over the next control period. We will continue to review whether this would be more appropriate over the next few months.

Revenue and financial projections

- Our projected expenditure requirements translates into a CP4 revenue requirement which is above the range projected by ORR.
- It also means our debt would increase significantly by the end of CP4.

Figures 3 and 4 below set out the revenue requirement for England & Wales and Scotland respectively. These tables are prepared on the same basis as Figures 1 and 2 above. The incremental revenue requirement associated with the additional outputs represents the combined effect of the proposed additional spend on allowed maintenance, amortisation and returns.

This shows that the income which we believe is necessary to fund the HLOS outputs is higher than the high end of the ORR range. For England & Wales this difference is £917 million and for Scotland it is £152 million. Additional revenue of £235 million and £15 million respectively would be required to deliver the additional outputs contained in this plan. However, this would also generate extra value for the industry and wider economic benefits.

In addition to the outputs which are funded through the periodic review and the Transport Innovation Fund (TIF), we expect to deliver and/or finance additional enhancements worth around £2 billion over the next control period. This includes third party funded investments across the network and around £1.2 billion of the "on-network" works which we are expected to deliver during CP4 as part of the Crossrail programme. We have assumed that these investments will be debt financed but that we will receive an income reflecting the amortisation and return on the incremental asset value. We also assume that there is an appropriate balance

Figure 3 England & Wales revenue requirement

£ million (2006/07 prices)	ORR Low	ORR High	SBP	SBP update
Maintenance	3,810	4,250	4,646	4,506
Controllable opex	2,920	3,480	3,429	3,429
Non-controllable opex	1,460	1,930	1,690	1,649
Schedule 4 and 8	410	770	450	871
Amortisation	5,830	7,620	8,682	7,620
Allowed return	7,550	6,950	7,704	7,947
Tax	0	0	68	68
Gross revenue requirement	**21,980**	**24,980**	**26,671**	**26,090**
Third party income	(1,790)	(1,390)	(2,133)	(1,472)
Schedule 4 and 8	(410)	(770)	-	(871)
Revenue requirement to deliver the HLOS	**19,790**	**22,830**	**24,538**	**23,747**
Revenue for additional outputs	-	-	-	235
Total revenue requirement	**19,790**	**22,830**	**24,538**	**23,982**

Figure 4 Scotland revenue requirement

£ million (2006/07 prices)	ORR Low	ORR High	SBP	SBP update
Maintenance	410	460	473	483
Controllable opex	290	350	342	348
Non-controllable opex	120	180	152	147
Schedule 4 and 8	50	90	50	56
Amortisation	700	1,070	1,065	1,070
Allowed return	870	770	870	909
Tax	0	0	19	17
Gross revenue requirement	**2,440**	**2,910**	**2,971**	**3,029**
Third party income	(140)	(110)	(177)	(111)
Schedule 4 and 8	(50)	(90)	-	(56)
Revenue requirement to deliver the HLOS	**2,250**	**2,710**	**2,794**	**2,862**
Revenue for additional outputs	-	-	-	15
Total revenue requirement	**2,250**	**2,710**	**2,794**	**2,877**

between risk and incentive for these projects. We have assumed that the Scottish ring-fenced fund will contribute to Tier 3 schemes.

Taking account of the financial assumptions described above and these additional enhancements, the level of debt is projected to increase from nearly £22 billion at the end of the current control period to around £35 billion by 2014.

Conclusions

This remains an exciting time for the railway industry and, collectively, we have the opportunity to build on the progress achieved by everyone in the industry over the last few years.

To achieve success, it is critical that the current regulatory review concludes with challenging but realistic targets for the next control period. We will then be able to focus on working with our industry partners to deliver our plans for CP4 whilst also developing sound and affordable plans for CP5 and beyond.

Success also requires that Network Rail continues to develop and improve at everything it does. In particular, our people must be constantly focussed on the requirements of our immediate customers – the passenger and freight train operators – as well as those of passengers, freight users, government and the taxpayer.

Getting this wrong by setting inappropriate targets, or by failing to meet those targets, risks undermining what has already been achieved. Getting it right will enable the industry as a whole to transform the railway for the benefit of passengers and freight users over the next control period and beyond.

1 Introduction

In October 2007 Network Rail published its Strategic Business Plan for Control Period 4 (CP4). This was the main submission to the Office of Rail Regulation's (ORR) periodic review.

The objectives of the October SBP were:

- to set out a strategy for the industry and for Network Rail which delivers the High Level Output Specifications (HLOSs) for CP4 set by the Department for Transport (DfT) and Transport Scotland;
- to meet any other reasonable requirements of our customers and funders; and
- to achieve these two objectives in a manner consistent with the long term strategies for the railway.

These objectives remain unchanged in this update on our plans.

This document aims to address the outstanding issues associated with the October 2007 SBP. In particular it sets out our position in those areas which we acknowledged required further work or where this has become apparent from discussion with ORR and our industry partners; and provides further justification and evidence in support of the projections in our SBP. This document does not, however, aim to provide a full refresh of the SBP. It should therefore be read in conjunction with that plan and the supporting material which was presented with it.

The rest of the document follows the same structure as the October 2007 SBP and provides an update on the following chapters:

- Chapter 2: The demand for rail
- Chapter 3: The industry strategy
- Chapter 4: Network Rail's policies and strategies
- Chapter 5: Efficiency and input prices
- Chapter 6: Our plan for CP4
- Chapter 7: Expenditure and financing
- Chapter 8: Outputs.

These chapters should be read in conjunction with the relevant version of our SBP which contains further details on our plans.

There is also a set of appendices to this document which summarises the updated forecast of total expenditure, income and outputs together with disaggregated forecasts for England and Wales, and Scotland.

As part of this submission we have provided ORR with supporting documentation that provides further detail and substantiation of elements of this plan. We have identified the supporting documents at the end of each relevant chapter. In some cases, these documents are also available on our website (www.networkrail.co.uk).

Stakeholder consultation

The development of this document, like the October SBP, is the result of significant co-operative working and consultation with train operators in particular, but also wider stakeholders and funders. This collaborative approach is fundamental to creating a plan that has the support of the rest of the industry and their commitment to assisting in its delivery.

Collaborative working and consultation with stakeholders is integral to many of our development and delivery processes that underpin this plan. For example:

- the development of route plans and underpinning route utilisation strategies (RUSs) are developed jointly with train operators and the RUS process includes a stakeholder management group;
- we have created a process for developing longer term performance plans with train operators that extends beyond the current JPIP timescales to specifically support the development of our performance planning for the next control period;
- we have also started to develop performance planning frameworks for CP4 with freight operators;
- the forecast of safety improvement in CP4 is underpinned by train operator safety improvement plans submitted to RSSB as part of the development of the Rail Strategic Safety Plan 2008 to 2010;
- the development of the concept and definition of the Strategic Freight Network has been undertaken jointly with industry;
- the development of the National Stations Improvement Programme has been overseen by a joint industry board and delivery will be through joint local delivery teams;
- we have started to discuss the impact of the DfT's rolling stock plan trilaterally with DfT and train operators;
- we have shared our long term renewals and enhancements proposals with the supply industry through industry workshops; and
- development of project-specific outputs and scope has been developed with funders and operators.

In addition to this extensive consultation on specific elements of the SBP update, we have held regular consultation meetings with ATOC and the owning groups of the train operating companies.

The plan will continue to be refined in consultation with our industry partners. Ultimately it will be the March 2009 Business Plan that will form the committed delivery plan for the next control period, consistent with the ORR's final determination.

Comments

Comments on our Strategic Business Plan update and further information on the plans as they develop will also be placed on our website where appropriate.

2 The demand for rail

In the SBP we described how demand for rail travel has changed over the last ten years, the level of demand that is currently being experienced and our view of how demand will grow over the next ten years. In this chapter we give a brief update on trends in passenger demand since the publication of the SBP; our view of future demand; and the implications for our plan.

Current trends in demand

Since the SBP was published, passenger numbers have continued to increase. In the first half of 2007/08 (the latest period for which data are available at the time of writing), the number of passenger-kilometres travelled by rail were six per cent higher than in the first half of 2006/07.

The DfT's High Level Output Specification (HLOS), published in July 2007, specified capacity requirements for commuter services into London and other major cities. Although the winter 2007/08 passenger counts for all passenger train operating companies (TOCs) have yet to be finalised, the data that is available, and ticket sales data from train operators, suggests that growth in these markets has continued over the last year. For example, data for London & South East TOCs shows average morning peak growth of between four and five per cent over the last year. This is significantly higher than would have been predicted by standard industry models.

Future demand

In the SBP we noted that there was significant uncertainty over growth forecasts, largely because of the high levels of growth – higher than standard industry models would have predicted – seen in 2006/07. For purposes of the SBP we used the growth forecasts provided by DfT and Transport Scotland in their respective HLOSs, while noting that train operators generally believed that growth could be significantly higher than this.

Since the SBP, it has become clear that the high levels of growth in 2006/07 have largely continued into 2007/08. This would tend to lend weight to a view that future growth may be higher than predicted by standard models. However, economic events of the last six months have led both government and independent economic forecasters to lower their view of short term economic growth, which would tend to reduce forecasts of rail demand. On balance, we do not believe there is sufficient evidence (in either direction) to justify a change to demand forecasts at this point.

Implications for the SBP

We noted in the SBP that our plan was robust in the face of uncertain future demand since further train lengthening will often be possible without major additional infrastructure interventions. We still believe this to be the case. Our plan does not rely on any particular demand forecast turning out to be exactly right; indeed, much of the additional capacity that we propose to provide is needed to alleviate existing levels of crowding, even without significant growth in future.

We intend to continue working with government and train operators over the next few years to improve our forecasting of demand for planning purposes.

3 The industry strategy

The challenge for the industry over the next control period is to deliver the outputs specified by government in the HLOSs, as well as the reasonable requirements of our other customers and funders, in a cost-effective way for the entire industry.

Delivering this strategy will continue the transformation of the railway to improve safety and reliability while making major investments to allow more people and goods to travel by rail.

Safety

Safety remains our highest priority. Our analysis in the October SBP showed for both passenger and work force safety that the plans developed by both Network Rail and the train operators would deliver the safety improvements required in the DfT's HLOS. The projections in our plan are consistent with the Rail Strategic Safety Plan for the period 2008 to 2010 published in January 2008.

Punctuality and reliability

The October SBP indicated that we thought the industry could achieve a national Public Performance Measure (PPM) Moving Annual Average (MAA) of 91.6 per cent without additional performance-specific expenditure. We included a provisional allowance of £400 million to achieve the HLOS outputs.

Since publication of the SBP, we have analysed further what we believe can be achieved within the baseline plan. We now believe the baseline plan can deliver 91.8 per cent.

We estimate that the HLOS outputs, including the significant lateness outputs, can be achieved with incremental investment of £250 million.

In the HLOS, the DfT attached importance to narrowing the gap between poor performing services and other services, without specifying an actual target. We have interpreted this ambition as getting all operators to at least 90 per cent PPM MAA by the end of CP4. Our plan will achieve 90 per cent PPM on all services except long distance services on the East Coast and Great Western main lines.

As a result of discussions with the operators on these routes we have identified two enhancement schemes which will provide a step change in performance on these routes. These are re-doubling the North Cotswold line on the Western route and a series of initiatives to improve the reliability of the overhead lines on the East Coast main line. We have included these schemes in the plan as part of a portfolio of optional enhancements which, although not necessary to meet the HLOS outputs, we believe offer good value for money and meet a wider set of objectives than just the HLOS outputs.

The plan is forecast to reduce total freight delay minutes per 100 kilometres by 25 per cent over CP4. Network Rail and the Rail Freight Operators Association have agreed to introduce a Freight Performance Measure (FPM) as soon as practically possible.

Further detail of Network Rail's plans for improving punctuality and reliability can be found in Chapter 8.

Capacity

Since publishing our SBP in October, we have been refining the proposed strategies to take account of:

- continued discussions with train operators;
- DfT's announcement on its rolling stock plan;
- progress with the programme of RUSs; and
- ongoing project development.

Since October, the most significant development has been the publication of the DfT's rolling stock plan at the end of January 2008. Following its publication we have started to engage in trilateral meetings with train operators and DfT to establish the impact of these proposals on the strategies in the SPB. These discussions are continuing and we are not yet in a position to understand the full impact of these proposals. There is the potential for these discussions to change the proposed service enhancements, the deployment of new and existing rolling stock and have a consequential impact on the proposed infrastructure programme.

Since October we have made further progress with our programme of Route Utilisation Strategies (RUS):

- we have published the final RUSs for Greater Anglia, the East Coast Main Line and South London;
- we have continued to make progress on the Lancashire and Cumbria, Yorkshire and Humber, Merseyside and Network RUSs; and
- we have commenced the Kent, Sussex, East Midlands, West Midlands and Chilterns, and the Great Western RUSs.

The RUSs provide the industry with greater confidence that we have the appropriate strategies for the next control period and that these proposals are consistent with a longer strategy for the development of the network, at both a route and network level.

We have updated the summary of the proposed capacity interventions in light of these developments and this is provided in Figure 3.1 on the following pages. Further detail can be found in the accompanying Route Plan documents.

Rolling stock and depots

We have not updated our assessment of the additional rolling stock required in CP4 that was included in the October SBP. We will not be in a position to do this until we have a greater understanding of the impact of the DfT's rolling stock proposals and discuss these further with train operators.

In the October SBP we did not include proposals to address the depot and stabling requirements created by the delivery of the proposed new rolling stock and consequential cascade proposals. In the limited time available since the publication of the DfT's rolling stock proposals, we have made a high level assessment of the additional depot and stabling requirements. Our estimate for the costs of these works is around £300 million. This is based on a number of key assumptions:

- the depot and stabling requirements are based on the rolling stock figures set out in Figure 3.1 of the October SBP;
- we have evaluated existing facilities on the basis of operational capacity (assumed train formations) and not on the basis of theoretical capacity (assumed number of additional vehicles);
- we have considered significant fleet lengthening programmes only; and
- the initial study has focused on the south east of England, where capacity constraints appear to be the most critical.

In outline these works include:

- a number of new depot and stabling facilities to provide the capacity required for the substantial number of new vehicles; and
- significant alterations to existing depot and stabling facilities to provide both additional capacity and to alter the existing facilities to accommodate longer trains.

The costs are indicative only and we have not included these costs in our overall funding requirements in the plan.

We will work with train operators and DfT to refine these proposals such that we have an agreed strategy with each train operator and the DfT for the delivery of the HLOS capacity metrics. This will require collaborative working between all parties over the coming year in order to get a joined up and deliverable programme of service changes, new and cascade rolling stock proposals, and associated infrastructure, depots and stabling plans.

Enhancement schemes

The plan includes proposed enhancements to the infrastructure necessary to support the interventions identified earlier. In particular:

- major projects specified by funders such as the Thameslink programme, Reading station area re-development, the Inter-City Express programme (IEP), Airdrie – Bathgate and Glasgow Airport Rail Link;
- various infrastructure works such as platform lengthening and power supply strengthening to support the capacity interventions; and
- investments required to meet the HLOS reliability outputs.

Since October we have been undertaking further development work to better understand the outputs delivered, and the scope and cost of these projects. Further detail on our enhancement plans for CP4 can be found in Chapter 6.

As in October, we have also included schemes in the plan that, although not necessary to deliver the HLOS outputs, we believe could be justified based on broader criteria:

- one-off opportunities to enhance the functionality of the railway in a cost-effective way when renewing key parts of the network;
- contribution to narrowing the gap between the poorest performing services and the rest, an ambition highlighted in DfT's HLOS;
- contribution to wider benefits such as journey time improvements;
- creation of additional patronage and revenue;
- wider economic benefits and strong benefit to cost ratios; and
- fit with longer term economic and rail strategies as set out in the Eddington Review and DfT White Paper.

Figure 3.1 Strategic Routes 1 – 13: summary of proposed capacity interventions

Routes	Sector	Interventions
Route 1: Kent	Long Distance	1. Eurostar relocates from Waterloo to St Pancras
	London & South East	1. Integrated Kent Franchise new timetable 2. Thameslink Key Outputs 0 and 1, enabling more capacity through the Thameslink core route 3. 12 car suburban operations on routes into Charing Cross and Cannon Street
Route 2: Brighton Main Line and Sussex	London & South East	1. Implementation of Brighton Main Line RUS providing additional capacity for the Brighton line and to Redhill 2. Thameslink Key Output 0 extending services to Blackfriars up the Thameslink core route 3. Main line and suburban timetable re-write enabling the East London Line service to operate and link with Thameslink and South London RUS options 4. East London Line services extension to West Croydon and Crystal Palace 5. Thameslink Key Output 1 enabling 12 car services through the Thameslink core route 6. 12 car operations on the East Grinstead to Victoria line 7. 10/12 car suburban line operations to Victoria and London Bridge 8. Reinforcement of Uckfield services
Route 3: South West Main Line	London & South East	1. Eurostar relocates from Waterloo to St Pancras 2. Demand management through Smart technology 3. Run all peak trains at maximum permitted length 4. 10 car operations on all suburban routes; introduced progressively starting with the Windsor line services
Route 4: Wessex Routes	London & South East	There are no capacity interventions planned for CP4, although projects expected to take place on Route 3 will produce benefits for services using the Wessex routes
Route 5: West Anglia	London & South East	1. 12 car operations on Liverpool Street to Cambridge and Stansted Airport services 2. Increased service frequency from Cheshunt via Southbury provided by a shuttle to Seven Sisters 3. 9 car operation of high capacity suburban stock on Liverpool St to Chingford, Enfield Town, Cheshunt and Hertford East services
Route 6: North London Line and Thameside	London & South East	1. Additional 12 car operations on the c2c main line 2. 12 car operations on the Tilbury Loop and Ockendon branch 3. North London Line train lengthening and capacity upgrade
Route 7: Great Eastern	London & South East	1. 7 additional morning peak trains on Great Eastern Main Line 2. Additional 12 car operations on the Great Eastern Main Line 3. 8 additional peak trains on Great Eastern inner services 4. Rolling stock replacement on Great Eastern Norwich to higher capacity stcok
Route 8: East Coast Main Line	Long Distance	1. Additional hourly path and extra rolling stock included in the Inter City East Coast franchise and longer trains on Cross Country Anglo-Scottish services
	London & South East	1. Increased 12 car operation on Outer suburban commuter services 2. Shoulder peak train lengthening on Inner routes followed by additional peak services
	Regional: Inter Urban	1. 4 car operations on Trans Pennine Express peak services to/from Newcastle
	Regional: Commuter	See Route 9
Route 9: North East Routes	Regional: Commuter	1. Train lengthening for Northern Rail services in the Newcastle and Middlesbrough areas
Route 10: North Trans-Pennine, North and West Yorkshire	Long Distance	Included in Route 8
	Regional: Inter Urban	1Train lengthening on Trans Pennine Express peak services to/from Leeds 2. Revised service patterns and improved journey times on various services across the route
	Regional: Commuter	1. Train lengthening for Northern Rail services in the Leeds area on some corridors and additional peak services on others
Route 11: South Trans-Pennine, South Yorkshire and Lincolnshire	Regional: Inter Urban	1. East Midlands Trains inter-urban train lengthening and new Northern Rail Nottingham – Sheffield – Leeds service provide additional peak capacity into Sheffield 2. Improved journey times on various services across the route
	Regional: Commuter	1. Train lengthening for Northern Rail regional services in the Sheffield area
Route 12: Reading to Penzance	London & South East	1. Train lengthening for Kennet Valley service
Route 13: Great Western Main Line	Long Distance	1. The deployment of High Density High Speed Trains on services into Paddington to provide additional capacity
	London & South East	1. Strengthening Paddington peak arrivals up to 7 cars 2. Additional fleet of faster vehicles to operate 6 or 7 car Thames valley and some Cotswold/Oxford to Paddington main line services
	Regional: Commuter	1. Strengthen Bristol area services to 4 cars 2. Additional vehicles for new Ebbw Vale service

Figure 3.1 Strategic Routes 14 – 26: summary of proposed capacity interventions

Routes	Sector	Interventions
Route 14: South and Central Wales and Borders	Regional: Rural	1. Hourly Cambrian service and Pembroke Dock service
Route 15: South Wales Valleys	Regional: Commuter	1. Strengthening the Valleys services and half-hourly Vale of Glamorgan service
Route 16: Chilterns	Long Distance	1. Train lengthening the Birmingham Snow Hill to Marylebone services
	London & South East	1. Train lengthening local services to Marylebone 2. December 2010 timetable re-cast to provide a peak hour regular train service, shorter journey times, and more capacity.
Route 17: West Midlands	Long Distance	1. Strengthening long distance services 2. West Coast timetable alterations from December 2008
	Regional: Commuter	1. Extension of cross-city services to Bromsgrove. 2. Train lengthening on local services. 3. Increase in service levels on Redditch branch.
Route 18: West Coast Main Line	Long Distance	1. Train lengthening the class 390 fleet to 11 car length 2. December 2008 timetable recast to improve services frequencies and network capacity utilisation.
Route 19: Midland Main Line and East Midlands	Long Distance	1. New hourly Kettering to St Pancras service
	London & South East	1. Thameslink enabling peak hour train lengthening into St Pancras International and service increases
	Regional: Inter Urban	1. Additional vehicles for East Midlands Trains and Cross Country regional services at Nottingham and Leicester
	Regional: Commuter	1. East Midlands Trains train lengthening for peak services into Nottingham
Route 20: North West Urban	Long Distance	1. Strengthening of Liverpool intercity services 2. Strengthening of Manchester intercity services 3. West Coast timetable alterations from December 2008
	Regional: Inter Urban	1. Additional vehicles in the Liverpool area 2. Additional vehicles in the Manchester area to support existing services and relieve overcrowding. 3. Transpennine upgrade phase 1: Liverpool – Manchester – Leeds line speed and capacity increase.
	Regional: Commuter	1. Strengthening services in the Liverpool area. 2. Strengthening services in the Manchester area.
Route 21: Merseyrail		Non additional capacity interventions required to meet HLOS outputs
Route 22: North Wales and Borders		Non additional capacity interventions required to meet HLOS outputs
Route 23: North West Rural		Non additional capacity interventions required to meet HLOS outputs
Route 24: East of Scotland	Regional: Inter Urban	1. Additional vehicles and services to Fife including the acceleration of Aberdeen/Edinburgh services by altering the stopping patterns 2. Increase in service level and additional vehicles facilitated by the Edinburgh to Glasgow Electrification
	Regional: Commuter	1. Opening of Stirling/Alloa/Kincardine route, including 6 car working
	Regional: Rural	2. Borders Railway new line extending services to Tweedbank every half hour
Route 25: Highlands	Regional: Inter Urban	1. The introduction of an hourly service between Perth and Inverness
	Regional: Rural	1. Completion of the Invernet project
Route 26: Strathclyde and South West Scotland	Long Distance	1. Additional vehicles for Glasgow intercity services
	Regional: Inter Urban	1. The introduction of an hourly semi-fast service between Edinburgh Waverley and Glasgow Central via Shotts 2. The introduction of an hourly semi-fast service between Edinburgh Waverley and Glasgow Central via Carstairs
	Regional: Commuter	1. Additional vehicles to facilitate the Glasgow South timetable recast (including the Kilmarnock line) 2. New line between Airdrie and Bathgate and the introduction of the 4 trains per hour service between Glasgow Queen Street and Edinburgh via Airdrie and Bathgate 3. New line between Paisley and Glasgow Airport and the introduction of the 4 trains per hour Glasgow Airport Rail Link service 4. Electrification and upgrading of the Rutherglen to Whifflet line

We have developed an outline appraisal for a number of these schemes. As a whole, the schemes appraised would generate £137 million more revenue over CP4 and CP5, effectively recovering the cost of the investment over this time period. Overall benefit cost ratio for this package of schemes is 18 to one.

This analysis suggests that a number of the journey time improvements, such as between Leeds and Manchester, will generate patronage and revenues in excess of the cost of implementing the schemes, making them financially positive to the industry.

Other schemes, particularly North Cotswold re-doubling and East Coast overhead line schemes that help close the gap between poorer performing and other services, offer good value for money. These schemes generate additional revenue and economic benefits, that exceed the cost of implementing them, by ratios of eight to one and 11 to one respectively.

We need to develop further the business case for a number of schemes, particularly the enhancements to renewals. The likely benefits will be better defined as the optioneering process for the proposed renewals develops.

Other schemes have been appraised as part of a wider strategy proposed within the RUSs, for example schemes recommended in the East Coast Main Line and North West RUSs.

A full list of such enhancements is set out in Chapter 6.

Stations

Our stations strategy proposals have not changed materially since the October SBP.

We are working closely with the rest of industry as a member of the National Stations Improvement Programme (NSIP) board to agree the most appropriate format and process for developing station plans. It is likely that the local delivery groups established for NSIP will facilitate delivery of plans for each Station Facility Owner's (SFO) portfolio of stations. We have received positive feedback on the provision of increased transparency of our plans disaggregated to each SFO. We hope this will continue to provide the basis for more effective discussion with train operators. In addition, we are keen to explore different delivery options which could mean that operators deliver more of the required investment at stations. This is already happening in the development of the NSIP proposals.

Strategic Freight Network

In the SBP in October we committed to working with industry stakeholders to develop the concept of the Strategic Freight Network (SFN). We have coordinated the development of the SFN on behalf of the industry and DfT. We have translated the concept of the SFN into a vision and have proposed the first steps to be implemented in CP4.

The development of the SFN has been overseen by a Strategic Freight Network Group (SFNG) consisting of representatives from DfT, the Welsh Assembly Government, Transport Scotland, Freightliner, EWS, GB Railfreight, DRS, ATOC, the Freight Transport Association, Rail Freight Group and ATOC.

The stakeholder group examined the nature and pattern of flows, stakeholder aspirations, development of core and diversionary routes, and the costs and benefits of identified schemes.

The concept

The SFN can be viewed as a network of core trunk and diversionary routes with sufficient capacity and appropriate gauge to carry the expected growth of major flows of freight. An optimised pattern of freight trunk routeing would minimise conflicts between freight and passenger traffic, benefiting both forms of traffic.

Subject to acceptable business cases, the core network would ultimately be expected to:

- have sufficient capacity for growth with possibly fewer high capacity lines;
- have limited conflicts between passenger and freight traffic by using avoiding lines and grade separation;
- provide for longer trains;
- provide for appropriate axle loads;
- have appropriate gauge for the traffic that needs to use it; and
- include defined diversionary routes for each core route with the objective of ensuring availability whenever operators wish to use the network.

The SFN will need to evolve over time to reflect emerging issues in the freight market. It is important therefore to safeguard routes for future requirements where there is a business case.

The SFNG examined the largest flows from their source (or port) to the largest markets or distribution points. This provided the starting point for the designation of core trunk and diversionary routes.

The proposed SFN network is extensive. The intention is that this will provide sufficient flexibility to enable increased availability of the network for freight against the background of growth in both the passenger and freight markets. With the appropriate investment to increase capacity and gauge, it should be able to accommodate growth from the main originating points of freight traffic (including main ports). It will enable routeing of more of the freight traffic away from London and reduce passenger conflicts on the East Coast main line, West Coast main line (particularly around Birmingham) and South West main line.

Proposed CP4 schemes

The choice of proposed schemes to be taken forward in CP4 has been made in light of the analysis of the costs, benefits, contribution to a more available railway, reduction in network conflicts, deliverability and fit with other strategic schemes. The schemes are:

- Phase one of Ipswich to Nuneaton capacity enhancements to address growth in intermodal traffic, enabling growth from Haven ports to the north east to be accommodated;
- diversionary route from Southampton with W10/12 gauge clearance between Southampton and Worting Junction via Laverstock and Andover;
- the provision of a diversionary route enabling Channel Tunnel traffic to travel via Redhill and Reading and beyond;
- a fund dedicated to train lengthening schemes in order to enable haulage of more freight per train without changing the weight per axle. Such schemes permit growth within capacity utilisation constraints;
- a fund dedicated to gauge in-fill schemes in order to progress towards the SFN vision of extensive W12 gauge clearance; and
- a small fund reserved for studies to further develop the SFN vision.

Governance procedures will be established to ensure timely and appropriate use of SFN funds.

Additional funding

Additional funding contributions will be sought from scheme promoters and it may be possible to allocate funding to other schemes identified by the SFNG.

The CP4 Network Rail Discretionary Fund (NRDF) may also be a source of funding for schemes that meet its criteria. Possible candidate schemes may include the Hope Valley, Midland Main Line slow line schemes and Basingstoke loop.

The development of the SFN will continue beyond CP4. The first candidate in CP5 will be the second phase of the Peterborough to Nuneaton capacity works.

Seven day railway

In response to demand to provide services to customers for longer periods of the day and week, we have been developing proposals with our industry partners to increase the availability of the network to better match this demand where there is a business case to do so. We have developed with our industry partners the following principles to ensure consistency of approach throughout Network Rail that describes the impact of the seven day railway:

- a demand-led timetable that offers consistent services on each of the seven days in the week;
- a possession access regime that minimises its impact on the customer;
- increased productivity and efficiency of engineering work; and
- changes to the operational capability and configuration of the network to facilitate the above.

ATOC and the freight operators have undertaken work that has provided estimates of the substantial revenue benefits of moving towards an increasingly seven day railway. ATOC estimate the annual revenue benefit to be £106 million of running a full service on a Sunday. In addition, increased Saturday travel could lead to further revenue of approximately £19 million per annum. A report for the freight industry has calculated the annual revenue for freight operators to increase by £105 million by 2014 and to approximately £300 million by 2030.

Further details of our plans to deliver the seven day railway are set out in Chapter 6.

Longer term strategies

Our plans for CP4 need to fit within a longer term strategy for the development of the rail network and within an overall planning framework for transport as a whole. We are keen to work with the industry, government and wider stakeholders in developing proposals for the longer term. We are clear that this must be done within a sound planning framework that begins by defining the needs and objectives before analysing alternative transport options, comparing the costs and benefits of rail options with other modes.

This is an exciting time for the railway. We need to gain certainty on what will be delivered in CP4

and at the same time, develop the planning framework for the longer term in order to respond to DfT's and Transport Scotland's longer term objectives and the Eddington Review. We are already working with industry partners and others on a number of key initiatives that need to be explored within the context of a long term transport strategy.

Since the publication of the October SBP, we wrote jointly with ATOC to DfT to set out our views on their White Paper and the case for electrification. There is consensus within the industry that there is a sound commercial, economic and environmental case for the development of a wider electrification programme and that implementation of such a programme should not be deferred to CP5. We are already working together through the Network RUS on opportunities for infill electrification in the short term and where appropriate, more widespread electrification in the medium to long term. This work is being extended to include a thorough technical, economic and environmental assessment of a wider electrification programme taking into account the plans for the introduction of new trains.

We also recognise the need to examine options for additional capacity to accommodate growth beyond CP4 and how best to meet the Secretary of State's ambition to accommodate double today's level of freight and passenger demand in the longer term. We need to work with industry partners and government on the options for providing capacity in the longer term necessary to accommodate this level of demand including the examination of what further capacity can be delivered within existing railway corridors and what the options might be thereafter.

We must also ensure the network evolves and adapts as part of an integrated transport system. We have recently announced the trial of the innovative concept of "tram-train" which has the capability to run on both railway tracks and tram lines. We will be trialling this on the Penistone line between Huddersfield, Barnsley and Sheffield. Tram-trains are lighter and use less fuel than conventional stock and have benefits in terms of track wear and acceleration. It also has the potential of running commuter services closer into city centres and also removing services from congested city centre stations onto road running. If this trial is successful, then we can assess the benefits of its wider application.

Stakeholder support

The HLOS specifies a set of industry, rather than Network Rail, outputs for achievement in CP4. Our plan must be acceptable to both industry and wider stakeholders, if it is to be delivered successfully. The strategies and schemes contained in the SBP have been developed in consultation with our customers and wider stakeholders. Such schemes, whilst addressing directly known performance and capacity issues, also have the potential to deliver wider social, economic and environmental benefits to the communities that the services support.

Supporting documents

We are providing the following supporting documents to ORR:

- an update of the 26 Route Plans which describe the proposed strategy for each route; and
- a paper explaining the concept of the Strategic Freight Network and our individual priorities.

4 Network Rail's policies and strategies

Introduction

In the October SBP we explained that the development of a number of key policies and strategies is critical to the delivery of our plans for CP4. This chapter provides details of where these have been developed further since the publication of the SBP and where additional supporting information has been provided. We also outline the progress we have made in developing our broader approach to the management of our assets.

Performance

Improvements in train service reliability can be delivered by a number of mechanisms, including improved timetabling and service recovery, better asset reliability and reductions in delays per incident. As the cost of delivering reliability improvements will vary considerably, the initial identification of a PPM target for each mechanism (and for each asset type when considering asset reliability) is unlikely to provide an optimum solution. A more iterative process is required, as shown below.

Chapter 8 provides details of our performance forecasts and the mechanisms that underpin these forecasts, including expected changes in asset reliability as a result of the implementation of our asset management regimes.

Asset reliability

For the development of asset management polices, our approach was as follows:

- based on existing PPM levels, provide clarity on which parts of the network should be given priority when considering possible asset reliability improvements initiatives;
- develop management regimes for each asset group that minimise whole life, whole system costs, balancing inspection, maintenance and renewal costs with business risks associated with asset degradation or failure. Where appropriate, these regimes are differentiated by route, reflecting the nature and volume of traffic carried and the consequential cost of delay;
- identify asset reliability forecasts as a result of these regimes, in line with the disaggregation of the HLOS requirements;
- determine the likely impact of the asset reliability levels on PPM;
- assess the impact of all other train service reliability improvement initiatives (see below) and compare with HLOS requirements;
- if there is a shortfall, consider options to improve PPM and prioritise, generally on the basis of consideration of cost per percentage point improvement in PPM delivered and any deliverability risk. This further consideration includes asset reliability options that do not meet existing minimum whole life, whole system cost criteria; and
- amend the asset policy (and consequential activity and expenditure forecasts) where further asset reliability is considered affordable.

Maintenance and operations

There are a number of sources of potential performance improvements from the maintenance and operations parts of our business that are included in the iterative process described above. These include:

- improvements in the effectiveness of our maintenance activities, particularly on points;
- the use of remote condition monitoring to alert us to a possible impending failure;
- reviews of proposed technology and process changes and their likely impact on performance;
- the examination of performance data to identify potential savings that could be achievable through error free and resilient timetabling;
- possible timetable savings are discussed with train operators. In some instances this has identified further performance improvements that may be achieved from a full review of the timetable; and
- reviews of possible infrastructure changes that may provide improved operational resilience.

Measuring success

We are making good progress with the balanced scorecard initiative, described in the SBP. Our objective with this initiative is to support the management of the business by the development of a new suite of key performance indicators (KPIs), to be available from April 2009. Sixteen corporate KPIs have been defined across the four perspectives of the balanced scorecard. The majority of these are now being built so that they can be used in 'shadow' mode from April 2008. This will allow us to understand better the trends and data quality and will enable improved target setting. The KPIs will be monitored through a simple user friendly tool which is currently being built. The use of this tool will increase the understanding of the KPIs across the organisation and with external stakeholders.

Sustainability

In the October SBP we set out our vision for a more sustainable railway. Since the publication of that plan we have improved considerably the framework we intend to use to assess the impact of our plans and to communicate these plans to our people and our stakeholders. For each of the three pillars of sustainability used in this framework (economic, environment and social) we are developing a number of clearly defined goals.

Our social goals include:

- maintaining rail's position as the safest mode of public transport in the UK;
- setting the industry benchmark for safe and secure railway stations;
- being recognised for creating great travel environments;
- having fully engaged employees;
- recruiting and retaining high potential and high performing individuals; and
- being known as a great developer of both leadership and technical skills.

Our economic goals are:

- to improve the economic value to society from the existing railway;
- to reduce the level of subsidy required to support the provision of existing services; and
- to encourage investment in the railway to facilitate modal shift.

Our environment goals are:

- carbon impact reduction;
- sustainable consumption and production; and
- the protection of natural resources.

Each goal is supported by a delivery strategy and appropriate performance indicators are being developed. These indicators form an important component of our balanced scorecard, described above. We expect to be publishing a sustainability policy for Network Rail in early April.

Asset management

The improvement of our asset management capability is at the core of our plans to provide our customers and funders with a world class service. In the October SBP we summarised the progress we have made in improving this capability and outlined our plans. An important input into the development of these plans has been the work carried out by the independent reporter for asset management, Asset Management Consulting Limited (AMCL).

Asset policies

In October 2007 we published updated versions of our asset management policies. Considerable work had been carried out following the initial publication of risk-based policies in June 2006, with a primary focus on providing more quantitative supporting evidence. To assist in prioritising the necessary actions we carried out a criticality analysis to identify the key asset management interventions that required further consideration. This analysis was based upon a consideration of the likely expenditure in CP4 as a result of the intervention and the level of existing quantitative supporting evidence on which the policy is based.

Following the publication of our updated policies in October, Network Rail and ORR asked AMCL to carry out a further review of these policies, with particular focus on:

- reviewing progress made since the publication of the policies in June 2006 and our criticality assessment in January 2007 (used to prioritise our improvement programme);
- assessing the extent to which justification is provided to demonstrate the suitability of the policies;
- assessing the strengths and weaknesses of each of our asset management policies; and
- identifying short and longer term developments considered necessary to achieve a level of maturity commensurate with the importance to the rail industry and to our stakeholders of effective and efficient asset management.

In its report on the analysis of our policies, AMCL acknowledges the progress we have made and confirms that this progress is generally consistent with the priorities defined through the criticality analysis undertaken at the start of 2007.

The report also identified where AMCL believed that some additional supporting evidence could be provided by March 2008, to improve the level of confidence in the robustness of our expenditure and activity forecasts for CP4. This is summarised below. In response to this study, and to a number of detailed questions raised by ORR, we have provided considerable additional information in support of our SBP. This is also summarised below for each asset.

We have reviewed the policy improvement opportunities identified by AMCL for each asset group. Where practical in the time available, we have generally addressed the issues raised. Where the timescales have not allowed this, the appropriate action will be taken as part of our

ongoing policy improvement programme that is summarised below.

In addition to the further supporting information we have supplied to ORR, and in order to review the application of these policies, ORR and its consultants have carried out a number of visits to view sites where renewal work is planned or is currently in progress. Work carried out at these sites included renewal of track and switches and crossings (S&C), bridges and other structures, and stations (including the work at Paddington, Victoria and King's Cross stations).

We have described our further work relating to the volume and expenditure forecasts associated with the application of these policies, and any associated supporting information provided to ORR, in Chapter 6 of this document.

We intend to publish revised asset policies in support of our 2009 Business Plan.

Track

AMCL's review of our track policy suite of documents concluded that:

- the policy for track is comprehensive in content and based on solid engineering principles and judgement;
- the policy and policy justifications are the most developed of the asset groups and provide the most quantitative supporting evidence;
- the format and content of the policy has progressed significantly since June 2006 and Network Rail has exceeded AMCL's assessment of the progress that could be achieved by March 2008; and
- the ongoing focus for track needs to be the development of more robust risk-based analysis and the provision of more quantitative supporting evidence.

A number of key opportunities to improve the robustness of asset management interventions were also identified by AMCL, primarily relating to the provision of more quantitative supporting evidence. These suggestions are being incorporated into our plans.

Additional supporting evidence

We recognise that a number of key asset management interventions set out in our October policy documents were not fully supported by quantitative analysis. There have also been a number of questions raised concerning the practicality of carrying out additional maintenance to extend the life of our assets. To address this (and to supplement the site visits described above) we carried out further analysis in support of the major cost drivers of our asset management plans.

We have carried out a whole life cost appraisal for plain line track renewals. This demonstrates that the renewal intervention, as defined in our asset policy, delivers medium to high value for money (using the DfT's benefit appraisal methodology). For secondary routes, the benefit will be less than this but the analysis still demonstrates a positive net present value (NPV). We have carried out a similar analysis for the renewal of timber bearer S&C on primary routes (which forms the bulk of our S&C renewals in CP4). This also delivers medium to high value for money. For secondary routes, again the benefits will be reduced, but still remain positive.

We have also updated the analysis that underpins track system renewal (i.e. the grouping of rail, sleeper and ballast renewal activity when the renewal is driven by the age or condition of one of these components). Based upon whole life cost considerations we have now identified the remaining age of the other components that determine if system renewal is more cost effective.

Other key information relating to the rationale underpinning our track policy provided to ORR since the publication of the October SBP includes:

- inspection frequencies – we have assessed the implications of varying the inspection frequencies on primary routes and satisfied ourselves that overall the current frequencies provide a sensible balance between cost and risk of asset degradation;
- maintenance frequencies – we have carried out a similar exercise for maintenance frequencies and are considering a number of minor amendments;
- maintenance activities – we have documented the key driver for each of our key maintenance activities (primarily focussing on achieving expected asset life or leading to improved reliability) to provide greater clarity on what the activities are expected to achieve; and
- outputs – we have produced a detailed and comprehensive asset measurement regime to monitor the impact of our asset polices.

In addition, since the publication of the SBP we have reviewed our approach to differentiating asset management policies across the network. This was in part to ensure that further reductions in whole life, whole system costs could not be

achieved by a greater degree of disaggregation, particularly on the primary and key London and south east route category. This review has confirmed our current approach. As the major track asset management cost drivers are based on tonnage, rather than route category, we believe that the reliability and performance benefits delivered by this approach justify our current three tier approach to network disaggregation.

Signalling

As part of the long term signalling review, we carried out significant development work on our asset management policies for signalling assets. As a consequence, during late 2006 and 2007 our focus has been on refining our plans for the introduction of ERTMS technology in CP4 rather than further development work on our core policies. It is our intention, however, to continue with the development of these policies and align the format, where appropriate, with the format of the policy documents for our other assets. This will also need to take account of further work on our longer term operational strategies.

In their review of our existing policies, AMCL identified a number of key strengths, including:

- recognition of the extensive analysis that has been undertaken as part of the signalling scenario review;
- the adoption of a consistent approach for assessing asset lives for different signalling assets and the use of the Signalling Infrastructure Condition Assessment (SICA) tool to monitor the condition and remaining life of assets; and
- the development of a long term vision involving a move towards in-cab signalling.

AMCL also identified a number of key opportunities to improve our signalling policies. These primarily concerned the provision of more quantitative supporting evidence, which AMCL believe should be prioritised based upon a criticality assessment, and the greater use of failure analysis to verify the effectiveness of the maintenance and renewal regimes.

A considerable proportion of this information is already available, and has been shared with ORR as part of the ERTMS discussions. The next version of our signalling policy will include this important supporting information.

AMCL's suggestions are being incorporated into our forward plans for the further development of our signalling asset management plans.

Additional supporting evidence

Given ORR's previous understanding of the rationale behind our signalling asset policies as a result of our work with them on the long term signalling review, the majority of issues raised by ORR concerned the activity and expenditure forecasts related to the application of the policies rather than the policies themselves. Our response to this is set out in Chapter 6.

Civils

We have carried out considerable work on our civils suite of policy documents since their publication in 2006. AMCL acknowledged this and commented that:

- the description of the Civil Engineering Cost and Strategy Evaluation (CECASE) and its application demonstrates improved supporting analysis;
- there is now a more comprehensive commentary on the examination and mitigation regime for underbridges, which includes the development of risk based examination frequency intervals;
- there has been a general improvement in the content of the degradation, failure modes and consequential risk analysis sections; and
- good use has been made of references to studies that support our policies.

Additional supporting evidence

The CECASE modelling tool was available in 2007 for the first time for the production of long term expenditure forecasts. In Chapter 6 we provide details of the further work we have carried out to validate the outputs of this model.

CECASE models a number of policy options, with policies B and C (as set out in the October SBP) the basis for our cost submission. It is clear that there has been some misunderstanding on the difference between policy C as it was applied in CP3 and our revised approach for CP4. The main differences can be summarised as follows:

- CP3 – the application of policy C is generally based on only carrying out the maintenance and renewal activities necessary to maintain the immediate functionality of the structure. Frequently this patch and repair approach provides a sub-optimal solution in whole life cost terms; and
- CP4 – the proposed application of policy C for CP4 is, as for policy B, based upon a consideration of costs over the life of the asset. Unlike policy B, however, it may not equate to a lowest whole life cost solution where sufficient funding is not available and

opportunities exist to defer investment by allowing asset deterioration. Where subsequent work is required to restore the functionality or capability of the asset, this is generally carried out on a minimum whole life cost basis, again subject to funding availability.

In Chapter 6 we provide more detail of the immediate and longer term implications of retaining the current (i.e. CP3) policy C approach through CP4.

For a number of assets within the civils portfolio we believe that the SBP did not provide a sufficiently comprehensive explanation of the rationale for the policy and what it was expected to deliver during CP4. Further explanation has been provided for the following assets:

- earthworks;
- major structures;
- tunnels; and
- culvert clearance, ancient mines and other assets.

These explanations have been structured to provide a greater understanding of the underlying purpose of the policies, how their delivery has been modelled and how the policies compare with those applied in CP3. In addition we have produced management plans for a number of major structures. These provide greater clarity on our plans for managing these, often complex, structures.

We believe that the asset management policies proposed for CP4 for our civils portfolio will address the continued decline in overall condition that, whilst slowed down in CP3, will continue in CP4 without additional investment. In Chapter 6 we provide quantitative evidence that we believe supports our forecasts for the change in condition over CP3 and that supports the expenditure and volume numbers resulting from the application of the CECASE model.

Operational property

Prior to the publication of the October SBP the operational property policy had been part of a broader civil engineering policy suite of documents. AMCL acknowledged that the suite of documents published in 2007 provided a good foundation for future development. However, it registered some concern about the apparent overlap between functional capability and asset condition in our policy definitions and a lack of visibility of whole life, whole system cost analysis supporting the assessment of optimum asset management regimes.

Additional supporting evidence

We recognise that the original wording of policies B and C could be considered as ambiguous. We have amended the wording to make it clearer that both policies are based upon minimisation of whole life, whole system costs. We have also clarified that the application of policy C allows for the assessment of opportunities to downsize an asset on the smaller categories of station, where the usage requirement of the station has changed since the asset was first installed.

Our October SBP included a third policy, which related to the assessment of increasing the capability of an asset when it became due for renewal (policy A). Although we will indeed consider this opportunity where appropriate, as this is providing an enhancement to the station, we do not now believe that it is appropriate to be included in our policy suite for maintenance and renewal.

A significant development since the publication of the October SBP has been the availability of asset volume and condition data from our Operational Property Asset System (OPAS). We have provided ORR with OPAS data from a sample of 100 stations. Chapter 6 contains details of how we have utilised this data and the impact it has had on our activity and expenditure forecasts.

As we stated in the October SBP, we are committed to optimising station investment by working closely with train operators and other industry stakeholders. In response to concerns raised about the relationship between station charges and station investment, an approach where charges are set according to expected investment is currently under review. Over the next few months we will use our improved station condition knowledge, from OPAS data, to identify investment priorities for CP4 based on the relative condition of each Station Facility Owner (SFO) portfolio. This will enable us to make more robust investment forecasts to train operators.

Electrification and plant (E&P)

AMCL considers that our policy for overhead line equipment (OLE) renewal and maintenance, including the deterioration and whole life cost analysis, has been developed to a relatively high level of maturity. AMCL also believes that it would be possible to improve the robustness of our E&P expenditure and activity forecasts by providing additional evidence in support of our proposed plans for distribution and for system control and data acquisition (SCADA) equipment. In the longer term they would expect the

robustness of these expenditure forecasts to match those of the OLE.

Additional supporting evidence

The focus of attention in 2007 on improving the robustness of the asset management regime for OLE equipment was a direct result of the prioritisation exercise we undertook in January 2007. We recognised, however, that as the CP4 expenditure for distribution equipment represented a significant proportion of the total forecast for E&P, further justification was required.

A considerable proportion of our distribution equipment was installed in the 1950s and 1960s and is either at, or rapidly approaching, the end of its operational life. For some equipment the likelihood of complete asset failure is becoming high and cannot be mitigated against. For others, for example types of oil filled switchgear, the increased potential for explosive failure provides an unacceptable safety risk. In Chapter 6 we have provided a summary of the age profiles of our distribution asset base and identified how our policies are structured to remove these high risk assets from the network during CP4 and CP5.

In the longer term we will develop the robustness of the expenditure forecasts for the remainder of the E&P assets to match those for OLE activities. This will in part be facilitated by better asset condition and failure data for our assets through our Asset Information Strategy (AIS).

For SCADA we have refined the programme of works to improve the alignment with our operational control room strategy and the national telecoms programme, and also to reflect the replacement priorities of life-expired assets controlling the DC electrified network.

In addition, we have reviewed our proposed OLE structures painting programme and carried out a detailed whole life cost assessment. This analysis demonstrates the effectiveness of our policy, delivering high value for money using the DfT's value assessment criteria.

Telecoms

In its review of the telecoms policy AMCL identified a number of strengths, including the identification of technology choices, the asset failure modes and consequences and the maintenance and inspection regime options. AMCL also identified areas for improvement, including:

- a criticality assessment to prioritise future policy development work;
- greater visibility of the whole life cost assessment underpinning the policy; and
- clarity on the asset information that has been used to develop the policies.

Additional supporting evidence

The majority of issues raised by ORR concerned activity and expenditure forecasts related to the national telecoms programme rather than the asset policies. The nature of this discussion and the additional information provided to ORR is explained in Chapter 6.

Asset information

In September 2007, we completed a two and a half year programme of work, comprising a systematic specification of information requirements leading to a series of data quality and system functionality improvements. In parallel to this work, asset data maintenance procedures and an information assurance regime were implemented to prevent future degradation in data quality.

The 18 initiatives in this programme of work have been audited by AMCL. A preliminary report from AMCL, published in February 2008, acknowledges significant overall progress and concludes that the large majority of tasks have met their stated objectives. AMCL is currently following up a number of issues and will complete their report on this work at the end of March.

As we stated in the October SBP, improved access to data enables us to make better asset management decisions and improves our ability to make expenditure and activity forecasts. Our revised expenditure forecasts for operational property assets, as described above, are based upon improved data reliability. A key challenge for us, as with most organisations with a large asset base, is improving our data capture and maintenance regimes. This will remain a key focus for the company.

Our forward plans

We remain committed to the improvement of our asset management capability and the input provided by the independent reporter provides a very valuable source of material for the further development of our improvement programme. Our plans are currently based on a number of core themes, and include:

- improved clarity on the specification of each route, to improve the alignment between asset management activities and route outputs;
- consideration of the broader adoption of the policy differentiation approach used predominantly for track assets at present;
- the continued development of risk-based asset management planning, covering all key cost drivers;
- improved access to fault data and failure history;
- the ongoing development of decision support tools and whole life, whole system cost models;
- improved access to asset data, in particular asset failure and degradation data; and
- improving the alignment between all of the internal stakeholders involved in the asset management process.

We have recently carried out a detailed review of our approach to asset management, via a series of workshops with senior managers from a broad spectrum of functions from within the company. These workshops have built on the work to date in developing our asset management capabilities, and have produced a solid platform for the further development of this work, see Figure 4.1.

Key outputs of this workshop include:

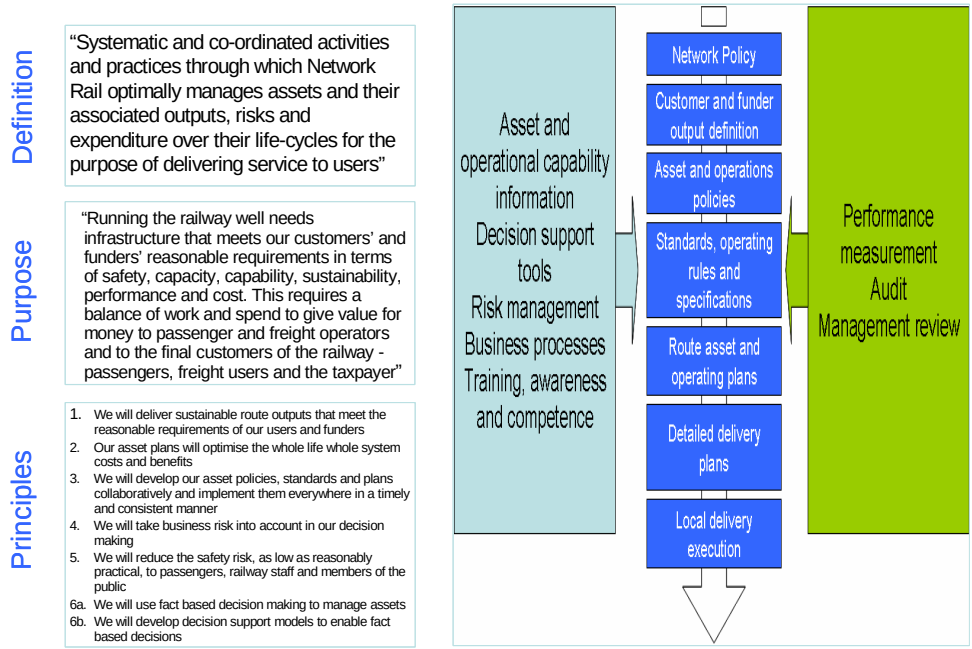
- the development of a vision for effective asset management that provides the appropriate guidance for those directly involved in asset management activities and meets the needs of those responsible for operating services on the network;
- a review of the asset management framework that underpins the delivery of our asset management responsibilities and the identification of functional roles and responsibilities for each component of the framework; and
- a gap analysis to identify key priorities.

A road map is currently in preparation that will detail how we intend to take this programme forward.

Managing technology

Network Rail manages a variety of technologies. Some of these technologies change relatively slowly over time, for example with bridge construction. Others are considerably more volatile, for example information technology and communications. Our approach to the management of these technologies has been shared with ORR and is summarised below.

Figure 4.1 Our approach to asset management



Research and development

The strategic framework that we have adopted for the management of technology takes account of the variation in complexity and volatility of the technologies we manage. It also reflects the fact that railways do not generally develop these technologies, but adapts them to the railway environment.

There are five components to our technology management framework, that generally operate as follows:

- business need definition: critical to the effective identification of potential solutions and the effective consideration of possible technologies;
- research; work with research establishments to establish basic technologies and develop initial proof of concept for operation in the railway environment;
- development; further establishment of proof of concept and development and testing of prototype under controlled conditions;
- implementation: prototype testing in an operational environment the technology following which technology enters service under standard operational conditions; and
- continuous improvement: the ongoing development of the technology, via the use of six sigma and other similar analytical techniques, to improve its operation and the value it provides to the railway, .

In this respect our research programme is about guiding the work of others through specification rather than conducting fundamental research itself. The actual role we play in each technology will be dependent on how well the technology is currently developed.

An important component of this approach is the management of technology transfer risk which we address via a process of creating a robust business case for the new technology and a dedicated sponsorship team to manage the technology transfer.

Remote condition monitoring

In our October SBP we explained how improved infrastructure monitoring is a key component of our strategy to improve the value provided by the rail network. Since then we have developed further our strategy for intelligent infrastructure, in particular the use or remote condition monitoring.

Rationale for the strategy

The move to a "predict and prevent" asset management regime requires regular and objective asset condition monitoring, delivered by automated systems. This has formed the basis of our train borne strategy and is now being extended to the fitting of remote condition monitoring (RCM) equipment to significant numbers of fixed assets.

Understanding asset condition in real time provides a number of key benefits:

- it allows intervention prior to the asset failing;
- it facilitates the move from fixed interval inspections to condition based regimes, which is particularly helpful where access is becoming more difficult; and
- trend analysis may help optimise timely renewal and should help with new asset design.

Installation plan for CP4

At present a relatively small number of assets are fitted with RCM, with a variety of technologies and monitoring regimes utilised. In 2008/09 and through CP4 we will roll out a standard solution across the network.

The monitoring of points and track circuits forms the backbone of our condition regime for CP4. For points, the equipment will monitor changes in current and timing. Equipment installed on track circuits will detect variations in voltage.

Based upon consideration of asset failure characteristics, and the experience of European railway operators who have operated condition monitoring equipment, we believe that around 40 per cent of failures can be prevented by an effective condition monitoring regime.

Although the maximum improvement in asset reliability would be delivered by installing the equipment on all points and track circuits we do not believe that this will deliver value for money. Following an examination of failure history (in particular those assets that have failed on more than one occasion) we have estimated that fitting the equipment onto 50 per cent of the network should provide a probability of around 80 per cent that an asset about to fail is fitted with RCM. Assuming that 40 per cent of failures can be prevented, this should, therefore, reduce failures by 32 per cent.

These reliability improvements have been included in our forecasts of asset performance in CP4, which underpin our train performance projections.

We are also planning to install the equipment on:

- level crossings;
- point heaters;
- signalling power supplies;
- solid state interlockings; and
- axle counters.

The forecast impact on asset reliability as a result of this strategy is detailed in Chapter 8.

There may be a case for additional investment in condition monitoring and we will continue to investigate this. However, the additional investment and potential benefits are not included in our plan.

Engineering access strategy

Over the last few years the demand for rail services has increased and as a result the volume of traffic running on the network has also increased. The changing demographics and mobility of the population, and increasing congestion in road traffic are helping to drive further growth in demand for rail services.

These changes in levels of traffic have contributed to increased volumes of maintenance and renewals being required. However, this same increase in demand ultimately put pressure on the levels of engineering access available to carry out the increased volume of works. In the SBP we outlined many of these pressures and tensions that surround the existing engineering access strategy.

Existing engineering access patterns make considerable use of night-time and weekend disruptions and possessions, reducing the ability to run weekday services at weekends. It is widely acknowledged that there is a growing demand for weekend rail travel.

In the SBP we described our aim to move towards engineering access patterns that would facilitate more services to be operated at the weekends and at night, where there is a demand sufficient to justify the overall industry costs. We have continued to work across the industry with TOCs and FOCs and other stakeholders to estimate the benefits that could be achieved, on a route-by-route basis.

Our engineering access strategy has now evolved to incorporate, as a base, the guiding principles that have been developed for the move towards a seven day railway. The first stage of this is to move to a position in which we run the weekend timetable as published, consistently and without disruption. Following this will be a move towards actively changing engineering access patterns towards those consistent with a seven day railway, on a route-by-route basis according to the industry cost benefit case for each individual route. Further detail on the move to a seven day railway is set out in Chapter 6.

Supplier strategy

In the October SBP we outlined our plans for strengthening the relationships with our suppliers and ensuring that we maintain an effective supplier base. As part of this work we have established four strategic aims:

- maximising value from supplier markets;
- supporting delivery;
- delivery efficiencies; and
- improving capability.

We have continued to work with our suppliers since the publication of the SBP and they have provided input to the development of our efficiency plans.

In order to make sure that we maximise the opportunities for efficiency and effective supplier relationships we are actively developing a European sourcing strategy. Our aim is to identify and source companies within Europe for specific goods, services and works and encourage non-UK suppliers to actively engage with Network Rail. In doing this we hope to be able to more easily import best practice, alleviate supplier constraints and introduce greater levels of competition, and use any downturns in the wider European railway investment cycles to mutual advantage.

To facilitate this we intend to set up a communication process that allows ongoing engagement of the market beyond the incumbent supply base. We will do this through a number of initiatives including easier access into our supplier registration, whereby companies can log their interests and specialities, and by running more widely accessible and attended supplier conferences and events.

Infrastructure cost model

Since the publication of the SBP we have made some further improvements to our Infrastructure Cost Model (ICM). The model has also been subject to detailed audit.

We have undertaken a detailed review of the workings of the track maintenance elements of the ICM. This review was partly driven by our concerns about the results of the variable cost analysis presented in the SBP which showed surprising variations in incremental costs of

different routes. We reviewed forecast volumes for every activity at network level and by route category and revisited the engineering specifications for the model. This review process was informed by Halcrow's independent review of the SBP variable cost estimates, and the detailed ICM audit described below. The resulting impact on our CP4 forecasts is set out in Chapter 6.

Early this year, Halcrow undertook a detailed independent technical audit of the whole model, reporting jointly to Network Rail and ORR. This follows the independent audit of version 1 by AMCL in 2006. While the AMCL review was strategic and focused on the model's application of our asset policies, Halcrow's remit was to carry out a forensic audit of all the calculations in the model to ensure that they accurately captured the model specification. The audit identified some errors in the calculation of activity volumes, principally in the track maintenance module, some of which had already been corrected during our own review. The thoroughness of Halcrow's process and the small number of significant errors found increases our confidence in the modelling process.

In addition, Halcrow made a number of constructive recommendations about the future development and use of the model, including 'future-proofing' for changes to, for example, the segmentation of the network. These are very helpful and will be taken into account in our continuing refinement of the model.

The other key area of ICM development has been franchised stations, where the availability of a much more detailed asset database, covering a much larger number of stations, has allowed the improvement of the model by applying similar principles on a much more station-specific basis, where the SBP relied on extrapolation from a relatively small sample of stations. This is discussed further in the operational property section of Chapter 6.

In addition to generating our core expenditure forecasts, the ICM has been applied to the estimation of the marginal costs of accommodating additional traffic in the context of setting appropriate variable access charges. This has been done by running the model with different traffic scenarios and analysing the differences in costs and volumes over the long run. This is discussed further in the charging section of our plan and the supporting document on charges.

5 Efficiency and input prices

Introduction

In the SBP, we described the basis of our assumed efficiency savings. These were based on specific initiatives and bottom-up plans together with an element of further stretch as we recognised that we would continue to identity additional opportunities for savings over the next few years. This was also informed by the available top-down analysis of potential efficiency savings. We also included our assessment of the likely increase in input prices during CP4.

Since publication of the SBP, we have continued to develop our efficiency analysis. In particular, we have carried out further top-down analysis to assess further the potential efficiency savings that can be achieved in CP4. We have also continued to develop the specific efficiency initiatives. As a result of this further work, we concluded that we should not change our overall efficiency profiles from those published in the SBP, except for track renewals. In this area we have increased the assumed efficiency by one per cent per year as we expect to start the control period with higher unit costs than were assumed when we produced the SBP. We have assumed that we will recover this gap by the end of CP4 but that it is not realistic to assume that this can be achieved in the first year.

In this chapter, we update the expected position at the end of CP3 and summarise the further work we have undertaken including:

- assessing in greater depth the UIC data to understand better the differences between Network Rail's costs and those of other European operators;
- assessing the range of efficiency achieved by other regulated infrastructure companies;
- assessing the potential pace of change that may be possible within the company and the industry;
- explaining the further work we have undertaken in assessing the work commissioned by EWS;
- reviewing the outputs from ORR's benchmarking of other European and North American network operators; and
- updating the study into input price changes to reflect the latest projections.

CP3 efficiency

Although we are continuing to reduce the costs of running the network, it is becoming increasingly difficult to achieve savings. Our projected operating costs and maintenance expenditure in 2008/09 will be around £40 million higher than we had previously published. This is largely due to the more restricted engineering access on the West Coast main line with the implementation of the new December 2008 timetable (which we had previously assumed would not have a major impact until the following year) and the impact of the increase in traffic.

For most asset categories, renewals expenditure is forecast to be broadly consistent with the SBP. However, we have increased track renewals expenditure in the final two years of CP3 by around £50 million as we are not confident that we will achieve the planned efficiency savings of 23 per cent by the end of CP3.

Developing CP4 efficiency plans

Our efficiency plans for maintenance were derived using a bottom-up approach to identify the types of activity that would be targeted. The quantum of these activities was identified and costed and then subject to a significant element of stretch, around 35 per cent, which was embedded in the detailed modelling. We have then added a further top-down stretch of around one per cent. Overall, the specific bottom plans are forecast to deliver savings of around 12 per cent. Inclusion of the further stretch increases these maintenance savings to 17.6 per cent by the end of CP4.

Our renewals plans are also derived using a bottom-up approach, based on the specific initiatives that we have identified to date across each of the asset groups. The bottom-up efficiency profiles for each asset ranged from around eight per cent for track to around 18 per cent for signalling. The overall bottom-up saving was around 12.5 per cent by the end of CP4. We then included a further stretch of around 40 per cent, which increased the overall savings to 17.6 per cent. There is a further stretch as a result of the need to catch up the shortfall in efficiency in track renewals from our previous CP3 projections. Details of our bottom-up efficiency plans for both maintenance and renewals were detailed in the SBP and its supporting documents.

ORR considers that the savings identified from our bottom-up initiatives are unlikely to be sufficiently challenging as they have been "identified by those managers who will deliver them". We consider that this has been taken into account through the application of an additional stretch. The level of stretch reflects the opportunity both to identify further opportunities

and to achieve greater savings from these specific initiatives.

Our controllable operating expenditure is heavily influenced by a small number of specific areas; pensions, insurance, accommodation, information management, and the operational cost of signalling the network. This last category is, in turn, directly influenced by the size and operational requirements of the network. We also assumed that we would achieve savings of 17.6 per cent for most areas of operating costs (excluding signalling costs, pensions and insurance for which we have developed specific assumptions). We do not yet have detailed plans for how we will achieve these savings and this is a major priority for the next few months.

In many cases the only way to reduce our operating costs significantly will be though major investment to rationalise the infrastructure. This requirement has to be balanced with the investment in day-to-day renewal and enhancement of the network required to deliver the outputs and accommodate growth.

We continue to work more closely, and are developing improved relationships, with our suppliers. This has included working with the Railway Industry Association (RIA) so that it can understand in detail the scale of the challenge to deliver a large investment portfolio while achieving significant efficiency savings. RIA has provided the results of its analysis to ORR.

The headline efficiency profile does not capture all the efficiency improvements being planned in CP4, as there are some scope efficiencies embedded in our forecasting of activity volumes. A key example of this is the planned change in delivery of S&C renewals with a greater proportion of units being partially renewed. The impact of this on the efficient costs of delivery can be approximated by comparing our CP4 plan with the cost of applying the current delivery mix to the same total number of S&C units. This implies an additional scope efficiency of up to 15 per cent on S&C costs, broadly equivalent to 3.5 per cent on the whole track renewal portfolio.

Top-down analysis

ORR continues to put a strong emphasis on the use of top-down analysis and on that basis considers that we have underestimated the scope for efficiency improvement. ORR has stated that its analysis indicates that Network Rail may be at least 30 per cent less efficient than the average European rail infrastructure managers covered by the UIC benchmark data. ORR also recognised the importance of improving our understanding of why our costs differ from those of other European operators.

We have therefore commissioned further analysis to assess:

- the scale of the gap between Network Rail and other infrastructure managers; and
- the realistic pace of change over CP4 taking into account all aspects of the business.

We recognise the importance of top-down analysis in assessing potential efficiency savings and have taken this into account when deriving the level of stretch that has been applied to our bottom-up plans. We have fully engaged in the lasting infrastructure cost benchmarking (LICB) carried out by Union International Chemins de Fer (UIC) over the last ten years. We have recently been encouraging further developments in this area, including the more comprehensive approach that takes account of the outputs being achieved in each country.

However, we continue to believe that efficiency outputs should not be based on top-down assumptions alone. It is important that we are confident that we can actually deliver the assumed efficiency savings. The use of top-down analysis is therefore dependent on a detailed understanding of structural and other factors that drive cost differences.

We recognise that top-down benchmarking can be used in more detailed work with individual companies to understand the differences between maintenance and renewal regimes and identify improvement opportunities. This has been successful at a detailed level, and a number of the bottom-up initiatives contained in our plan have been inspired or informed by activities observed elsewhere.

European cost benchmarking

Econometric analysis of UIC data

Leeds Institute of Transport Studies (LITS) has been carrying out statistical analysis of the UIC LICB data to support ORR's assessment of potential efficiency savings. The broad conclusions from this analysis are consistent with those in the original LICB analysis, which shows that there is a significant gap between Network Rail's costs and other European infrastructure managers.

We have expressed concerns that this gap cannot be considered to represent the potential

opportunity for efficiency gains. In particular, we consider that there are other structural factors that must be taken into account and that further analysis is required to identify the efficiency components of the expenditure gap, including a more fundamental understanding of best practice amongst European infrastructure managers. This will not come from a high-level statistical model alone but from benchmarking performance in specific activities within maintenance and renewals.

We therefore engaged BSL Management Consultants to carry out further analysis to explain better the expenditure gap. Any conclusions on efficiency should take account of this further analysis rather than simply concluding the gap revealed by the UIC data is due to inefficiency. We asked BSL to include the costs of Amtrak of the USA in this analysis.

BSL is a German-based consultancy, and part of Lloyds Register Rail (LLR), with significant experience in rail infrastructure and operations. It was instrumental in the inception of the UIC LICB study and devised much of the methodology and metrics that are used in that study.

The analysis was based on the UIC's LICB data, comparing Network Rail's costs to the average for the European railways and Amtrak (referred to as the peer group). Wherever possible BSL took into account its own more detailed understanding of specific cost drivers, based on a wide range of in-depth work carried out for a number of European infrastructure providers and contractors.

Normalising costs

BSL's first step was to make some minor improvements to the existing UIC LICB data, where necessary, to address retrospective data errors which had been identified. This applied to both the Network Rail and peer group data. Using established UIC methods the data were then normalised for comparative price levels, network complexity and network utilisation. However, no additional normalisation for labour cost variation was applied which is consistent with the LICB approach.

Having made these adjustments, BSL calculated that Network Rail's normalised annual maintenance expenditure is around £1.1 billion and normalised annual renewals expenditure (based on a 10 year average) is around £1.9 billion. The peer group total average cost per track mile is around 57 per cent less than Network Rail's costs. This comprises renewals, for which the peer group is around 68 per cent (£1.3 billion) lower, and maintenance, for which it is 38 per cent lower.

In making these adjustments, BSL noted that Network Rail's infrastructure and operational characteristics are broadly similar to the peer group average indicating that the cost benchmarking should be valid.

BSL also analysed the average age of rail and switches and crossings for the peer group. This indicated that Network Rail's track assets are more than 40 per cent older than the peer group average. BSL considered that this implied that Network Rail currently has a significant investment backlog compared to the peer group.

Explaining the gap

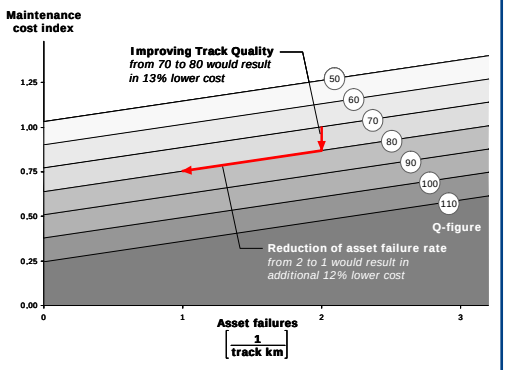
BSL then carried out further analysis to explain the cost gap between Network Rail and the peer group. It separately analysed the impact of activity levels and efficiency as these are likely to have different cost drivers.

Activity volumes gap

Maintenance

The consultants considered that different maintenance activity levels result from different levels of track quality and signalling system reliability. BSL has assessed their impact on maintenance costs based on analysis carried out with Banverket in Sweden. BSL has developed a relationship between the quality of the infrastructure, the number of asset failures and maintenance costs, as illustrated in Figure 5.1.

Figure 5.1 Impact of quality on maintenance cost



Source: BSL/Banverket

This indicates that higher quality track or newer assets require less frequent maintenance interventions and will generally suffer fewer failures. Recognising that Network Rail's track assets are significantly older than the peer group

average, BSL considers that Network Rail has higher track and signalling failure rates than the peer group average.

BSL has assessed that the peer group average has around 50 per cent fewer infrastructure failures than Network Rail which results in costs that are around £80 million lower. We believe that this reflects historically higher levels of spending, particularly on track renewals and signalling systems, in some European countries over a number of decades. In this plan, we have identified significant improvements in infrastructure failures during CP4, as described in Chapter 6. Achieving a reduction in failure rates of 50 per cent is our longer-term aim, but it cannot be quickly achieved and it is essential that the improvement is sustainable.

BSL also considers that Network Rail's current track quality is worse than the peer group average. This requires increased maintenance activity to manage the asset which accounts for a further £90 million of the gap.

The impact of higher asset quality in the peer group accounts for £170 million of the total gap, leaving a further £263 million to be explained.

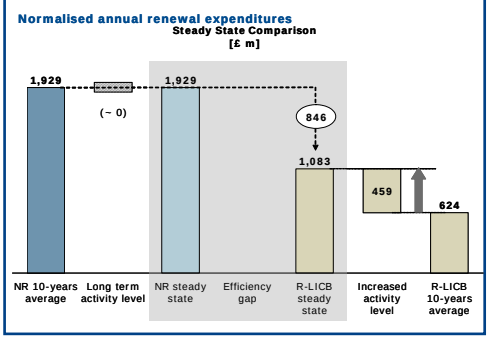
Renewals

Over the last ten years, Network Rail has significantly increased its renewal volumes. BSL considers that the current activity levels are higher than the levels required to maintain assets in a steady state. However, it also considers that this level of spend is not reflective of inefficient unit costs, but is necessary to address previous under-investment. When examined over the last ten years BSL believes that the average renewal volumes in Britain are broadly equivalent to those required over the longer-term to deliver a steady state asset condition.

BSL has also assessed the volume of renewals by the peer group. This analysis showed that a number of the peer group countries have been renewing assets at levels below that required to maintain a steady state. While in the short to medium term this will allow reduced levels of expenditure, BSL considers that it is not necessarily indicative of higher efficiency but may reflect a reduced level of activity, which may reflect under-investment in the infrastructure.

BSL concluded that the required increase in the volume of renewals for the peer group to achieve steady state would require additional normalised expenditure of around £459 million. This would increase the average annual renewals for the peer group to around £1.1 billion. This would reduce the gap between Network Rail and the peer group average to £846 million as illustrated in Figure 5.2.

Figure 5.2 Normalised peer group renewal rates



Efficiency gap

The BSL analysis has then assessed the key differences in efficiency levels between Network Rail and the peer group. It is noted that BSL's analysis was based on expenditure up to 2006/07. It does not, therefore, take account of further efficiency improvements during the rest of CP3. BSL did not have data for the peer group for this period. However, we believe that Network Rail's efficiency savings during this period may outperform those being achieved by the peer group, which would further narrow the maintenance and renewals gap.

Maintenance

BSL has identified three key differences between the costs of Network Rail and the peer group. First, BSL analysed the cost of employment in different countries. BSL has concluded that the peer group's average labour unit costs are around 14 per cent lower than the cost of employment in Network Rail. On the basis that Network Rail's maintenance costs include approximately 66 per cent labour, BSL has concluded that this increases Network Rail's annual costs by around £100 million.

BSL believes that variations in good practice in maintenance delivery units can vary by up to 25 per cent. BSL has assumed we can deliver further improvements in this area but recognises that some of this is at least partly reflected in our efficiency plans. BSL has assumed that achieving best practice could deliver annual savings of around £55 million. However, we note that this would introduce another significant level of change in addition to the significant improvements already identified in our bottom-up initiatives. We are continuing to develop our

bottom-up initiatives, which include cascading best-practice, and believe that some of the improvement identified by BSL may already be reflected in our plans.

BSL has also identified that our on-track fleet (particularly tampers) is larger than the fleets operated by the peer group and its utilisation appears to be generally lower. BSL has estimated that this could contribute a further £15 million to the gap between the costs of Network Rail and the peer group. Again, we note that our bottom-up initiatives already include some rationalisation of on-track machines and, therefore, we believe some of these savings may already be included in our bottom-up savings.

The above differences account for around £170 million of the remaining gap of £263 million. Our planned savings during CP4 are expected to reduce costs by a further £180 million which is more than the remaining gap (although there may be some overlap with the identified opportunity for improved practice in MDUs). This is illustrated in Figure 5.3.

Renewals

As a result of the adjustments reflecting the level of renewals activities, there is a gap of £846 million in the cost of renewals between Network Rail and the peer group.

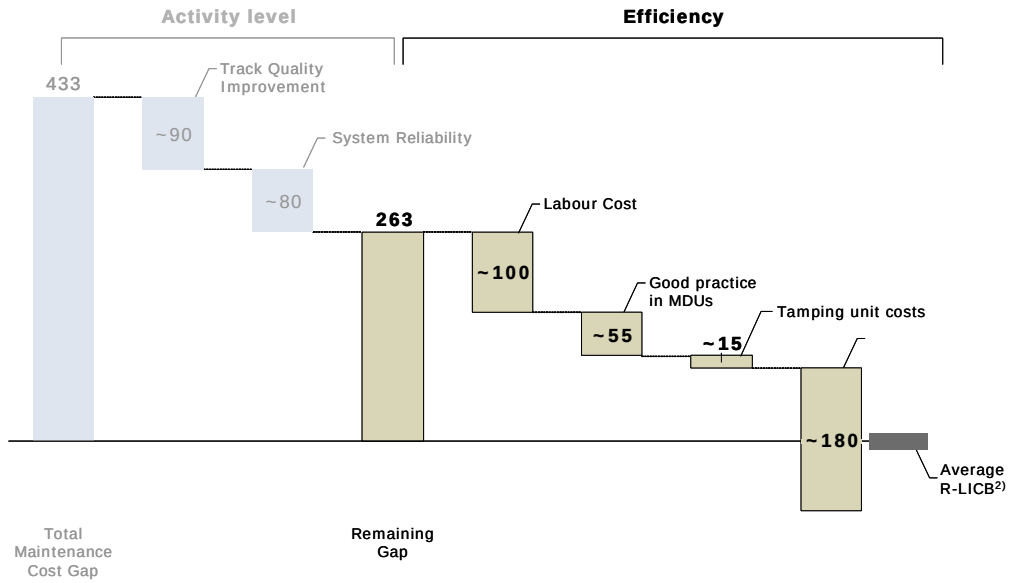
There are a number of areas that BSL believes contribute to the overall gap. Similar to maintenance, labour costs are higher in the UK, resulting in costs that are around 14 per cent higher than the peer group. This is estimated to account for around £150 million.

The cost of purchasing plant (including locomotives) is around 30 per cent higher in the UK than in Europe. Most of this difference is due to variation in specifications and safety standards, and the equipment manufacturer Plasser estimates that the additional cost of the UK specification for crash-worthiness alone is around 15 per cent. BSL estimates this accounts for around £80 million.

Working with Banedanmark in Denmark, BSL has previously analysed the economies of scale that can be achieved by optimising the length of track renewal worksites. It developed a relationship between the length of renewal worksites and unit costs. BSL considers that the average worksite in the UK is significantly shorter than its assessment of the optimum length. It has assessed that these shorter worksite lengths in the UK account for around £120 million of the gap. However, it is not clear that we can adapt our workbank to achieve longer possessions while continuing to maintain activity volumes at the planned levels, and avoiding additional disruption to rail users.

The productivity of track renewal possessions has also been assessed. BSL observes that Network Rail's typical track possessions are generally between four and six hours. It also notes that track activity is predominantly

Figure 5.3 Maintenance activity and efficiency gap



1) Efficiency gains (to be) achieved between 2006 and 2008 are not considered
2) Average R-LICB needs to be seen as a *"moving target"* as other countries aim to improve, too

delivered using conventional plant which is significantly less productive than high output equipment. BSL notes that achieving greater efficiency from the use of more high output machinery would require longer possession times and greater productivity within possessions. Lower productivity is also considered by contractors to be caused by safety requirements in the UK. BSL considers that the increased productivity that is achieved in other European railways, for example through greater use of high output plant, accounts for around £100 million of the gap.

We recognise that we must continue to challenge the standards and structures used within the industry. However, this takes time and it may take several years before changes start to deliver significant benefits. Our bottom-up initiatives include a number of actions to address these issues, such as:

- faster take-up and hand-back of possessions, which will increase the amount of productive time available;
- changes to the engineering access regime that will deliver improved whole system benefits; and
- more effective use of plant, including high output plant.

BSL considers that contractor transaction costs in the UK are a further contributor to the cost gap between Network Rail and the peer group. This includes, for example, the impact of suppliers sub-contracting labour from agencies and the impact of changes to project delivery plans. BSL considers that the additional transaction costs account for around £70 million of the gap.

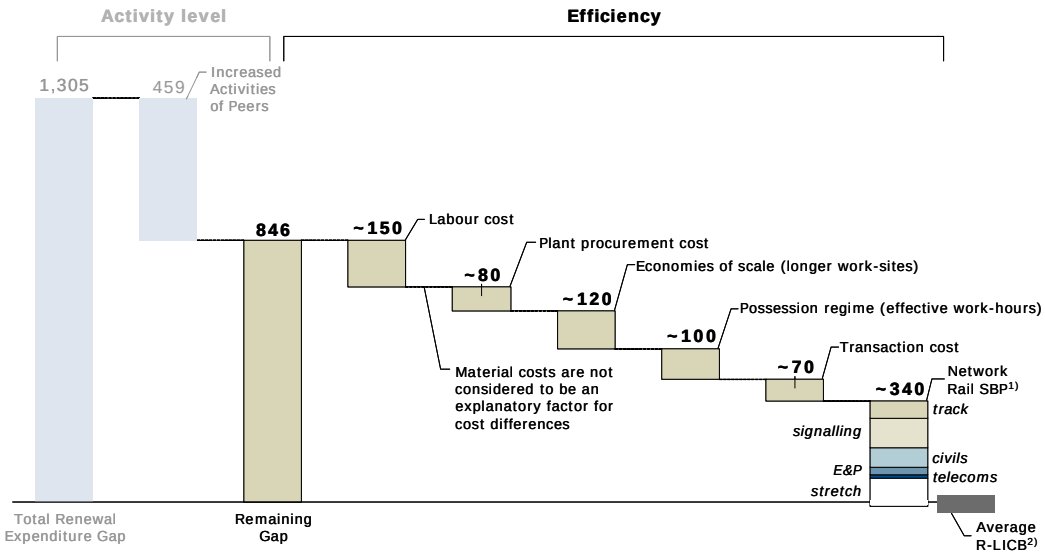
BSL has also stated that it considers other railways may also be expected to improve efficiency, although they do not generally have such ambitious targets for the next few years.

The specific issues identified by BSL explain around £520 million of the £846 million gap, reducing it to around £326 million. Our planned savings during CP4 are expected to reduce costs by a further £340 million which accounts for the remaining gap. This is illustrated in Figure 5.4.

Conclusion

There is a significant gap between Network Rail's expenditure and the average spend in other European railways. A significant part of this gap reflects the current age and condition of the UK infrastructure, which BSL has analysed is significantly older and in worse condition than many of the peer group, and the current under-investment by many countries in the peer group. As the overall quality of our asset base increases over time, we expect there to be lower volumes of maintenance and renewals required as asset condition reaches steady state. This is captured separately through the volume forecasts in the ICM rather than through our headline efficiency

Figure 5.4 Renewals – activity and efficiency gap



1) Annual saving in the final year of CP4 (2013/2014); stretch component calculated to meet an overall improvement of 17.6%
2) Average R-LICB needs to be seen as a *"moving target"* as other countries aim to improve, too

assumption.

Higher labour costs in the UK are a further significant structural difference. BSL identifies a number of other factors that drive the difference, such as differing standards. For many of these Network Rail cannot achieve significant savings in the short to medium term, but must continue to be challenged to deliver the long-term benefits where appropriate.

Our efficiency assumptions for CP4 will close the remaining gap for maintenance and renewals.

The pace of change

At the start of CP3 we were challenged to make significant efficiency improvements while at the same time delivering improvements in outputs. Our plan for CP4 continues this strategy of improving the reliability of the network while simultaneously continuing to reduce costs. However, unlike the start of CP3, we are now expecting to deliver a significant investment programme to increase the capacity of the railway. We need to be more flexible in meeting the needs of our customers by continuing to develop our plans during the control period to deliver the required improvements in capacity and performance, while also significantly reducing our cost base.

It is important that the assumptions for CP4 efficiency take into account the overall range of improvements that we are planning to deliver. We therefore commissioned LECG to assess the level of efficiency that might be achieved in CP4 based on the analysis of efficiencies achieved by other regulated infrastructure companies, taking into account the overall improvements achieved.

ORR's analysis

In its February 2008 assessment of our SBP ORR included a wide range of plausible efficiency assumptions. This range was partly informed by the December 2005 LEK/Oxera report which stated that the potential range for annual efficiency savings was between two and eight per cent. We provided a detailed assessment of this report in support of our SBP in which we concluded that a more plausible range is between two and around three per cent per annum. A key part of this analysis challenged LEK/Oxera's assumption that the pre-Hatfield expenditure trend was not an appropriate starting point for the development of efficiency targets for CP4.

In assessing the potential efficiency savings in CP4, LECG has reviewed the LEK/Oxera report and our analysis of it, together with other available analysis. LECG considers that the upper end of the range is high in comparison with the results of similar studies for other regulated industries, in which it is rare for identified potential gains to exceed five per cent per annum.

In developing its assessment of potential CP4 efficiency savings, LECG focussed on four main areas of concern:

- the LEK/Oxera analysis includes some double counting of the potential efficiency savings;
- the LEK/Oxera analysis uses an inappropriate set of comparators;
- the top end of the efficiency range achieved in other regulated industries was often at the expense of lower quality outputs; and
- other regulators conclusions have not been based on the extremities of the identified top-down ranges.

In the following sections we provide further detail on these points. We have also provided ORR with LECG's report.

Double counting potential efficiency savings

LECG considers that the LEK/Oxera report has adopted an inconsistent approach in developing the upper end of its range and that this has over-stated the potential future efficiency savings.

In their report, LEK/Oxera state that other regulated companies have achieved average annual savings 5.4 per cent in their second control periods. They have also assessed that Network Rail should be able to achieve savings of between two and five per cent during CP4 based on an efficiency gap resulting from increased costs following Hatfield. LECG considers that LEK/Oxera have then inappropriately combined these assumptions in concluding that annual savings of up to eight per cent can be achieved in CP4. LECG considers that the potential savings implied by the identified efficiency gap should be compared to savings achieved by other regulated companies rather than added to them.

LECG also considers that LEK/Oxera has over-estimated the potential savings that Network Rail could achieve in CP4as they have assumed that the assessed efficiency gap resulting from the increased costs following Hatfield can be closed fully during CP4. LECG considers that regulators do not normally assume that an entire efficiency gap can be closed in a single control period. As a result, LECG considers the potential annual

savings should have been calculated to be between one and three per cent.

Choice of comparators

The LEK/ Oxera report incorporates an assessment of efficiency savings achieved in other regulated industries based on those which are considered appropriate comparators with Network Rail. The analysis is largely drawn from earlier Oxera work. The report suggests two criteria for selecting the comparators:

- the nature of work should match that of Network Rail; and
- the industry must be subject to economic regulation.

The industries included are water, electricity and telecoms. LECG states that it is unclear why BAA and Royal Mail are not included, as they appear to share more of Network Rail's key characteristics (for example, increasing returns to scale and density, long term effects of past investment) than other comparators. Royal Mail has a high level of unionisation in much of the workforce and a long history of challenging industrial relations.

It is equally unclear why BT is included given the impact on BT of changes of technology. LECG considers that driving efficiency improvements in organisations that rely more on manpower than data compression technologies is harder, and slower, and that BT is not a suitable comparator when judged against the LEK/Oxera criteria.

LECG considers, therefore, that the comparator set of industries used within the LEK/Oxera report, and apparently informing the figure of 5.4 per cent, is flawed. It has analysed the impact of excluding BT and including BAA and Royal Mail from the average efficiency achieved by the comparators. The impact of these changes, which are shown in Figure 5.5, is to revise the central range of CP2 gains achieved to between two and four per cent. This is similar to the range identified by LECG in its recent efficiency study for Postcomm when assessing potential efficiency savings for Royal Mail's second price control.

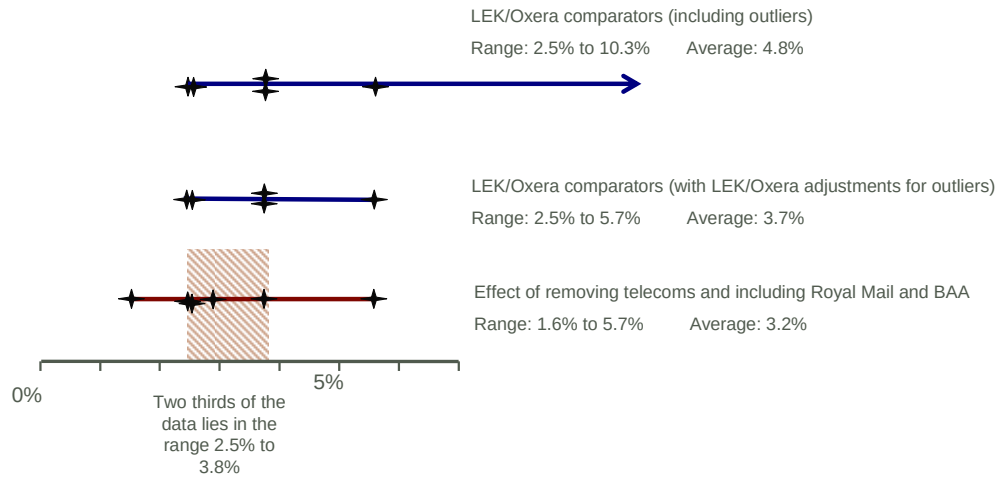
Improving outputs

LECG has reviewed LEK/Oxera's analysis of the actual cost savings achieved by other regulated industries. As shown in Figure 5.6, those savings were generally achieved when companies were already delivering very high performance on service availability.

LECG also observes that the highest efficiency gains are associated with static or declining measures of quality and service reliability, while the highest quality improvements tend to be associated with lower levels of efficiency savings.

Network Rail has delivered significant improvements in service reliability over the past five years. This is demonstrated by the improvement in the Public Performance Measure (PPM) from around 78.7 per cent to more than 90 per cent at the start of CP4. This will improve to 92.6 per cent by the end of CP4 against a backdrop of increasing passenger numbers. We will also deliver improvements in network availability while delivering significant improvements in capacity as a result of the large investment programme. However, LECG states that there is little evidence that it is feasible to manage improvements on all these fronts while simultaneously reducing costs at the potential

Figure 5.5 Impact of changes to the set of comparison industries



rate suggested by ORR.

LECG identified one company that needs to deliver improvement on a similar scale to that of Network Rail, Royal Mail, which started its second price control (2003 to 2006) with some 90.1 per cent of first class mail delivered within the target deadlines. Its efficiency savings targets were notably close to the low end of the range set out by ORR.

LECG's review of other industries highlighted four important concepts adopted by regulators:

- when identifying expected efficiency gains, only a proportion of any efficiency gap can be caught up in a single control period;
- regulated companies need an incentive to outperform their efficiency targets, which requires them to be set a target below the top end of the range;
- where a regulated company is expected to improve its outputs, account needs to be taken of the costs of this; and
- where input prices are anticipated to be out of step with RPI, the effect of this needs to be considered.

LECG states that there are natural limits to any organisation's capacity to handle change. It considers that the effect of those limits is exacerbated in the case of rail where there is also a need for significant improvements in capacity and reliability, and to maintain and continue to improve levels of safety. The inter-relationships between the targets for safety, quality and efficiency generally appear more complex than those facing other regulated industries.

LECG concludes that the scale of quality improvements required in over CP4 suggests that efficiency targets closer to the middle of any comparator range would be more appropriate than targets set at its upper extreme.

Conclusion

LECG has concluded that the plausible range for efficiency gains achievable by Network Rail over CP4 is narrower, and its upper bound is around four per cent. In addition it considers that there are good reasons to locate CP4 efficiency targets for Network Rail within, rather than at the upper extreme of, the appropriate range.

Just before publication of this plan, ORR provided us with a draft of a further report prepared by Oxera on the scope for efficiency gains in CP4. We have not yet had time to analyse this report. We will review it over the next few weeks and will provide our views to ORR in a supplementary document. However, we provide some initial observations below.

We are surprised that Oxera is still arguing that that costs have been reset to pre-privatisation levels following Hatfield, particularly as there has been no discussion of the detailed explanation of the changes in expenditure that we provided in the SBP. It is very simplistic to imply that this is inefficiency. We note that Oxera's analysis of engineering costs in other regulated industries

Figure 5.6 Changes to outputs in other industries

Industry	Comparator time period	Service reliability	Other quality parameters	RUOE % p.a.
BAA	1987 – 2001	-	QSM (Quality Service Measure) declined	1.6
Sewerage Industry	1992/93 – 2003/04	Remained above 99.9%	Customer service and environmental compliance improved	(0.7)
Water Industry	1992/93 – 2003/04	99.5% increasing to 99.8%	Water quality and customer service quality improved	2.0
Royal Mail	2002/3-2005/6	91.8% increasing to 94.1%	Customer complaints constant	2.9
Electricity Distribution	1990/91 – 2000/01	Remained above 99.9%	Customer interruptions improved	3.8
Electricity Transmission	1990/91 – 2000/01	Decreased from 95.9% to 95.4%	Voltage and frequency excursions broadly constant	5.7
BT	1996/97-2003/04	Faults per line per year declines, but a smaller proportion of faults are being repaired within 24 hours	Residential customer satisfaction declined from 86% to 79% Business customer satisfaction declined from 88% to 83%	3.8 10.3

shows significant cost increases for some parts of these industries, which suggests that significant variations in cost should not necessarily be assumed to be attributable to changes in efficiency.

Oxera argues that regulated companies have been able to deliver greater efficiencies in the second control periods as they have improved their understanding of the asset base. As we have improved our understanding of Network Rail's asset base, we have updated our asset policies so that the benefits are embedded in our processes going forward.

Oxera has included ranges of potential savings for more and less efficient companies. However, we note that the analysis does not take into account the improvement in outputs achieved by other companies. LECG's analysis indicates that regulators set lower efficiency targets when significant reliability and other output improvements are expected.

EWS sponsored studies

In the SBP, we explained how we had taken into account a number of studies commissioned by EWS to assess opportunities for us to achieve efficiency savings. These included:

- an analysis by Lloyds Register into the potential opportunities for reducing track renewals costs;
- a study by Nortrack which looked to benchmark Network Rail's track maintenance and renewals costs against those undertaken in Canada; and
- a study by LEK comparing Network Rail with US Class 1 railroads.

In its February 2008 document, ORR comments that Network Rail has "largely rejected" much of the evidence available from these studies. We do not consider that we have largely rejected the findings. Our efficiency initiatives already incorporate many of the opportunities identified. Since publication of the SBP, we have continued to examine these studies and discuss with ORR the main issues raised. In the majority of areas this has resulted in no change to our original assessment. We summarise below further work in these areas.

Review of track renewals

The main conclusion of Lloyds Register Rail's (LRR) analysis is that there are potential savings of up to 30 per cent in track renewals by the end of CP4. Our bottom-up analysis for track renewals describes a best case efficiency during CP4 of around ten per cent. However, there are a number of inconsistencies between these figures. The principal differences are:

- LRR's analysis was based on 2006/07 data and therefore part of the efficiency opportunity has been reflected in the further savings we have achieved during the rest of CP3
- LRR's analysis was based on only two of the seven categories of track renewal;
- as a result LRR's analysis did not consider the total track renewal cost base – it considered 78 per cent of conventional plain line track renewals; this is only 34 per cent of total conventional and high output track renewals, or 27 per cent of our total plain line track expenditure (including drainage, fencing, etc) and it is incorrect to assume that LRR's headline efficiency rate could be applied to the entire track expenditure; and
- LLR's analysis also excluded haulage costs and contained some minor errors regarding the quantities of materials required.

We summarise in Figure 5.7 the comparison between LRR's analysis and our CP4 efficiency assumptions.

Figure 5.7 LRR/SBP comparison

Efficiency %	Renewal type	
	Cat 4	Cat 11
LRR/EWS		
Study conclusion	39	29
Additional materials/time	-10	-2
Adjusted conclusion	29	27
SBP		
CP3 efficiency plan	13	19
CP4 best case	11	11
Best case efficiency model	24	30
Most likely efficiency case	*20*	*25*

We have discussed this in detail with ORR. We have continued to carry out in-depth analysis into the specific ideas and points raised in the LRR study. This has highlighted that the production rates quoted overall were broadly in line with our contractors' best production rates. However, there are some aspects of the methodology described that we could not adopt as they would import an unacceptable risk. There are also some areas where specific elements of the work required had been omitted. We are keen to understand more about the assumptions that were made during LRR's analysis and are arranging a further workshop with the consultants

to enable us to test whether we have misunderstood or missed potential opportunities.

Comparison with Canadian railways

In this report prepared by Nortrack, the consultant reviewed working practices at a small number of track renewal and maintenance worksites and compared these to Canadian practices. As a result he identified a number of opportunities for improvement. We comment further below on the key opportunities identified.

We are developing new products to help facilitate the drive towards shorter possessions, and our intention is to reduce track renewal possessions through CP4 to a standard 16 hours by the end of the control period. Having developed the engineering access strategy on WCML and initiated the move towards a seven day railway initiative, we will clearly need to continue driving improvements in this area.

We have initiated a project to reduce the time taken for both taking and handing back possessions, including the management of associated isolations. The objective is to increase the productive working time available in possessions. This will enable a combination of reduced risk of overrun, improved quality of works, improved production and hence fewer possessions, and reduced costs, depending on the particular work item under consideration.

A study is being undertaken across all the delivery units to assess the appropriate balance between delivery and support staff. By developing appropriate metrics, we will establish a more common manpower model across the delivery programmes. This will enable us to understand better the impact support have on construction costs, programme risk and output quality. At this stage we do not expect significant headcount reductions as early indications are that the opportunity for efficiency is likely to be quite small and disproportionate to the delivery risk which may be imported into programme.

The consultants state that Canadian National (CN) can deliver higher volumes in shorter possessions using less (and older) equipment. We believe that this reflects CN railway operating at a lower speed and lower hand back speeds following possessions. Running a higher speed railway in the UK also drives:

- an asset management strategy which requires more full renewals rather than the higher level of replacement of individual components in Canada;
- the need for more detailed surveys before renewal to enable us to plan renewals effectively; and
- a higher volume of tamping and track stabilisation to achieve higher hand back speeds.

We are also required to remove used materials from site which incurs additional time and cost compared to Canada.

We are addressing plant reliability and availability in a number of ways. The current contractual arrangements for the supply of tampers do not incentivise contractors sufficiently well to maintain equipment effectively or to replace old equipment. This is being addressed as part of an ongoing study and changes will be implemented by the start of CP4. Central planning of tamping resource is currently under review in order to optimise use of tampers. This includes considering different approaches for maintenance and renewals, as well as for high output and conventional works. Again this will be implemented by the start of CP4.

The consultant considered that there may be an opportunity to reduce redundant plant at worksites. The site specifically visited was a trial site for our modular switches and crossings programme. As this is a key improvement initiative, we deliberately over-provided plant as contingency against possible problems that might arise through the initial use of new techniques. This is not representative of the way our contractors routinely work. However, the following initiatives have been developed in order to reduce redundant plant on site where it is at risk of occurring:

- within the current contractual arrangements the costs of plant that is not used is disallowed;
- we are implementing optimisation reviews to enable both contractors and ourselves to understand the most efficient use of plant on site; and
- more effective sharing of best practice.

Comparison with US Class 1 railroads

LEK has compared the costs of track renewals for US Class 1 railroads to Network Rail. Recognising that there are significant differences between these railways, the consultants made a number of major cost adjustments in making an assessment of the potential impact of these changes. As we outlined in the SBP, we do not consider that conclusions can be drawn from analysis that compares such different railways.

However, we do recognise that we can learn from good practice. We are therefore continuing to assess the different approaches adopted in the US. In particular, we are carrying out further work to understand better the extent to which more maintenance can be carried out between trains in the US and the extent to which this would enable more mechanised maintenance on parts of our network. We expect to have results from this analysis during April and we will share these with ORR.

ORR international benchmarking

ORR conducted a major investigative study with a number of other network operators around the world in the second half of 2007. In a number of cases Network Rail employees accompanied ORR on these trips. ORR has provided us with the majority of the draft reports from these visits, including Australia, Austria, the Netherlands, Switzerland and North America. The key findings in the reports are expressed as challenges or questions to Network Rail, which may provide opportunities to achieve cost reductions and other improvements.

We have reviewed the 84 challenges in these reports and summarised our response in a separate supporting document that we have provided to ORR. Most of the challenges reflect issues that we have already identified, and are generally already being addressed. Some of the challenges are based on railways that have significantly different asset management strategies. The biggest differences relate to Austria/OBB and Union Pacific. For example, in Austria the condition of track is maintained to the highest condition possible, whereas Union Pacific maximises the life of its assets through a regime of extended maintenance and minimised renewals. Both organisations believe that their approach delivers the lowest overall whole life cost for their network and traffic patterns. We will continue to examine possible options and refine our policies in order to deliver the lowest whole life cost based on traffic levels in the UK and the network that we are managing.

There are some challenges for which our policies and activities are already well advanced, while in other areas this challenge has helped us to focus attention on the issues as resources become available. However, there are a number of challenges that we do not consider should be implemented. Our supporting document provides further details. We are grateful for the insight these studies have permitted us into the operations and rationale of other operators in other countries, and how they are addressing many of the same problems and issues we face.

Input price inflation

Network Rail appointed LEK Consulting to refresh its August 2007 input prices study, addressing specific issues raised by ORR and Network Rail senior management, including:

- the impact of the Crossrail programme following confirmation that it will proceed;
- reviewing the forecasts for the highly volatile copper and steel prices;
- adjusting the underlying spend assumptions to be consistent with the SBP;
- extending the methodology to enhancement expenditure; and
- assessing the validity of several component inflation forecasts within the signalling, power, communications and IT markets.

The overall result is a net increase in the annual average real (i.e. above RPI) input price inflation from 0.97 per cent to 1.11 per cent. This would increase our CP4 expenditure by around £70 million. However, we have not included for this increase in our plan as we recognise that there is a range of uncertainty around this result, with particular volatility in some specific areas.

The impacts of each element are explained in more detail below. We have recently received advice from Railway Industry Association (RIA) which suggests that a number of LEK's assumptions may be conservative and we understand that this has been sent to ORR.

Crossrail

Plans to build Crossrail, part of which will be delivered by Network Rail, were formally announced in the 2007 Comprehensive Spending Review. LEK has considered how the total programme could affect our costs.

LEK observes that the major activity of Crossrail programme starts around the time that other major infrastructure projects are completed (e.g. Heathrow T1/T2 refurbishment, London 2012) and that, therefore, construction capacity should become available for Crossrail. We agree with this assumption for the civil engineering industry in general, but are concerned about potential constraints in specific sectors such as project management and civils design.

LEK has also assumed that, unlike London 2012, the scheduling of Crossrail will be under the programme team's control to a greater extent which should enable it to minimise additional

labour inflation. We are concerned about the validity of this assumption but recognise that quantification of this risk is not yet possible.

In assessing the potential impact of Crossrail, LEK carried out an assessment of two recent projects; Vancouver 2010 Winter Olympics and the Big Dig in Boston. LEK concluded that in Vancouver, where the projects are time-limited, high levels of concurrent construction work have driven additional inflation. However, in Boston, the completion dates have been allowed to slip to minimise overheating of the labour market. Again, it is not clear what flexibility is available around completion dates for Crossrail.

Overall, LEK has concluded that Crossrail will not have an incremental impact on Network Rail's supply markets. Our view is that there is a major risk resulting from Crossrail if LEK's underlying assumptions about the flexibility of completion and the application of generic supply market assumptions to specific labour types are invalid. This reinforces the need for clarity about how such risks will be dealt with.

Steel prices

In its August 2007 study, LEK proposed that steel prices would increase in line with RPI over CP4. However, the short-term decreases forecast in the second half of 2007 did not materialise as China introduced measures to restrict steel exports. As part of this refresh, LEK has reviewed recent independent forecasts and, although a price decline is no longer expected in the short-term, forecasts indicate that steel prices will increase in line with RPI in the longer-term.

Many forecasters have stated explicitly that they do not expect the recent announcement of an increase in iron ore prices of 50 to 60 per cent, and a temporary cut in production in China, to affect 2008 steel prices materially. The continuing price volatility is unlikely to reduce in the short term by potential changes in ownership of the main iron ore producing companies.

Copper prices

Copper prices have been extremely volatile in the six months following the previous study with the lowest price being around 25 per cent below the price peak across the period. In the short term, LEK observes that views are mixed around whether prices will fall or whether increased demand will temporarily sustain prices. However, the market participants are still forecasting a long-term fall in copper prices with a significant decline of around eight to 12 per cent per year over CP4. However, we note that this reduction has not yet started to materialise. Furthermore, we are seeing increases in tendered prices for equipment with a significant copper content, such as circuit breakers and points heaters.

LEK has concluded that updating the inflation forecasts for steel and copper prices does not have a material impact on the overall premium to RPI. However, we are remain concerned about the potential magnitude and volatility of materials price inflation as we stated in the SBP.

Spend profiles and enhancements

Reflecting the SBP assumptions in the analysis and more detailed application of input price inflation forecasts for enhancements has not changed LEK's forecasts of input price inflation.

Inflation forecast reviews

The key driver of the increase in input price inflation since the SBP has been the revision of the components described below.

In the August 2007 study, the Oxford Economic Forecasting (OEF) computer and office equipment index was used as the basis for forecasting for signalling IT inflation. In its update, LEK has used an index based on the components and weightings of the BEAMA Industrial Electronic Equipment index.

In the August 2007 study, the OEF computer and office equipment index was also used for IT inflation. This is predominantly a hardware index. However, our IT expenditure comprises 60 per cent software and 40 per cent hardware. In the update, LEK has used the ONS software professionals' labour index for its forecast of software prices.

In this update LEK has applied a more consistent approach to all project management resources than it was able to apply in the earlier study. The differential in premium between project management and the more generic skilled labour inflation previously employed has resulted in a small increase in input price inflation.

Supporting documents

We have provided ORR with the following supporting documents:

- rail infrastructure cost benchmarking assessment (BSL);
- assessment of Network Rail's scope for efficiency gains (LECG);
- input price trends report (LEK); and
- review of ORR's international benchmarking.

6 Our plan for CP4

Introduction

This chapter summarises our expenditure and income projections for CP4. It is based on delivering the safety, capacity and reliability outputs specified in the HLOSs, while meeting the other reasonable requirements of our customers and funders. The projections have been developed using the Infrastructure Cost Model which we have continued to refine. They incorporate the asset policies and other strategies included in Chapter 4 and the efficiency and input price assumptions included in Chapter 5.

The chapter describes the key changes made to our projections since publication of the SBP. Where we have updated our projections, we have included tables summarising the revised projections. We have not included tables for categories of income and expenditure that have not changed since publication of the SBP. This chapter also summarises the further justification and evidence provided in support of our expenditure and income projections.

Since we published the SBP, we have continued to review our projections and have responded to ORR's review of our plan. There are a number of areas where we have identified potential changes to the plan. We are conscious that the timescales for the 2008 periodic review are very tight and that ORR has asked us only to include changes that could have a material impact on our revenue requirements in CP4. We have therefore restricted the adjustments to the SBP, and have not amended the figures for a number of the issues which are discussed in this section. However, we will need to keep under review how we can best deliver the overall outputs with the available resources across the business as a whole.

Further details, including disaggregated information for England and Wales and Scotland are contained in the appendices, for which we have provided a full update.

Controllable operating costs

Since we published the SBP, we have developed our detailed budgets for 2008/09 and have updated our forecasts for this year. This has resulted in some changes to the CP3 forecasts included in the SBP.

The only change we have made to our CP4 forecast of controllable opex is an increase in signalling staff costs in Scotland of £6 million relating to the incremental costs of enhancement schemes completed late in CP3 or in CP4.

Although we are continuing to reduce the costs of running the network, it is becoming increasingly difficult to achieve savings.

In the SBP we described the costs associated with the occupancy, upkeep and operations of our corporate offices. We have continued to develop our strategy to manage this estate in the most efficient way and will continue to consolidate some of our sites where the opportunity exists. We have now established that this strategy will require some periods of dual occupation which will increase our operating costs over the short term but will facilitate longer-term savings. The overall impact of this is around £32 million over the control period. We have not included this incremental cost in this update and we will need to absorb this cost by increased efficiency savings elsewhere.

The independent Pension Commission, which included both employer and union representatives, was set up in September 2006 jointly by Network Rail, other rail industry employers and the trade unions to review the current railway pension scheme and to consider

Figure 6.1 Operating costs

£m (2006/07 prices)	2009/10	2010/11	2011/12	2012/13	2013/14	CP4 total	CP4 average
SBP							
Controllable	775	764	750	744	738	**3,770**	754
Non-controllable	342	362	373	381	385	**1,842**	368
Total	**1,117**	**1,126**	**1,122**	**1,124**	**1,123**	**5,613**	**1,123**
Variances							
Scottish enhancements	1	1	1	1	1	**6**	1
BT police	-9	-9	-9	-9	-9	**-46**	-9
SBP update							
Controllable	776	765	751	745	739	**3,776**	755
Non-controllable	332	353	364	371	376	**1,796**	359
Total	**1,108**	**1,118**	**1,114**	**1,116**	**1,115**	**5,572**	**1,114**

Figure 6.2 Maintenance expenditure

£m (2006/07 prices)	2009/10	2010/11	2011/12	2012/13	2013/14	CP4 total
SBP	**1,040**	**989**	**951**	**926**	**914**	**4,819**
Variances						
Track	0	12	14	15	13	**54**
Scottish enhancements	1	2	4	4	4	**16**
SBP update	**1,041**	**1,002**	**968**	**945**	**931**	**4,889**

the long term future of how to provide pensions. It was to consider, against a background of rising costs of pension provision, what, if any, alternative means of long term pension provision might be available that would be fair and affordable for both employees and employers.

As a result of the commission's findings Network Rail intends to offer a new third pension option for all employees from summer 2008. This will sit alongside the current Railway Pension Scheme and the Network Rail Defined Contribution Scheme to give our employees a wide choice of pension options. The new scheme will be a defined benefit pension plan based on career average revalued earnings (CARE). This scheme addresses a key recommendation of the Pensions Commission, which considered the long-term future of how to provide fair and affordable pensions. We have not revised the projected CP4 costs as a result of these proposals.

DfT has asked that we hold and manage the National Vehicle Register (NVR). This is beneficial to the industry as it will enable a single point of contact for vehicle register issues. However, it attracts a small incremental opex cost of under £1 million over the control period. We have not updated our projections for this increase.

Non-controllable operating costs

Electric traction costs

The forecast costs of procuring electric current for traction (EC4T) in 2008/09 have increased by about £60 million since the SBP, reflecting trends in the wholesale electricity market. About half of the forecast volume of electricity has already been purchased for 2008/09 at the request of TOCs under the new procurement arrangements. However, since the electricity market remains volatile, we have not revised our forecasts of costs and associated income recovery for CP4.

British Transport Police

We have reduced our forecasts of British Transport Police (BTP) costs, reflecting lower than previously forecast costs in the final two years of CP3. We are now projecting £58 million per annum in CP4, in line with the expected cost in 2008/09 and reflecting the agreement that the BTP budget will not increase by more than RPI during CP4. This represents a saving of £46 million over CP4 compared to the SBP.

Cumulo rates

The next assessment of our cumulo rates will be complete in April 2010. The forecast in the SBP was based on early discussions with the valuation office, which suggested a potential increase due to the improved financial position of the company when compared with the previous assessment. Our latest discussions with the valuation office indicate that its focus will be on our overall profitability despite our suggestions that given the structure and funding of the company this is not necessarily the most appropriate approach. However, there remains considerable uncertainty over the revaluation and we have therefore not revised our projections at this stage.

Maintenance

Our forecast maintenance expenditure in 2008/09 has increased by £32 million since the SBP. This is largely due to the impact of the new access regime on the WCML which will take effect with the December 2008 timetable change. This does not affect our CP4 forecasts as the increase was already included from 2009/10. The other driver of increased costs is the impact of additional traffic growth being experienced. This is a particular issue in the south east where the impact of new train fleets, which are heavier and have stiffer suspensions than the fleets they replaced, is driving significant increases in rolling contact fatigue and other track defects.

We have increased our forecast of maintenance costs in Scotland during CP4 by £16 million to allow for the incremental costs of enhancement schemes that are completed late in CP3 or in CP4, the main schemes being Airdrie - Bathgate and Stirling - Alloa - Kincardine. These costs were not included in the SBP.

Figure 6.3 Summary of renewals

£m (2006/07 prices)	CP3 total	2009/10	2010/11	2011/12	2012/13	2013/14	CP4 total	SBP CP4	Variance
Track	**4,047**	759	720	690	667	645	**3,481**	3,468	14
Signalling	**1,857**	473	470	447	455	493	**2,338**	2,415	-78
Civils	**1,761**	434	428	393	368	355	**1,979**	1,979	0
Operational property	**1,125**	325	305	265	233	210	**1,337**	1,465	-128
Telecoms	**1,062**	292	235	160	113	57	**856**	856	0
Electrification	**354**	128	148	146	104	97	**623**	467	156
Plant and machinery	**430**	127	85	54	54	54	**373**	356	17
IT and other	**726**	252	146	98	99	75	**670**	596	74
Discretionary investment	**0**	0	0	0	0	0	**0**	885	-885
WCRM renewals	**2,920**	0	0	0	0	0	**0**	0	0
Total	**14,281**	**2,790**	**2,536**	**2,253**	**2,092**	**1,987**	**11,658**	**12,487**	**-829**

We have undertaken a detailed review of the track maintenance module of the ICM, which underpins our CP4 projections. This review was partly driven by our concerns about the results of the variable cost analysis presented in the SBP which showed large variations in the incremental costs of different routes. The forecasting for each activity, and the resulting volumes at network and route category level, has been reviewed carefully and a number of changes made, some affecting the balance between route categories.

This review was informed by two studies undertaken by Halcrow: a report on our variable cost analysis and a detailed technical audit of the ICM. The audit identified some errors and software bugs that meant the model was not accurately reflecting the original specification. These have now been corrected. We believe that these changes have significantly improved the robustness of our activity forecasts.

The net impact of these changes is an increase in track maintenance costs of £54 million over CP4 compared to the SBP. This increase occurs in the later years of CP4 as overall activity volumes do not reduce as much as previously predicted. The SBP figures showed a pre-efficient reduction in track maintenance total costs of six per cent over the period due to changes in activity volumes, despite the impact of increasing traffic. While there are savings associated with, for example the renewal of jointed track with continuously welded rail (CWR) which is cheaper to maintain, these savings were overstated in the SBP. However, it is still the case that we are forecasting a reduction in pre-efficiency costs of around two per cent at the same time as accommodating traffic growth of 8 per cent, and planning to increase volumes of certain activities significantly, particularly repadding of sleepers, above the levels currently undertaken.

The overall efficiency improvement implicit in our plans is therefore significantly higher than the headline 12.2 per cent rate as a result of these additional scope efficiencies which are embedded in the pre-efficiency volume projections.

We are continuing to work to harmonise the terms and conditions of our maintenance workforce following their transfer in-house from contractors. The details are still being negotiated and hence the overall impact on costs in CP4 is not yet known. We will need to discuss this with ORR as the implications become clear.

Renewals

Our updated forecasts of renewal expenditure over CP4 are summarised in Figure 6.3, which also shows total expenditure in CP3. In the following sections we detail the changes we have made to the renewals forecast and describe the further evidence that we have provided to support our projections.

Track renewals

It is now apparent that we are not going to

Figure 6.4 Track expenditure

£m (2006/07 prices)	2009/10	2010/11	2011/12	2012/13	2013/14	CP4 total
SBP	**741**	**712**	**689**	**668**	**657**	**3,468**
Variances						
Correction of rail renewal	-12	-12	-12	-12	-12	-58
Revised CP3 exit efficiency	30	19	13	10	0	72
SBP update	**759**	**720**	**690**	**667**	**645**	**3,481**

Figure 6.5 Track volumes

		2009/10	2010/11	2011/12	2012/13	2013/14	CP4 total	SBP CP4	Variance
Rail	Km	832	825	826	830	833	**4,146**	4,582	-436
Sleepers	Km	692	692	692	692	692	**3,459**	3,484	-25
Ballast	Km	754	754	754	754	754	**3,769**	3,759	10
S&C	Equiv. units	451	450	452	455	441	**2,248**	2,245	3

achieve the level of efficiency in 2008/09 targeted in the SBP. Our forecast expenditure in 2008/09 has therefore increased by £14 million. Our CP4 plans have been revised to reflect these higher unit costs at the end of CP3 but, as we described in the previous chapter, we plan to reach the same cost level by the end of CP4 as was projected in the SBP. This is broadly equivalent to an additional one per cent per year efficiency improvement, or £72 million over CP4.

We have also identified an error in the ICM calculation of rail changing volumes which overstated the forecast level of activity by around 30 kilometres per year in CP4. This correction reduces forecast expenditure in CP4 by £58 million. The net impact is an increase of £14 million in track renewals.

The overall reduction in rail kilometres shown in Figure 6.5 also adjusts for a summation error in the SBP table which treated single rail renewal as both rails. The actual rail volume in CP4 should have been recorded as 4,290 kilometres in the SBP, a reduction of 292. This did not affect the calculation of costs. The further impact of the correction to the forecast volumes is 144 kilometres over CP4.

Signalling renewals

In our October SBP, we stated that we expected activity totalling around £130 million to be deferred from CP3 to CP4. This assessment has been updated and the amount of deferral has increased to £180 million. We have taken this into account in our assessment of the regulatory asset base at the start of CP4.

Since the SBP we have reduced our forecast expenditure in 2008/09 substantially. This is the result of the reprioritisation of the commissioning of signalling schemes in order to support the WCRM project. The major schemes where commissioning has been deferred into 2009/10 are Colchester-Clacton, South Erewash, Newport and Oxley.

We have also reviewed our minor works forecasts by analysing our bottom-up workbanks for minor works for the years 2007/08 and 2008/09. The analysis considers our forward plans across 20 different interlocking elements and includes an allowance for reactive minor works renewals carried out each year by our maintenance function. Investment papers to support this allowance have already been provided to ORR.

The analysis suggests we are planning to deliver a significantly lower level of minor works activity in 2007/08 and 2008/09 than the CP4 forecast included in the SBP. We consider that the ongoing activity levels of activity should be broadly consistent with 2007/08 and 2008/09 and should be sufficient to support the programme of resignalling set out in the SBP. We have therefore reduced the level of minor works activity by £96 million over CP4.

We have identified two risks to the CP4 forecasts for ERTMS train fitment in the SBP. First, as part of the ERTMS trial scheme on the Cambrian lines, a detailed assessment of the power supply system on the Cambrian Class 158 has shown that the addition of the ERTMS power load will have a significant impact on the available spare capacity of the train auxiliary system. Vehicles are designed with extra power capacity so that new electric systems can be installed at a later date, but for older vehicles in particular, this capacity can be taken up by systems such as air-conditioning, on-train CCTV and GSM-R.

For the Cambrian lines, a solution is currently being developed to increase the power output accordingly, but there is a risk that other classes

Figure 6.6 Signalling expenditure

£m (2006/07 prices)	2009/10	2010/11	2011/12	2012/13	2013/14	CP4 total
SBP	490	486	463	470	508	**2,415**
Variances						
Minor works	-20	-20	-19	-18	-18	**-96**
CP3 deferral	4	4	4	3	3	**18**
SBP update	**473**	**470**	**447**	**455**	**493**	**2,338**

of train will also not be able to power the ERTMS equipment. Our current assessment is that this power supply issue could increase costs by around £15 million in CP4.

Second, we are currently working with DfT and ATOC to understand the most appropriate fitment strategy following the new rolling stock announcements by DfT. Various options exist ranging from fitting the new stock with ERTMS from the outset, to fitting all of the new stock retrospectively. An optimised plan, combining fitment from new with retrospective fitment is also under review. The costs of providing cover for existing vehicles being taken out of service while equipment is fitted is also under review. Depending on the outcome of these discussions, our CP4 forecasts for ERTMS train fitment could change significantly. However, we have not revised our projections at this stage.

There has been a significant amount of further discussion with ORR around the key inputs to the SBP, as set out in the signalling price book, in order to provide further clarity and confidence in their robustness. These discussions have covered areas such as derivation of SEU rates, the reasons for adding a percentage for 'abnormal' costs (and how this percentage has been calculated) and the distinction between 'existing SEUs renewed' and 'equivalent SEUs renewed'. We have also provided ORR with analysis showing the normalised SEU rates for resignalling schemes that have progressed beyond GRIP stage 3, including the actual SEU rates for commissioned schemes.

Civils

In the October SBP we set out an investment programme for our civils asset portfolio that we believe provides an appropriate balance between affordability and minimising whole life costs. Our proposals for CP4 are intended to build on the momentum that we have started to achieve in CP3. The additional investment that has been made available, compared with CP2 in particular, has helped us to start to address the gradual deterioration in asset condition that had been prevalent for a number of years. Importantly, our plans for CP4 also provide for expenditure to mitigate against increasingly severe weather conditions as reflected, for example, in recent flooding.

The Civil Engineering Cost and Strategy Evaluation (CECASE) modelling tool was available in 2007 for the first time for the production of long term expenditure forecasts. The model itself is becoming acknowledged as ground breaking in the civils industry in terms of its scope and functionality. However, given the level of funds that we are seeking for CP4 and the complex nature of the modelling that underpins our expenditure estimates, we recognise that further information on these plans is both helpful and necessary.

In this section of the plan we have provided:

- more context about the operation of CECASE and its key dependencies;
- an explanation of some of the policy choices we have, and the likely impact on outputs and whole life costs; and
- some additional information that supports our expenditure forecasts for major structures, tunnels and earthworks.

The CECASE model

In the access charges review in 2003 it was recognised that civils expenditure would need to increase through CP3 in order to reach steady state levels in CP4 and beyond. Our ability to determine this steady state levels of expenditure with a good degree of confidence has improved considerably as a result of the development of CECASE. This is in part as a result of the increased flexibility with CECASE compared with our previous model, and also as a result of the significant increase in the number of sample studies that underpin the operation of the model.

CECASE is, by necessity, complex in nature and we are using it to model a variety of possible asset management regimes (with numerous possible intervention options) on over 60,000 individual assets, over an asset life of approximately 100 years. Although during the development phase considerable effort was put into ensuring that the model is robust, we have used the period since the publication of the SBP to review the operation of the model and ensure the outputs are consistent with our understanding of asset behaviour and degradation.

CECASE uses sophisticated modelling techniques to produce long term expenditure forecasts for a large asset population. We have worked with leading industry experts in the field of statistical analysis to ensure that the modelling process is robust. As with all models, however, CECASE is dependent upon good quality input data and there are primarily four core sources of input data:

- an assessment of the existing condition of each asset to be modelled, for example using the structures condition marking index (SCMI);

- our understanding of asset degradation characteristics and the impact of interventions (that form the basis of our asset management policies);
- case studies considering optimum asset management regimes of actual assets, the results of which are used within the model to improve the reliability of the outputs; and
- unit cost information to produce expenditure forecasts.

Considerable time has been spent on reviewing and refining the quality and coverage of this input data. We have had a number of discussions with ORR to improve its understanding of the importance of this data to the CECASE outputs and our confidence in the quality of this data. In conjunction with ORR we commissioned the independent asset reporter, AMCL, to carry out a review of CECASE. The remit for this work placed particular emphasis on assessing the statistical significance of the number of case studies used for each asset type and the likely impact of this on the robustness of the resultant expenditure forecast from the model. AMCL's analysis confirmed our assessment of an accuracy of approximately +/- 17 per cent at the 95 per cent confidence level across the whole portfolio, and for the three key areas of spend in CP4:

- +/- 13 per cent for metal and masonry underbridges;
- +/- 20 per cent for the majority of earthworks; and
- +/- 20 per cent for overbridges.

We believe these confidence levels reflect the major step forward we have made in our ability to estimate our expenditure requirements, particularly given the range and complexity of our structures portfolio.

It is our intention, however, to improve the level of robustness of future forecasts by the targeted increase in the number of case studies. Note that an increase in the number of such studies will not necessarily reduce the forecast (the central forecast may actually increase), but will tend to reduce the level of uncertainty.

We have also spent considerable time reviewing the outputs from the model and comparing these with our current understanding of asset behaviour. The first consideration was to compare expenditure forecasts from the model with actual expenditure during CP3.

Our management regime during CP3 was based upon a mixture of a limited number of interventions that delivered minimum whole life cost solutions and a more extensive use of a 'patch and repair' regime to maintain the safe operation of assets, but deferring as long as reasonably practicable any major spend on the asset. Although funding for structures in CP3 was higher than in recent years, in particular compared with CP2, we believe that this was only sufficient to slow down the rate of deterioration of the asset base, rather than to arrest it completely and return it to a sustainable condition for the long term.

This view is supported by an analysis of the SCMI scores for over 100 metal underbridges and consideration of how these scores have varied over time. SCMI scores operate on a range one to 100, with 100 representing an 'as-new' asset. The average change in the SCMI score for these 100 structures was 12 points over a six year period (i.e. an average deterioration of two points per year). Where the SCMI score was above around 50, the rate of deterioration appears to be relatively independent of the original condition of the asset. However, where the original condition score was below 50, the rate of deterioration increases significantly.

Although this sample size is limited, it is statistically significant and we believe that this analysis provides evidence to support:

- our CP4 expenditure forecasts, as a higher level of expenditure is required than that incurred in CP3 to maintain average current condition levels;
- our use within CECASE of an SCMI score of 45 to identify the condition at which an intervention is required. The choice of this condition trigger is also supported by work we have carried out with Lloyd's Register; and
- our view that a failure to address asset deterioration will result in a growing problem, as the condition profile of our asset base (which approximates to a normal distribution curve) means that the number of assets dropping to a score of 45 or lower each year will increase significantly.

We have also carried out a table-top exercise to examine a number of structures across a broad spectrum of types and locations, and to consider typical interventions for the optimum management of the asset over an extended period. We extrapolated the results of this work across the whole of the asset base. This produced a long term average annual

expenditure that is approximately 50 per cent higher than that predicted by CECASE.

This actually indicates a good alignment, as we would expect the statistical modelling in CECASE to produce a lower average expenditure forecast (due to the large numbers of assets being considered) than a bottom up approach. This is partly because there is a tendency to round up probabilities (i.e. be more pessimistic) when considering individual assets as part of a bottom up exercise.

As a consequence of this work we believe that we can have considerable confidence in the expenditure forecasts.

Policy options considered

The application of policy B to the management of our civils asset portfolio provides the minimum whole life cost. However, we recognise that moving to a minimum whole life cost approach in CP4 would be both unaffordable, at around £2,655 million, and undeliverable. As a result, we modified our plans, as follows:

- proposing the application of policy C for assets on rural and freight only routes (this reduces the CP4 funding by £232 million); and
- smoothing the expenditure profile over 28 years (which represents the analysis period during CP3 and five future control periods) to provide a more affordable spend in CP4 and to remove peaks and troughs in the forecast workload (this reduces the CP4 funding by a further £444 million).

This smoothing would limit our ability to implement fully policy B on assets on primary, secondary and London and south east commuter routes. We would address this by the selected application of policy C on these routes, with the actual management regime for individual assets considered on a case by case basis. In making these choices particular reference would be made to long term cost implications and any impact on train service reliability.

The net effect of these adjustments is forecast expenditure in CP4 of £1,979 million. We believe that this approach provides an appropriate balance between funding requirements, deliverability and minimising any future additional costs.

Other policy options are clearly possible. It should be noted, however, that whilst any further movement away from the universal application of policy B could be considered as a mechanism to reduce expenditure requirements for CP4, this would introduce additional costs in future control periods and potential introduce deliverability issues. The actual policy mix adopted for CP4 will be dependent on the funding available and will be subject to further debate with ORR.

The two options outlined below provide an illustration of what could be delivered for alternative CP4 funding regimes:

- limiting the application policy B to metal bridges and earthwork on primary, secondary and London and south east commuter routes (with expenditure smoothed over 28 years). Policy C would be applied to all other assets; and
- the application of Policy C (without any smoothing) to all modelled assets.

The expenditure forecast for CP4 for the first option would be approximately £1,892 million, a reduction of £87 million. The more widespread application of policy C on masonry bridges would have a comparatively minor longer term cost impact, due to their relatively slow deterioration compared with that experienced by metal bridges. The application of policy C to metal bridges on rural and freight only routes would result in addition expenditure in future control periods but is unlikely to create any significant deliverability issues in the future. Due to the smoothing of the policy B expenditure, our ability to operate this policy fully on all metal bridges on primary, secondary and London and south east commuter routes would be limited. As described above, this would be addressed by the selected application of policy C. There would be no impact on the delivery of the HLOS in CP4 as a result of this approach but the cost of delivering this policy mix would rise in future control periods.

Considering the second option, the application of policy C to all modelled assets would reduce the CP4 expenditure forecast to approximately £1,617 million, a reduction of £362 million from our SBP forecast. Although it is unlikely that this option would impact significantly on the delivery of the HLOS in CP4, there would be a risk of an increase in number of temporary speed or other operational restrictions towards the end of the control period. Of more concern would be the continued deterioration of the civils asset portfolio and the increased total cost of recovering this deterioration in future control periods. A significant increase in expenditure is likely to be required in CP5 and beyond to address this deterioration and deliverability would also

become a risk, both in terms of the supplier base and access to the network.

We have chosen these two options as we believe they provide a boundary within which further options and the implications of these options can be considered. Expenditure in CP4 below £1,617 million would potentially compromise the affordability of the railway due to significantly higher asset management costs in subsequent control periods and may present a future workload that is undeliverable. A more detailed consideration to determine the optimum mix of policies and the likely longer term implications and future cost impact can be made when the funding position is clarified.

Earthworks

Prior to CP3, earthworks expenditure was very low, with expenditure averaging £20 million per annum in CP2. This period coincided with a high level of temporary speed restrictions (TSRs) and earthworks failures with the number of earthworks TSRs reaching almost 100 in 2002/03.

In CP3, there has been a significant ramp-up in expenditure to an average of around £90 million per annum. The increased funding has enabled us to adapt our management approach, putting an increased focus on addressing the root cause of asset deterioration, rather than just treating the symptoms. This has led to big reductions in the number of earthworks TSRs with the number reducing to 23 in 2007/08. We have also reduced the percentage of earthworks classified as being in "poor" condition to six per cent, from around eight per cent in 2003/04.

In CP4, we intend to keep the number of TSRs at this level and continue to address the remaining poor sites to reduce vulnerability to extreme rainfall. This is particularly important given that earthworks in poor condition can increase the risk of collapses and the potential for derailments. We also aim to reduce the proportion of reactive works further to around ten per cent of total spend by the end of the control period.

Although challenging, we believe that this can be achieved with a lower level of expenditure than in CP3 and are therefore proposing no change to our SBP plans.

Major structures

Since publication of the SBP we have continued to discuss our plans for major structures with ORR. The plans are dominated by works required to the Forth and Tay bridges which together account for around 70 per cent of total planned expenditure on major structures. These plans are implementation stage estimates based on actual tendered rates and therefore we have a high level of confidence in their robustness.

We have shared tender documents and detailed work scopes for this work with ORR to provide further evidence and justification for the proposed level of expenditure.

We are developing detailed management plans for the other major structures and studies are already in progress on a number of key structures. We have recently shared our detailed management plans for Goole Swing Bridge with ORR, and intend to provide similar information for the Royal Albert and Tay bridges in the near future.

Tunnels

Since publication of the SBP we have re-examined our plans for tunnels, focussing on the largest areas of expenditure. Tunnel condition is classified into five bands - sensitive, poor, fair, good and very good.

The largest area of expenditure is on sensitive tunnels which are those where condition warrants careful and frequent additional examinations. Our strategy for these assets is continuous monitoring and a programme of defect removal such that their condition band improves to at least "fair" by the end of CP4. The strategy is based on the fact that deterioration of sensitive tunnels tends to accelerate over time, resulting in a rapidly changing risk profile which becomes increasingly difficult to manage. We have provided ORR with details of how our estimates for sensitive tunnels have been generated.

We are planning a similar level of expenditure on programmed maintenance, where our strategy is to prevent further deterioration of condition and reduce the number of "poor" condition tunnels. Again, we have provided ORR with details of how our estimates for this expenditure have been generated.

We have also provided ORR with further clarity on how our estimates for hidden shaft investigations and minor works have been produced.

Operational property

The planned expenditure on our operational property portfolio has been revised, in part due to the availability of more robust asset volume data

for franchised stations, and is summarised in Figure 6.7. This identifies a reduction in our planned spend of £128m over CP4 compared with the SBP.

Franchised stations

As discussed in Chapter 4, a significant development since the publication of the October SBP has been the availability of asset volume and condition data from our Operational Property Asset System (OPAS).

The SBP expenditure forecast was based on asset volume data for a sample of about 300 stations, from which average volumes for each station category (i.e. categories A to F) were derived. The OPAS data has replaced this approach, with actual asset volume data now being used for in excess of 1,900 of our stations.

An examination of the revised data set has shown that in certain areas, such as platforms, roofing and train sheds, the modelled volumes were overstated and consequently inflating our expenditure forecasts. In addition, the availability of more reliable data has enabled us to:

- review the level of non-modelled activity for each modelled asset. This has led to a small reduction in the allowance in the expenditure forecasts;
- re-assess our expenditure forecasts for those assets or activities that are not modelled, usually due to their low frequency of occurrence or low unit costs. The expenditure forecasts for these activities were included in the "other station costs" element of the franchised station breakdown in the SBP. We have now reviewed this category, leading to an increased granularity of the activities covered by this category and a considerable reduction in our expenditure forecast.

Having established a more robust understanding of asset volumes, materials and construction types, the greater granularity of asset information has also enabled us to use the core unit cost schedules created by Franklin & Andrews more directly. In the October submission, in the absence of detailed material type information, we assumed profiles of material type, e.g. platform surfacing types as tarmac, concrete or timber, according to a small sample. We are now able to apply unit costs assumptions to actual asset material types, minimising any modelling assumption inaccuracy.

There are two key issues concerning asset life assumptions; expected life of an asset and remaining life. Our assumptions on the expected life for each type of asset on our stations and the appropriate intervention frequencies were validated by the Building Research Establishment (BRE), acknowledged experts in property asset management. We have reviewed our work to date in this area, and the work of the BRE, and we are confident that our assumptions, based on property industry best practice, are consistent with the achievement of minimum whole life cost.

Our SBP was based on an assumption that the average age of our assets was half of their expected lives, and that the number reaching the end of their assumed life each year would be broadly constant. We have reviewed these assumptions against remaining life data collected as part of the OPAS initiative and believe that our assumption is reasonable. In the longer term we expect to use actual remaining life in our modelling, but we believe some more detailed analysis of the data and amendments to our model are required before this can be implemented.

The review of asset lives and intervention frequencies revealed an inconsistency in the frequency of maintenance activities under policy C. This has been amended, resulting in a lower expenditure forecast on lower category stations.

The result of these adjustments is a forecast long run average annual pre-efficient cost of maintaining the current condition of assets on our franchised stations of £156 million. This compares with a forecast of £244 million

Figure 6.7 Operational property expenditure

£m (2006/07 prices)	2009/10	2010/11	2011/12	2012/13	2013/14	CP4 total	SBP CP4	Variance
Managed stations	138	122	86	57	37	**441**	416	25
Franchised stations	147	142	137	133	131	**691**	806	-115
Light maintenance depots	14	14	13	13	13	**66**	47	19
Lineside buildings	12	14	17	18	18	**79**	114	-36
NDS depots	1	1	1	1	1	**3**	23	-20
MDU buildings	12	12	11	11	11	**58**	58	0
Total	**325**	**305**	**265**	**233**	**210**	**1,337**	**1,465**	**-128**

Figure 6.8 Franchised stations by element

£m (2006/07 prices)	2009/10	2010/11	2011/12	2012/13	2013/14	CP4 total
Platforms	19	18	17	17	17	**87**
Roofs & roof drainage	12	11	11	10	10	**54**
Footbridges	15	15	14	14	13	**71**
Lifts & escalators	6	6	6	6	6	**30**
Electrical systems	27	26	26	25	24	**128**
Car parks	13	12	12	12	11	**60**
Facilities & accommodation	21	20	19	19	19	**98**
Inspections	7	7	7	6	6	**33**
Other stations costs	28	27	26	25	25	**129**
Total	**147**	**142**	**137**	**133**	**131**	**691**

identified in the SBP and average expenditure in CP3 of around £140 million. Figure 6.8 summarises the planned franchised station expenditure (after having applied our efficiency forecasts) by key element. As noted earlier the revised cost estimates presented in this update are based on a number of significant improvements compared to the initial figures given in the SBP. The main impact of these improvements is a lower overall expenditure forecast on smaller stations that is reflected in the revised total and the revised estimates for each station facility owner.

Note that the full impact of the change in our forecast long run average cost is not translated into a comparable reduction in our total CP4 expenditure plans. This is because our original analysis underpinning the SBP indicated a significant increase in activity levels compared with those carried out during CP3. To manage this transition, and to maximise the opportunity for delivery efficiencies, it was decided to phase in the proposed new asset management regime over CP4, and profiled the expenditure accordingly. We did not plan to reach the steady state position until early in CP5.

The revised forecasts do not result in such a significant increase so there is no longer a need to profile expenditure for franchised stations.

We remain committed to optimising station investment through working closely with train operators and other industry stakeholders and to link station charges to planned expenditure. This is also likely to include increased delivery of work by train operators. Our indicative expenditure projections by station facility owner are shown in the appendices.

Managed stations

We have updated our work banks for managed stations to reflect the development work undertaken since publication of the SBP. We have included a provision for lifts and escalators which had been previously omitted, and removed the renewals costs at London Bridge as these are included in the Thameslink 2000 scheme. The further development of the schemes has resulted in a forecast increase in the cost of the works at King's Cross by £13.2 million (train shed roof and eastern range offices) and at Paddington by £8.2 million (improved scope clarification).

Site visits and detailed reviews of major schemes have been undertaken with ORR at Paddington, King's Cross and London Victoria stations, with a joint visit to Edinburgh Waverley planned in early April.

The overall impact of changes to the managed stations expenditure plans for CP4 is an increase of £25 million from that detailed in the SBP. The planned expenditure in CP4 is heavily dominated by the major schemes at King's Cross and Edinburgh Waverley which account for about half of the total.

Lineside buildings, depots and maintenance delivery units

We have also reviewed our modelling for lineside buildings, light maintenance depots (LMDs) and maintenance delivery unit (MDU) buildings. For lineside buildings this has resulted in a slight increase in asset counts, a reduction in ground floor areas and some adjustments in unit cost applications. The overall impact of this is a £36 million reduction in expenditure over the control period compared to the SBP.

For LMDs, the further review of asset volumes, activity and unit costs has broadly confirmed our view of the appropriate steady state level of expenditure. However, in the SBP this was profiled in line with stations expenditure, starting much lower and not reaching the steady state level until CP5. As noted above, the overall reduction in forecast expenditure on franchised stations has now removed the need for this profiling, with the result that forecast LMD

expenditure increases by £19 million over CP4. This brings annual expenditure in CP4 into line with current levels.

We have also reviewed asset volume data for our maintenance delivery unit (MDU) buildings and concluded that our SBP expenditure forecast remains valid.

Our October SBP included planned expenditure of around £20 million on enhancing facilities at our national delivery service (NDS) depots. As the business case for this initiative has not yet been established this has been removed from our CP4 expenditure plans.

Telecoms renewals

Since publication of the SBP, we have updated our plans for the national telecoms programme. Our analysis shows that activity totalling around £140 million has been deferred from CP3 to CP4. We have reflected this in a reduction in the proposed regulatory asset base at the start of CP4.

The work on updating the national telecoms programme has also resulted in significant reprofiling of expenditure in CP3 from 2007/08 into 2008/09.

Our forecast for CP4 spend remains unchanged from the SBP. The latest national telecoms project plan, following reworking for the impact of lower mast heights and other issues, shows an increase of £13 million over CP4. We have also identified a potential underestimate in our forecasts for voice recorders of around £4 million in CP4. However, these changes are not considered sufficiently material to revise the figures in this update.

Electrification renewals

We have made a number of changes to our SBP forecasts for CP4 in this update.

Our forecast expenditure in the remainder of CP3 has been reduced with a total of £60 million of activity deferred into CP4 when it can be delivered more efficiently. This additional spend is assumed to be spread evenly over CP4.

Great Eastern overhead line equipment

We have re-positioned the £87 million replacement of the overhead line equipment on the Great Eastern main line as renewals expenditure. In the SBP, this was included as a performance scheme in the enhancements section.

The project involves replacement of the fixed termination overhead line equipment (OLE), originally installed in 1949, with a modern high reliability system. The existing fixed termination system design is complex, temperature sensitive and difficult to maintain. It is becoming increasingly unreliable and has failed on a number of occasions. Dewirement usually results in closure of all lines for 18 hours or more. As well as reducing delays caused by the OLE to a nominal level, the project provides synergies with other projects taking place in the same area such as Crossrail, the East London Line bridge 19 replacement and the London 2012 Olympic and Paralympics Games. We have undertaken a full investment appraisal of the project which shows there is a strong business case representing high value for money as well as being the optimal whole life cost solution.

We have provided ORR and DfT with supporting documentation, including the latest full investment appraisal of the project.

Replacement grid supply point

The second change relates to the grid supply point at Elvanfoot in Scotland. We had forecast the renewal of the site on a like-for-like basis in 2018/19, at an estimated cost of around £1.5 million. However, National Grid is upgrading its network from 275kV to 400kV in the area, and as a result plans to upgrade our connection from a 275kV/25kV system to a 400kV/25kV system. This will result in a cost to Network Rail of £8.9 million in 2012.

Figure 6.9 Electrification expenditure

£m (2006/07 prices)	2009/10	2010/11	2011/12	2012/13	2013/14	CP4 total
SBP	**87**	**99**	**105**	**91**	**85**	**467**
Variances						
GE OLE	28	37	21	1	0	**87**
CP3 deferral	12	12	12	12	12	**60**
AC grid supply points - Elvanfoot	0	0	9	0	0	**9**
Total	40	49	41	13	12	**156**
SBP update	**128**	**148**	**146**	**104**	**97**	**623**

Following discussions with National Grid where we were unable to reach an agreement, the matter was referred to OFGEM, which has now determined that Network Rail is liable to pay for these costs. This additional expenditure represents a significant increase in our planned electrification renewals expenditure for Scotland as set out in the SBP, which averaged around £9 million per annum, and has therefore been reflected in this update.

Distribution equipment

The renewal of distribution equipment that has reached an age or condition when it is no longer considered economical to maintain, at £315 million over the control period, forms a significant element of our electrification renewal programme for CP4.

We have reviewed our policy for distribution equipment and are confident that our expenditure plans are robust, for the following reasons:

- our high voltage switchgear renewal plans are limited to oil filled equipment, generally between 45 and 55 years old. The continued operation of these units presents a potential safety hazard (the Health and Safety Executive recommends renewal at age 35) and our plan is to remove all of this type of equipment by early in CP5;
- expenditure on vacuum and surface mounted outdoor switchgear is routine mid-life refurbishment necessary to achieve the planned life of the asset. The refurbishment of SF6/GIS switchgear is relatively limited in CP4, but increasing volumes of work are required in CP5;
- our renewal plans for transformer rectifiers are limited to those installed in the early 1950s, mainly due to environmental and safety considerations; and
- the majority of our cable renewal plans for CP4 cover DC high and low voltage cables. For the high voltage cables our policy is to replace oil filled cables (which present a potential safety and environment hazard).

The review of recent tender returns on one of our largest DC low voltage switchgear renewals projects shows higher unit rates than we have assumed in preparing our forecasts. We have not revised our forecasts at this stage but this underlines the risks of rising input prices in relation to our efficiency targets.

Plant and machinery renewal

The only change to our plant and machinery forecasts from the SBP relates to the application of efficiency to the costs of procurement of new high output track renewal equipment. In the SBP we applied the efficiency profile for the remainder of CP3 and CP4 to the forecast purchase costs. This is inappropriate for one-off capital purchases where the actual cost is known so this has now been removed, increasing our CP4 forecast by £17 million.

Discretionary investments

The SBP included additional investment of £885 million which was referred to as “discretionary”. Since the SBP we have done considerable further analysis of the justification for this investment and the amount which we have included in this update has been reduced to a net cost of £74 million. This remaining amount represents the net cost of items which are fundamental to the delivery of our plans for CP4 and where the benefits are therefore embedded in our projections for improved efficiency and performance.

This includes, for example, the investment in modular switches and crossings and our fleet engineering centre. It also includes the remainder of our planned investment to enable us to maintain the West Coast Main Line with the more limited access that will be available after 2008 and the reduction in future costs as a result of this investment, which we have netted off. These investments are discussed further in the other investment section below.

Some additional investment may be required depending on policy choices to be made by government or ORR. The relevant schemes are discussed further in the optional investments section below. In addition, we have proposed an approach to ORR which would enable us to make further investment where this pays for itself

Figure 6.10 Plant and machinery expenditure

£m (2006/07 prices)	2009/10	2010/11	2011/12	2012/13	2013/14	CP4 total
SBP	**119**	**79**	**52**	**52**	**53**	**356**
Variances						
High output plant (efficiency)	8	5	2	2	0	17
SBP update	**127**	**85**	**54**	**54**	**54**	**373**

(albeit potentially over longer than a control period).

The summary business case for each of the schemes included in our updated plan has been provided to ORR in a supporting document.

Other investment

Our forecasts for other investments have increased as the result of inclusion in the core plan of some schemes previously categorised as discretionary. These are described briefly below.

The modular S&C programme is one of our major efficiency initiatives, aiming to cut unit cost, reduce access requirements and improve quality through the development of standardised modular units which are assembled off-site and delivered by tilting wagons. The bulk of the implementation costs will be incurred in 2008/09 and the first two years of CP4, with the CP4 investment being £38 million out of a total of £65 million. These costs cover the procurement and fit out of a manufacturing facility, wagons to deliver the modular assemblies to site and other plant and IM costs.

Our supply chain synergy project will deliver substantial savings in our materials costs through investment in a new warehouse for all nationally held inventories and in associated IM systems. Implementation commences during CP3 but the bulk of the costs, £25 million out of £32 million, will be incurred in CP4. The project will enable efficiency savings from a reduction in the materials and spares inventory, and the rationalisation of existing warehouse and office accommodation. It will also enable some small specialist supply contracts to be brought in-house.

During 2008/09 we will commence construction of our National Fleet Engineering Centre, a new facility for the maintenance of our rail vehicles and on-track plant, including high output track renewal systems, grinders, stoneblowers and track monitoring vehicles. This will enable cost savings from avoiding the current use of contractors facilities, better quality of work and hence fleet availability, better planning of major overhauls and the consolidation of the management team at one site. The majority of the work will be completed during CP3 but £17 million will be incurred during CP4, largely during 2009/10.

The insourcing of telecoms maintenance contracts currently held with Thales are a key enabler for efficiency savings. The transfer is expected to take place in 2009. The implementation costs, largely associated with IM, including the enhancement of Ellipse and our fault management system to include telecoms assets and the settlement of IPR on data and systems are forecast to be £7 million in CP4.

In 2008/09 and 2009/10 we are continuing with our planned acceleration of investment on the West Coast Main Line that will allow us to maintain the line with the more limited access that will be available from December 2008. The completion of this work involves expenditure of around £50 million in the early stages of CP4. The acceleration of work from later in CP4 is estimated to reduce total renewal expenditure by £62 million, giving the net impact of £12 million.

Enhancements

This section provides an update on the proposed enhancements programme for CP4.

2008/09 position

The overall enhancement expenditure proposed for 2008/09 is £1,385 million. This is marginally less than that proposed in the 2007 Business Plan. Expenditure on the Thameslink programme and the West Coast accounts for 40 per cent of the proposed expenditure, with third party funded projects accounting for 15 per cent.

In the 2008/09 budget we have now allocated funds to the development of projects to be implemented in CP4 to deliver the DfT HLOS outputs. This was not included when we

Figure 6.11 Other renewal expenditure

£m (2006/07 prices)	2009/10	2010/11	2011/12	2012/13	2013/14	CP4 total
SBP	**163**	**148**	**109**	**103**	**73**	**596**
Variances						
Committed discretionary	64	12	3	3	3	**86**
WCML accelerated renewals	25	-13	-15	-7	-1	**-12**
Total	90	-2	-12	-4	2	**74**
SBP update	**252**	**146**	**98**	**99**	**75**	**670**

published the 2007 Business Plan as we were not yet in a position to identify the schemes requiring development until the HLOSs had been published in the summer of 2007. This funding provision is critical to ensuring that we have schemes sufficiently developed by the spring of 2009 to enable timely delivery within CP4.

Around £90 million is planned to be spent on Transport Scotland funded projects. We have agreed with Transport Scotland that these schemes will be RAB funded from the start of 2008/09. These had previously assumed to be grant funded.

CP4 enhancements

The portfolio of proposed enhancements for CP4 we included in the October 2007 SBP has been updated to reflect:

- refinement, in discussion with train operators and funders, of the portfolio of enhancements to meet the HLOS outputs;
- ongoing project development;
- further refinement of our cost and risk estimation; and
- the refresh of our assessment of deliverability.

The following section provides an update on the major enhancement schemes included in the plan. Figure 6.12 describes the categories used to describe the projects.

Project development

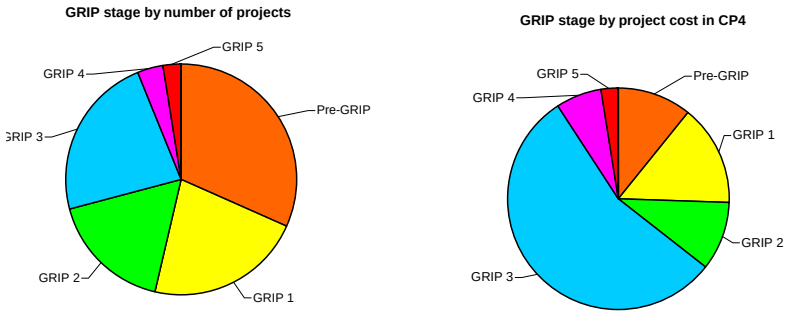
We have continued to make progress developing individual projects. Since October, seven schemes have moved into the GRIP framework, another seven have moved one GRIP stage and a further seven have moved two GRIP stages. Three projects have moved three GRIP stages. This assessment is based on project information provided in February 2008 for the purpose of the update of the SBP. Projects will continue to progress through the GRIP framework.

Figure 6.13 provides an assessment of where the England and Wales portfolio is in terms of GRIP stages, both by number of projects and value of projects.

Figure 6.12 CP4 enhancement – categories of projects

Category	Description
DfT baseline projects	Projects included in the SBP as committed. This includes the remaining elements of the West Coast strategy, King's Cross re-development and the Access for All programme.
DfT specified projects	Other projects, besides the baseline projects, that DfT explicitly specified in its HLOS. This includes the Thameslink Programme, Birmingham New Street, Reading station, IEP, ERTMS, NRDF.
DfT HLOS projects	Projects that Network Rail and train operators believe are required to support the strategies to deliver the HLOS metrics, such as platform lengthening, power supply upgrade and junction improvements and support the strategies summarised in Chapter 3.
Optional enhancements	Projects that, although not necessary to deliver the HLOS outputs, we and train operators believe have a strong business case and offer good value for money or where ORR / government policy decisions are required. These schemes are further defined in terms of the following sub-categories: • schemes that contribute to the DfT's aspiration to close the gap between the worst performing train services and the others; • schemes that provide additional capacity and performance benefits; • schemes that provide journey time improvements; • schemes that exploit the one-off opportunity to enhance the functionality of the railway in a cost-effective way when renewing key parts of the network; • schemes that support the move to a seven day railway • funding for the development of potential enhancements for CP5; and • policy choices including GSM-R on freight only routes.
Transport Scotland core projects	Projects specified in their HLOS including Tier 2 and Tier 3 schemes and a small projects fund.
Transport Scotland optional projects	Projects that support the move to a seven day railway and policy choices including GSM-R on freight only routes.
TIF projects	Schemes to be funded from Transport Innovation Funding such as Willesden–Gospel Oak–Barking capacity, Felixstowe Nuneaton gauge and Southampton–West Coast Main Line gauge.
Third party funded	Those projects funded by others, such as 2012 Olympics.
Crossrail	Expenditure associated with Crossrail that is subject to a separate funding agreement from the periodic review.

Figure 6.13 England and Wales CP4 enhancements – current stage of GRIP development



Cost and risk

Figure 6.14 sets out a summary of the updated cost estimates of the portfolio of projects in CP4. Where relevant, these costs are net of third party contributions.

Figure 6.15 shows the annual phasing of the costs during CP4. Much of the profile is determined by the phasing of expenditure associated with the major specified projects such as the Thameslink programme, Reading, Birmingham New Street and West Coast related schemes.

Figure 6.16 shows the expenditure across the strategic routes.

In updating our plan, we have reviewed the proposed enhancements to enable us to take account of the latest view of scope, cost and deliverability of each project and the portfolio as a whole. We have undertaken a high level review of the cost estimate for each project and refreshed our risk analysis, taking account of any further development of scope definition.

Figure 6.14 CP4 enhancement – capital expenditure summary (£m)

Projects	CP4 total	Description
DfT projects	8,581	DfT projects including baseline projects, specified projects, projects required to deliver the HLOS outputs plus options to deliver further outputs
Transport Scotland projects	448	Transport Scotland HLOS specified (Tier 2) projects, project (Tier 3) development funding plus options to deliver further outputs
TIF projects	117	Projects funded from the Transport Innovation Fund
Third party projects	779	Projects funded by Third Parties e.g. Olympics 2012
Crossrail	1,225	Network Rail infrastructure works
CP4 total	11,150	

Figure 6.15 CP4 enhancements expenditure by year and funder

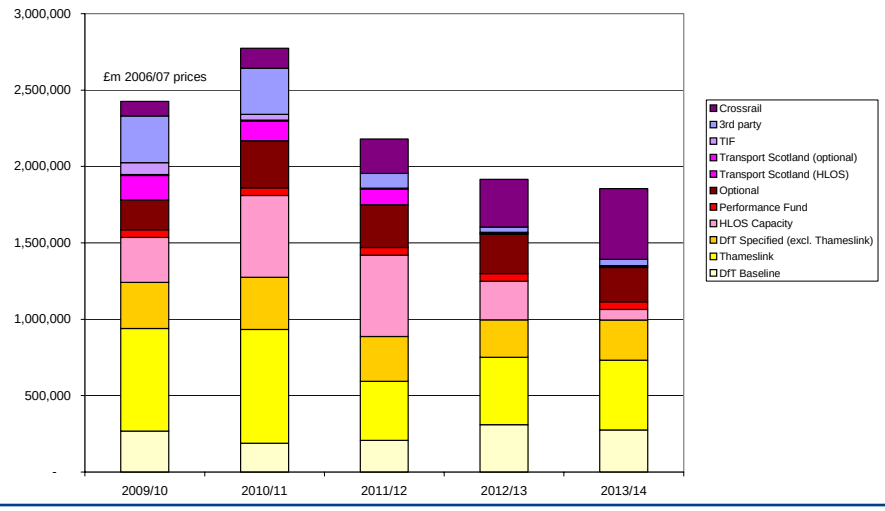
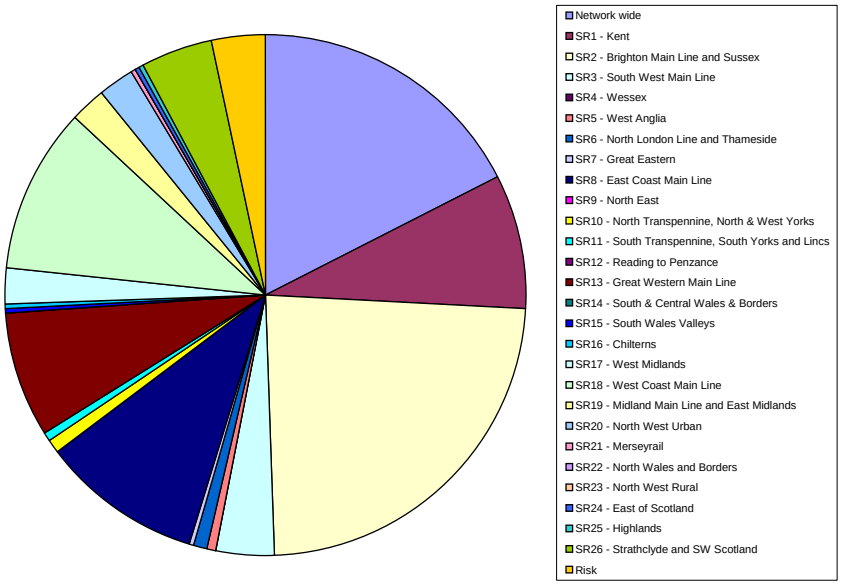


Figure 6.16 Enhancement expenditure by strategic route



As in the October SBP we have sought to provide an estimate of the cost of the projects based on having an 80 per cent level of confidence (referred to as the "p80") of delivering the portfolio within the estimated cost. Where projects are sufficiently well developed we have used available quantified risk assessments (QRA). Where projects are not sufficiently well defined to have a QRA, we have used a simplified but consistent approach of estimating a point estimate (or "spot") cost for each project and assigning a range of uncertainty about the costs based on available information on the definition of the project. This range was then used to calculate an overall risk provision for the portfolio of schemes based on having an 80 per cent level of confidence of delivering the portfolio within the cost estimate.

We have examined the total amount of risk allowance in the plan for enhancements. Our analysis includes only projects we are seeking to fully fund ourselves from the periodic review and also excludes funds such as NRDF. In summary:

- the point estimate accounts for about £5.2 billion of the DfT and Transport Scotland projects and equates to 84 per cent of the total cost included in the plan;
- the allowance for the mean values of the portfolio is around £600 million and represents 10 per cent; and
- the allowance to achieve 80 per cent certainty compared to the mean is £400 million and represents seven per cent.

Where applicable, prices used in the cost estimates have used current unit rates which are inclusive of efficiencies achieved to date. Further efficiencies in contracting and work packaging will be identified and reviewed as part of the development process. As in the SBP we have included specific allowances for input price inflation on more developed projects where there has been no explicit allowance for this in the QRAs.

Project summary

We summarise the material changes to the projects since the SBP was published below.

DfT specified schemes

Figure 6.17 below sets out a summary of the capital cost estimates of the portfolio of projects to be funded by DfT.

Thameslink programme

We have agreed a regulatory protocol which enables us to proceed with the delivery of the Thameslink programme. The projected expenditure in CP4 on the Thameslink programme has increased marginally, by less than five per cent, as a result of the acceleration of some works from CP5.

Birmingham New Street

In February 2008, the DfT announced its commitment to investment of almost £400 million in the transformation of Birmingham New Street Station. The project will be funded from a range of sources including Birmingham City Council, Advantage West Midlands and through the 2008 Periodic Review.

The scheme to be implemented is referred to as "Gateway Plus" and will double the size of the station concourse. In addition, the scheme will

Figure 6.17 DfT enhancement projects in CP4 (£m)

Projects	CP4 total
Baseline projects	
Access for All	206
King's Cross	175
Stafford Colwich remodeling	483
Bletchley Milton Keynes	114
Power Supply Upgrade	272
Total DfT baseline projects	1,251
Specified projects	
Thameslink Programme	2,700
Intercity Express Programme	260
Network Rail Discretionary Fund (NRDF)	234
National Stations Improvement Programme (NSIP)	156
Strategic Freight Network (SFN)	208
Reading Station Area Redevelopment	456
Birmingham New Street	128
Total DfT specified projects	4,141
Capacity schemes	1,685
HLOS performance fund	250
Optional enhancement projects	1,253
Total DfT enhancements in CP4	8,581

provide service by escalator to all platforms, making the station more accessible. There will also be three new entrances to the station from the city centre and new public square.

Intercity Express Programme (IEP)

Since the SBP we have been working with DfT to support their procurement programme for IEP. In particular, the following key documents have been published:

- the invitation to tender;
- the train technical specification;
- the Network Rail train infrastructure interface specification; and
- the IEP availability and reliability agreements.

The train infrastructure interface document is of particular relevance as it provides information to bidders on the infrastructure on which the IEP trains will operate. The core routes detailed in this document are the East Coast and Great Western routes. The scope of work necessary to allow the introduction of IEP on these routes is in early stages of development but is anticipated to include platforms, gauging, and power supply. The majority of this work in CP4 will be focused on the East Coast route.

National Stations Improvement Programme (NSIP)

Following continued industry work since the SBP, ORR has confirmed in February that the industry's plans for the NSIP programme are deliverable and efficient.

The National Programme Board agreed that the £150 million funding would be allocated in two tranches. The first tranche, of £100 million, has been allocated by train operator estate, with a further review before allocation of the remaining funding. An allocation methodology has been agreed by the National Programme Board based on the DfT criteria of fair geographical spread, passenger satisfaction and footfall.

The selection exercise for the subsequent tranche will be based on the same criteria as the initial tranche, but will in addition, reflect a successful track record in efficient delivery of the first tranche of schemes and in particular success in securing third party private and public sector funding. The final test will always be to confirm that the original intent to improve passenger perception of the station is achieved. The National Programme Board has decided that it will determine the allocation of the second tranche of NSIP funding in April 2010.

Network Rail Discretionary Fund

The NRDF is a mechanism for funding minor schemes which are linked to renewals or stand alone schemes which have a positive whole-industry business case. It should also be noted that the safety and environmental fund is to be discontinued and some schemes which may previously have been funded through that route may become candidates for NRDF.

In the SBP we assumed that a number of schemes we believe are necessary to deliver HLOS outputs would be funded through the

NRDF fund. In light of discussions with train operators we have included these schemes explicitly within the portfolio of capacity schemes required to deliver the HLOS metrics in order to provide greater certainty to their delivery. The alternative approach of using a significant proportion of NRDF for these schemes would appear to undermine the purpose of this fund. However, this may need to be reviewed in the light of overall affordability.

The remaining candidate schemes for NRDF funding in CP4 can be found in the route plans supporting the SBP update.

HLOS capacity schemes

There has been some refinement to the strategies assumed in October for delivering the HLOS capacity metrics. In particular, discussions with Northern Rail have led to the inclusion of a number of infrastructure schemes that improve the utilisation of the proposed new rolling stock to more effectively deliver the HLOS outputs. On certain corridors this additional infrastructure allows services to turn back thus reducing the overall cost to the industry, through less rolling stock, to deliver the capacity required. On other corridors the infrastructure allows for a revised train service pattern to deliver the new capacity through increased frequency rather than train lengthening initiatives as the infrastructure costs to facilitate train lengthening are prohibitive.

Figure 6.18 on the following page provides a breakdown by strategic route of the proposed capacity schemes required to meet the capacity targets. A description of the additional scope of the infrastructure schemes we have included since the SBP is set out below. Details of the schemes that were in the SBP are not repeated here.

Leeds Station Southern Entrance

The objective of this project is to reduce pedestrian journey times where accessing Leeds station from the south and to meet existing and future passenger flow requirements. The scheme includes bridge works over the river Aire, connecting the deck to both sides of the river, extension of the existing western footbridge and a structure to accommodate the lifts, stairs and escalators to facilitate access from the station to the south side.

East Leeds Parkway

This scheme is required to meet peak passenger growth through a revised train service operation on the Huddersfield / Bradford and East Leeds corridors due to insufficient track capacity at Leeds for longer terminating trains. The scheme includes the provision of additional platforms and a new ticket counter.

Maidenhead and Twyford platform extensions

The objective of this project is to extend the up and down relief line platforms at Maidenhead and Twyford stations to accommodate seven car suburban trains contributing to the delivery of the increased capacity at Paddington station to achieve the HLOS target.

Manchester area capacity enhancements

This scheme includes interventions that will improve the passenger environment at Victoria, and allow the cost effective deployment of Northern Rail's fleet. The scope of works include linespeed increases on the Hadfield Line, turnbacks at Rochdale, Stalybridge and Buxton (existing platform), as well as signalling and OLE works.

Finsbury Park to Alexandra Palace downside enhancements

The objective of this project is to provide increased evening peak hour capacity, improved performance all day and direct southbound access for freight traffic onto the Barking to Gospel Oak Route. The scheme will deliver two new 125 metre platforms, two waiting shelters, three new lifts and a footbridge.

Huddersfield platform 9

This project will provide an additional platform capable of taking 8 x 23 metre vehicles at Huddersfield to allow longer and additional peak services to operate. The additional platform will reduce conflicting station moves at peak times by allowing through services to use the new platform; thereby enabling longer and additional services to turn back in other platforms. This will help to meet growth predicted on the Manchester to Leeds route, improve station capacity and train performance at Huddersfield.

Small scale capacity schemes

Set out below are the schemes we previously assumed would be NRDF funded which we are now seeking specific funding for that are required to meet the HLOS metrics. The expected cost of each of these schemes is below £5 million.

Figure 6.18 DfT capacity enhancement projects in CP4 (£m)

Route	Projects	CP4 total
1	12 car operations Sidcup and Bexleyheath routes	5
1	Power supply enhancements (route 1)	19
1	12-car operations: Dartford to Rochester Inc. Gravesend	15
1	12-car operations: Greenwich and Woolwich route	3
1	12-car operations: Hayes and Sevenoaks (stopping) services	0
1	New Cross Enhancement to Power Supply	15
2	Power supply enhancements (route 2)	18
2	Gatwick Airport Remodelling and Passenger Capacity	30
2	East Croydon passenger capacity scheme	12
2	Strategic Route 2: suburban area 10-car operations to Victoria and London Bridge	76
2	West Croydon Stn Development	5
3	Power supply enhancements (route 3)	35
3	WIT conversion medium term	53
3	Clapham Junction station capacity and platform lengthening	56
3	10 Car SW Suburban Railway (Route 3)	110
3	Reading Southern Platforms	21
5	WA Outer 12 Coach Trains	27
5	Power supply enhancements (route 5)	3
5	WA Inner 9 Coach Trains	32
6	Power supply enhancements (route 6)	0
6	Tilbury Loop platform extensions	20
6	NLL capacity enhancement	44
7	Power supply enhancements (route 7)	6
7	Chadwell Heath Turnback	4
8	Alexandra Palace to Finsbury Park 3rd Up Line project	46
8	Finsbury Park – Alexandra Palace Capacity Studies	14
8	Hitchin Grade Separation	50
8	ECML level crossing closure programme	20
8	York Holgate Junction 4th line	10
8	Peterborough Station re-development and additional island platform	28
8	Shaftholme Junction re-modelling	42
8	FCC Platform Lengthening	12
8	Capacity relief to the East Coast Main Line	248
10	West Yorkshire - Platform lengthening (route 10)	9
10	Huddersfield Platform 9	9
10	Stabling for northern (West Yorkshire)	15
10	Leeds Southern Entrance	9
10	East Leeds Parkway	11
10	Leeds new Bay Platforms	17
11	Stabling for northern (South Yorkshire)	10
11	South Yorkshire - Platform lengthening (route 11)	11
13	Barry - Cardiff Queen St corridor (Part of Cardiff area signal renewal)	20
13	Maidenhead and Twyford (relief lines)	3
16	Chiltern Platform Lengthening	9
17	Redditch Branch Enhancement	16
17	Extension of cross city services to Bromsgrove	11
17	Platform lengthening (route 17)	32
20	Platform lengthening (route 20)	23
20	Stabling for northern (route 20)	14
20	Route 20 capacity enhancement package	29
20	Salford Crescent New Station	22
20	Salford Central New Platforms	11
21	Liverpool James Street	8
21	Liverpool Central Passenger Capacity	12
	Total capacity schemes	**1,384**
	Small scale capacity schemes	65
	Risk adjustment	237
	Total DfT capacity enhancement projects	**1,685**

Cogan Junction upgrade

This scheme complements the Cardiff area signalling renewal enhancements (CASR). The CASR key enhancement requirements are to deliver greater capacity (16tph) between Cardiff Queen Street North Junction and Cogan Junction through the key nodal points of Cardiff Queen Street Station and Cardiff Central Station.

8-car operations: Victoria Eastern to Bellingham

The South London RUS recommends that the existing Victoria Central to Denmark Hill to London Bridge service is amended to run Victoria Eastern to Denmark Hill to Bellingham, in order to supplement TfL's proposed Clapham Junction to Denmark Hill to East London Line service. This is mainly due to the existing service pattern being a sub-optimal use of the limited capacity available at London Bridge.

Initially both services would be restricted to four car operation. However the RUS recommends that the Victoria Eastern to Denmark Hill to Bellingham service is extended to 8-car as soon as practical, since a four car radial service into Victoria would quickly become overcrowded. Extension of this service from four car to eight car is also part of the package of measures contributing to the Victoria HLOS capacity metric. It requires platform extensions and Clapham High Street and Wandsworth Road. Some track layout changes are likely to be needed. Selective Door Opening (SDO) is unlikely to be a practical option for stations so close to a London terminal, since crowding would prevent passengers from walking through the train.

8-car operations Swanley to Ramsgate

The Maidstone East line is restricted to six car operation by short platforms at Kemsing, Barming, Hollingbourne, Harrietsham, Charing, Wye and Sturry. The rolling stock is not equipped with SDO and it is considered unlikely that the DfT rolling stock strategy would provide SDO equipped stock for this line.

It is anticipated that the Kent RUS will recommend that services on this route should be lengthened to eight car capability, primarily to alleviate crowding between Bromley South and central London. Extension of this service from six car to eight car is part of the package of measures contributing to both Victoria and Blackfriars HLOS capacity metrics.

12-car operations Swanley to Rochester

Services via Sole Street are restricted to eight car operation by short platforms at Farningham Road, Sole Street and Rochester. The rolling stock is not equipped with SDO and it is considered unlikely that the rolling stock strategy would provide SDO equipped stock for this line.

It is anticipated that the Kent RUS will recommend that services on this route should be lengthened to 12 car capability, primarily to alleviate crowding between Bromley South and central London. Extension of this service from eight car to 12-car is part of the package of measures contributing to both Victoria and Blackfriars HLOS capacity metrics.

Outputs from this scheme are dependent on implementation of the Dartford to Rochester 12 car scheme, which would provide 12 car capability at Rochester.

New bay platform Birmingham New Street

The scheme will transform the West Dock into a bay platform allowing West Country services to turn back without occupying a through platform.

Seven Sisters improved access

This is required due to the proposed turnback for the Cheshunt to Seven Sisters shuttles. Improved access is required for capacity reasons in connection with the additional proposed services and to meet predicted demand.

Seven Sisters turnback

This scheme facilitates the Cheshunt to Seven Sisters shuttles to meet predicted demand. This scheme is therefore linked to Seven Sisters improved access scheme.

Fenchurch Street and Chafford Hundred passenger circulation

This scheme is required to accommodate predicted demand at these stations.

Moorgate Branch improvements

This scheme is recommended in ECML RUS and provides additional signal sections. This will help to meet the high peak hour capacity metric for Moorgate for running additional trains which requires reduced headways from 5 to 4 minutes, which in turn requires the additional signals.

Todmorden turnback facility

This scheme is designed to help meet the peak hour capacity metric into Manchester to avoid the need for strengthening Leeds – Bradford – Manchester Victoria services, thereby reducing additional vehicle miles and possibly reduce the number of vehicles required as some 'bounce back' may be possible.

Horsforth turnback facility

This scheme is designed to help meet the peak hour capacity metric into Leeds on Harrogate line – additional peak hour Horsforth – Leeds services to avoid the need for strengthening some York / Knaresborough/Harrogate - Leeds services. This thereby reduces additional vehicle miles and will reduce number of vehicles required as some 'bounce back' is possible. This scheme is subject to further analysis in the Yorkshire and Humber RUS.

Harrogate – Horsforth – additional signal sections

This scheme will allow Horsforth shuttle services and is linked to the Horsforth turnback facility scheme.

Keighley turnback facility

This scheme will help meet the peak hour capacity metric into Leeds on the Skipton line by providing an additional peak hour Keighley to Leeds service to avoid the need for strengthening Skipton to Leeds services. This thereby reduces additional vehicle miles, reduces the number of vehicles required as some 'bounce back' is possible and avoids complex platform lengthening on the Shipley on Skipton line.

Ilkley – Leeds – platform lengthening

This scheme is not within the scope of the West Yorkshire platform lengthening scheme as it was originally expected that additional services would run to meet the peak capacity metric into Leeds on this route. However it is now proposed to allow train lengthening on the route.

East Midlands platform extensions

The scope of this scheme is being developed with CrossCountry and East Midlands Trains. The stations concerned are Wellingborough, Market Harborough and Loughborough.

Optional investments

Set out below in Figure 6.19 are a number of schemes that we, train operators and wider stakeholders believe have strong business cases and offer good value for money. In particular there are schemes that, although not necessary to deliver the HLOS outputs, we and the train operators believe are necessary to deliver the DfT's stated desire in the HLOS to close the gap between the worst performing train services and the others. Two such schemes are the ECML overhead line electrification (OLE) project and the Cotswold Line redoubling project, which are described fully below.

A numbers of schemes, such as Crewe Re-modelling, besides providing railway operational benefits potentially generate substantial wider benefits to the regional economy and the business case and funding opportunities need to be developed jointly with regional stakeholders.

The other schemes were described in the SBP and further detail is contained in the supporting documents.

East Coast main line OLE

The objective of this project is to reduce the number of delays on the ECML due to overhead line failures by 50 per cent. This is a programme of activities aimed at improving reliability on ECML including removal of defect backlog, vegetation clearances, neutral sections renewals as well asimproved protection settings pantographs and condition monitoring.

Cotswold line redoubling

The project objective is to identify the infrastructure enhancements necessary to deliver the proposed re-doubling of part or all of the Oxford to Worcester route. It is believed that there is the potential to increase service levels on this route from two to four trains per hour in both directions. This will reduce load factors by spreading peak flows across the additional services. The scheme would also improve performance through the removal of at least one of the current bi-directional single line bottlenecks. Journey time reductions of up to four minutes per train would be achieved as part of the redoubling due to the removal of slow speed turnouts at each end of the single line, enabling 90/100 HST through running where possible.

Seven day railway

Since publishing the SBP, we have continued to build up a programme to move towards a seven day railway in consultation with train operators. The case for the move towards a seven day railway is explained later in this chapter. We have also provided further supporting detail to ORR.

Policy choices

Some additional investment may be required depending on policy choices. These are described later in this chapter as they apply to both England and Wales and Scotland.

Figure 6.19 DfT optional enhancement projects in CP4 (£m)

Projects	CP4 total
Schemes to close performance gap	
ECML OLE	35
Cotswold Line re-doubling	51
Risk	13
Total schemes to close performance gap	**99**
Capacity and performance schemes	
West Croydon Track Capacity	15
Didcot - Oxford area capacity upgrade	19
Bolton Corridor Package	7
Buxton line capacity and LSI	15
Doncaster Loversall Carr junction revised operational layout	6
Hertford Loops (inc. Gordon Hill Loops)	16
Swindon - Kemble redoubling	32
Risk	17
Total capacity and performance schemes	**128**
Journey time improvements	
Westerleigh - Barnt Green linespeed upgrade	32
Wrexham to London Marylebone JTI	5
MML St Pancras - Sheffield LSI	59
TPE Route Enhancements – Linespeed Improvements	26
Risk	18
Total journey time improvements schemes	**140**
Enhancement to renewal	
Redhill remodelling	25
Crewe remodelling / resignalling	58
Reading Station Area Redevelopment Programme - Plat 1-8 Renewals	26
East Midlands resignalling - Nottingham Station Area	19
Round Oak to Walsall reopening	10
Risk	21
Total enhancement to renewal	**159**
7 day railway	
Projects to support move towards a seven day railway	320
Total 7 day railway	**320**
Longer term development	
Development fund for CP5 schemes	180
North West Feasibility Study (Manchester Hub)	60
Total CP5 development	**240**
Policy choices	
Policy choices (GSM-R freight only branches, SISS. DC regen braking)	167
Total policy choices	**167**
Total optional enhancement projects	**1,253**

Scottish projects

Figure 6.20 below sets out the enhancement expenditure in CP4 to be funded by Transport Scotland.

Airdrie Bathgate

Since the SBP this project has completed GRIP Stage 4. Following discussion with ORR a fixed price has been established for the delivery of our elements of the Airdrie to Bathgate project and this is reflected in the table below although at a different base to that of the agreement. In agreeing to deliver the project for a fixed price we have made it clear to both Transport Scotland and ORR that we must have the discretion to deliver the project in an efficient way making best use of innovative approaches where possible. We are seeking to finalise the arrangements with ORR and Transport Scotland.

Glasgow Airport Rail Link (GARL)

This project incorporates the costs of delivering the Paisley Corridor Signalling Renewal (PCR) project. The project has moved into GRIP stage 3 since the SBP. As part of this development, an estimate review has been initiated with Transport Scotland and the forecasts included in the SBP Update are based on the initial output of this exercise.

Glasgow Kilmarnock

The purpose of this project is to enable service frequency increases and train lengthening to accommodate growth on this corridor. In the SBP it was assumed that the project would be completed by the end of the current control period. We have developed the project to GRIP stage 4 and are now proposing to deliver the necessary infrastructure enhancements by October 2009 to allow for the introduction of a revised timetable service in December 2009.

Scotland Tier 3 schemes

Since October we have been working with Transport Scotland to prioritise the schemes identified within Tier 3 of its HLOS. These schemes deliver additional outputs not defined and funded through the HLOS. We have included funds in the plan to develop the prioritised schemes. Funding for delivery of these projects is not included in this plan except to the extent that this can be achieved through the ring-fenced fund.

We have agreed with Transport Scotland a set of priorities for the Tier 3 schemes:

- priority one schemes include a programme of improvements on the Edinburgh to Glasgow corridor including electrification, enhancements to support Transport Scotland's rolling stock strategy and Highland main line;
- priority two schemes include Inverness to Aberdeen service enhancements, journey time improvements between the central belt and Aberdeen, Paisley Canal, Whifflet, East Kilbride and Barrhead / Kilmarnock electrification; and
- priority three projects include Portobello Junction, a freight gauging scheme and cross Glasgow services.

Further detail on the Tier 3 priority schemes is set out below. We will complete the relevant Tier 3 schemes to GRIP stage 1 and provide the appropriate GRIP products in accordance with the programme agreed with Transport Scotland.

Edinburgh to Glasgow Improvement Programme (EGIP)

The objective of this project is to enable the operation of six trains per hour between Glasgow Queen Street and Edinburgh with a headline journey time of around 35 minutes and the operation of a further two trains per hour between Glasgow Central and Edinburgh with a journey time of around 65 minutes.

EMU rolling stock project

First ScotRail has invited tenders for the delivery of new electric multiple units (EMUs) at the request of Transport Scotland. This will be required for:

- additional stock required by the Airdrie to

Figure 6.20 Transport Scotland enhancement projects in CP4 (£m)

Projects	CP4 total
Airdrie - Bathgate	185
Glasgow Airport Rail Link	173
Borders Rail	3
Glasgow to Kilmarnock	12
Tier 3 project development	13
Small projects fund	20
Policy choices	12
Seven day railway (Scotland)	30
Total Transport Scotland CP4 Total	448

Bathgate (A2B) project;
- additional stock required by the Glasgow Airport Rail Link (GARL) project;
- additional stock to deliver other committed service improvements; and
- additional stock required as a result of predicted passenger growth.

In order to respond to increasing patronage on a number of routes, a portion of the new EMU build will be used to provide longer train formations rather than more trains. Some of the new EMU units may therefore be four car formations rather than three car formations, the current formation that has historically operated on the electrified Glasgow suburban network. This in turn drives a requirement to extend platforms on the routes over which these new trains will operate and undertake other associated infrastructure works.

Other infrastructure enhancements may be required, for example, enhanced depot and stabling facilities and overhead line power supply enhancements. However this will not become clear until the rolling stock specification is finalised. Our indicative cost estimates exclude these elements.

Highland Main Line

The objective of this project is to improve the infrastructure, principally on the Perth to Inverness route, in order to facilitate service frequency improvements on the route and reduce the journey time for these services.

Aberdeen to Inverness scheme

The first phase objective is to improve the infrastructure works to facilitate increased frequency and reduced journey time between Aberdeen and Inverurie and Elgin and Inverness, including potential new stations at Kintore and Dalcross.

The second phase objective is to improve the infrastructure on the Aberdeen to Inverness route leading to an hourly accelerated service (with an end-to-end journey time of around two hours) between these cities and the other rail connected towns along the route. The current scope assumes that a new dynamic loop is needed between Elgin and Keith plus various line speed enhancements between Elgin and Inverurie to achieve this. Scope for both phases is still under development.

Policy choices

Further discussions are required with ORR, DfT and Transport Scotland to agree the way forward on a number of policy choices relating to proposed expenditure. These choices are described below.

Station information and surveillance systems

The ownership and management of station information and surveillance systems (SISS) assets on franchised stations has been an issue since privatisation. SISS assets include customer information systems (CIS), public address (PA) systems, security CCTV systems and clocks. There is some ambiguity over asset ownership and disparate systems have been deployed across the rail network. A number of TOCs have installed additional SISS assets on their stations as part of their franchise commitments or as station enhancements funded by third parties. In many cases changes have been made without clear agreement on asset ownership and liability for future renewal expenditure, which is the subject of industry debate.

As described in the SBP, our core plan for telecoms contains £63 million over CP4 for a continuation of recent levels of SISS expenditure. We have also developed forecasts of the full renewals requirement of SISS assets, including the additional assets installed by TOCs. This forecast shows a possible incremental cost of £102 million over CP4 if we were to become liable for renewal of all of these assets.

DC regenerative braking

As discussed in the SBP, we are on course towards making the whole AC OLE electrification network capable of absorbing regenerated braking energy by the end of 2008 as part of our existing commitments funded through ACR2003. The position with the DC third rail network is more complex and we have been working with our industry partners to examine technical solutions which can provide the required capability at a viable cost.

The current preferred option, at an estimated cost of £29 million, involves:

- segregating our power supply system from London Underground's system, requiring the installation of five new substations; and
- renewing conductor rail where the impedance is greater than 100 ohms, requiring the acceleration of an estimated 120 kilometres of conductor rail renewal from CP5 to CP4.

The principal benefits of the project would be the reductions in energy consumption and hence costs to train operators, the majority of trains on

the DC electrified network having regenerative braking capability. This would also generate economic benefits from the associated reduction in carbon emissions and enable the system to accommodate additional traffic without further strengthening of supplies. Network Rail would derive some benefits from the reduction in damage to assets caused by stray currents. The project has a strong industry business case and is forecast to payback by the middle of CP5.

Related to this we are also discussing with operators potential investment in metering. This offers no financial benefit to Network Rail but there are likely to be wider industry and environmental benefits.

GSM-R coverage of freight-only branch lines

The GSM-R project will provide secure communication between drivers and signallers across the network, replacing the existing National Radio Network and Cab Secure Radio systems. In ACR2003, the SRA decided that freight-only branch lines should be removed from the scope of the project in order to limit the funding requirement. At the same time, they commissioned an investigation by RSSB of the potential for differential standards regarding driver to signaller communications to be established. The RSSB report, published in September 2006, did not provide conclusive arguments for reduced functionality on any lines.

The existing NRN systems which cover freight-only lines have to be switched off between 2012 (everywhere south of the line between the Severn and the Wash) and 2015. A number of safety recommendations call for a single national system of driver to signaller communications and the extension of GSM-R coverage appears to be the only viable way of providing full functionality. This is consistent with the DfT's Technical Strategy and strongly favoured by freight operators. The cost of extending coverage to freight-only branch lines during CP4 is estimated at £32 million.

Protection at stations

We have identified parts of the network where it may be necessary to enhance security, primarily at major stations. The two key areas are physical barriers and CCTV systems.

Strategic Freight Network (SFN)

The following schemes are proposed to be funded in CP4 from the funding made available for the SFN. Further explanation of the development of the concept and strategy for SFN can be found in Chapter 3.

Southampton to Basingstoke W12 via Andover

W12 gauge accommodates both 9'6" deep-sea container traffic, which requires a minimum of W10 gauge, and larger European containers and swap bodies. This project will provide a W12 diversionary route between Southampton and Basingstoke via Laverstock and Andover. It is the first step in a strategy to provide both additional capacity and diversionary capability for W10 traffic on the route from Southampton to the West Midlands and the West Coast main line.

Ipswich to Nuneaton freight capacity

This scheme increases the capacity of the cross country route between Ipswich and Nuneaton, with enhancements at a number of locations between Ipswich and Nuneaton, notably Ipswich (East Suffolk Junction), Ely, Peterborough, Leicester and Nuneaton.

It addresses the growth in intermodal trains from Felixstowe forecast in the Freight RUS. It builds on the Transport Innovation Fund and third party funded schemes for gauge clearance and incremental capacity enhancements between Ipswich and Nuneaton and provides an estimated additional 16 daily paths for intermodal trains on the cross country route. This allows for traffic growth and also allows some trains to be diverted away from their current route, providing a shorter and less congested route for these trains.

North Downs route

It is proposed that this scheme is progressed as the first step towards the development of the route enabling Channel Tunnel traffic to go via Redhill and Reading and beyond. The scheme will offer an alternative route from the Channel Tunnel to the Midlands and the North West.

Train lengthening

Train lengthening potentially enables haulage of more freight per train without changing the weight per axle. Thus it can permit some growth without increasing capacity utilisation. Nonetheless, in some cases it can only be facilitated by infrastructure spend on sidings and / or loops. It is therefore proposed that a specific ring-fenced fund is established to facilitate train lengthening in CP4.

In-fill gauge schemes

Progression towards the SFN vision of extensive W12 gauge clearance will require progressive

extension of gauge schemes over the next two control periods. A specific ring-fenced fund is proposed for those schemes which further this objective and have favourable business cases. Early examples may include, for example, Water Orton to Doncaster.

Crossrail

Network Rail is to deliver the necessary enhancements to the existing national rail infrastructure to facilitate the implementation of the Crossrail scheme. The cost of these works is included in this plan but the funding of the costs will be subject to a separate agreement process to the periodic review.

Programme

Figure 6.21 below sets out the indicative timescales for delivery of the proposed portfolio of enhancements. The timescales for delivery will be firmed up as the projects progress through the GRIP process. The timescales will be subject to further refinement to also take account of the DfT's rolling stock programme and ongoing trilateral discussions between us, the train operators and DfT on developing a more integrated industry programme.

Figure 6.21 Major enhancements indicative programme summary:

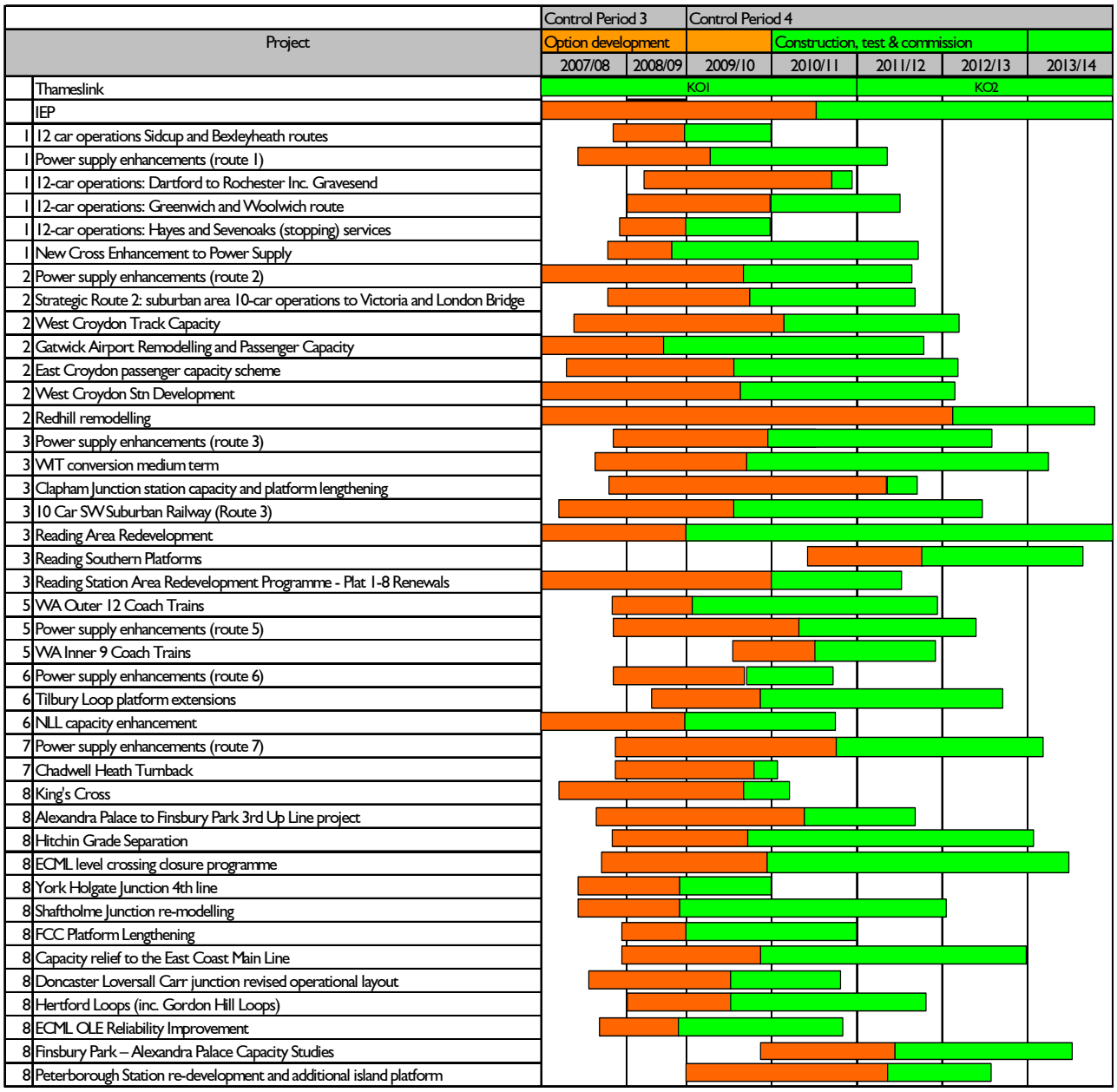


Figure 6.21 Major enhancements indicative programme summary:

	Project	Control Period 3		Control Period 4				
		Option development			Construction, test & commission			
		2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
10	West Yorkshire - Platform lengthening (route 10)							
10	Huddersfield Platform 9							
10	Leeds southern entrance							
10	East Leeds Parkway station							
10	Leeds new bay platforms							
11	South Yorkshire - Platform lengthening (route 11)							
13	Cotswold Line re-doubling options							
13	Swindon - Kemble redoubling							
13	Westerleigh - Barnt Green linespeed upgrade							
13	Didcot - Oxford area capacity upgrade							
13	Maidenhead and Twyford Platform Extensions							
13	Barry - Cardiff Queen St corridor (Part of Cardiff area signal renewal)							
16	Chiltern Platform Lengthening							
16	Wrexham to London Marylebone JTI							
17	Redditch Branch Enhancement							
17	Extension of cross city services to Bromsgrove							
17	Platform lengthening (route 17)							
17	Birmingham New Street Gateway Project							
17	Route 17 Round Oak to Walsall reopening							
18	Stafford/ Colwich Remodelling							
18	Bletchley Milton Keynes							
18	Power supply upgrade (West Coast Auto Transmission)							
18	Crewe remodelling / resignalling							
19	East Midlands resignalling: Nottingham station area							
19	MML St Pancras - Sheffield LSI							
20	Platform lengthening (route 20)							
20	Salford Crescent New Station							
20	Salford Central New Platforms							
20	Buxton line capacity and LSI							
20	TPE Route Enhancements – Linespeed Improvements							
20	Bolton Corridor Package							
20	NW route 20 capacity enhancement							
20	Stabling for northern (route 20)							
20	Manchester Hub							
21	Liverpool James Street							
21	Liverpool Central Passenger Capacity							
24	Borders Rail							
26	Airdrie - Bathgate							
26	Glasgow Airport Rail Link							
26	Glasgow - Kilmarnock							

The move towards a seven day railway

Since publishing the SBP, Network Rail has continued to build up a programme for moving towards a seven day railway through industry consultation, benefits analysis, industry demand analysis and developing an understanding of the required infrastructure enhancements, engineering techniques and costs to roll out the implementation.

This section explains the continued development of the project and provides more details on the business case, benefits, network availability, deliverability and the funding of the seven day railway.

ARUP has undertaken work for ATOC that estimates substantial increases in revenue, as a result of changing access as we propose. ARUP estimates an annual increase in passenger revenue of £106 million when running a full service on Sundays. They also predict that rail travel on Saturdays would increase; resulting in further annual revenue of approximately £19 million. Weekend travel would become more convenient for passengers as fewer services are cancelled and bus substitution is reduced. ARUP also predicts that as more people travel by train there would be knock-on benefits as roads become less congested. Over time, as customers' perceptions of weekend service quality improves we anticipate further increases in passenger numbers and TOC revenue.

The impact of increasing network availability on freight operators' revenues has been estimated for the FOCs by MDS Transmodal. As a result of implementing the seven day railway, they predict that annual rail freight revenues will be £105 million higher by 2014 and £300 million higher by 2030.

It will take time to implement the changes to the network and our working practices necessary to deliver the service improvements to passengers.

It will then take time for passengers and freight customers to respond to the service quality improvement. In light of this, we estimate that there would be additional industry revenue of £107 million during CP4. This revenue stream will continue after CP4 and grow as passengers respond to the improved offer.

We propose to invest in infrastructure enhancements, such as installing additional crossovers and bi-directional signalling, and new methods of undertaking work, such as developing methods of undertaking 200 metres of track renewal in eight hours, to facilitate delivery of the service improvements.

We estimate the financial NPV of the seven day railway at more than £700 million over 30 years. We expect to see positive cash flows around £35 million from 2014/15. Beyond CP4 we predict a significant reduction in costs and stable continuity in revenues. We have identified eight routes with independent financial business cases for implementing seven day railway timetables. The expected payback period on these routes is ten years.

We are planning to adopt a phased approach to implementation. We will concentrate initially on those routes which will deliver the greatest benefit, in terms of meeting customer demand and generating extra revenue. We identified a number of criteria required to implement the seven day railway concepts and, applying these criteria, we have identified 18 routes which may be suitable for the introduction of the seven day railway concepts during CP4. We have termed these the “tranche 1” routes. We are now consulting with our customers, identifying revenue opportunities and cost changes and documenting route remits which capture the specific requirements for each of these routes. These will be reviewed and refined over time to incorporate specific customer needs. We have initially focussed on the East Coast Main Line (ECML) and Great Eastern Mainline (GEML) remits and developed them in more detail. Our supporting document includes the analysis of the tranche 1 routes and the route remits for the ECML and GEML.

Jointly with ORR, we have developed a Network Availability KPI (NAKPI) for both passenger and freight operations and are proposing a forecast trajectory over the control period. The aim is to measure the level of disruption to passengers and freight users caused by possessions that require alterations to rail services. We are putting in place initiatives to continually reduce the amount of bus substitution over the control period. In addition, we will accommodate more easily the forecast freight growth and minimise the disruption to our freight customers. We want to establish consistent patterns for key freight paths by aligning midweek maintenance work cycles. Our aim is to align the maintenance requirements to either a one week in three or a one week in six cycle. This will create six rolling timetables with a small number of regular diversionary routes for the key freight services, reduce short term planning variation and enable consistent planning.

Figure 6.22 Potential routes identified, tranche 1

East Coast Main Line
London to South Wales
(London) Swindon to Bristol
Midland Main Line
Great Eastern Main Line
Didcot to Birmingham
Bristol to Birmingham
Birmingham York/Doncaster
(Waterloo) to Woking to Portsmouth
Waterloo to Weymouth
London to Brighton
London to Stansted
Chiltern Lines
Victoria to Swanley-Dover
Charing Cross to Orpington-Folkestone
Glasgow to Edinburgh
Transpennine
South Humberside Heavy Freight route

A timetable model has been developed that has been used to review the current timetables for both the GEML and ECML. We have identified the sections of these routes where enhancements would be required to enable the timetabled service to operate within the seven day railway guiding principles.

For each of the 18 tranche 1 routes we have undertaken a high level analysis of revenue opportunities, enhancements needed to operate a seven day railway timetable and the incremental maintenance and renewal costs resulting from seven day railway access regimes.

For renewals work we have taken, as a baseline, the possession plans required using current access arrangements and assessed and costed the work required to the network. We have also established the revised pattern of access that would be required to reflect the impact of implementing a seven day railway whilst still delivering planned renewals volumes. To assess

the impact on each of the 18 routes we have applied our methodology by asset type.

For enhancements we have assumed the number of possessions required to be based on the historic average but adjusted in proportion to the forecast spend compared to the historic spend. We have then assumed we will achieve the same possession and cost efficiencies as for renewals.

For maintenance we have assessed the work that needs to take place to make sure that worker safety is maintained, what process changes are required, and what the resource impact is of working under a different possessions regime. The changed access regime will require an increase in tamping capability in order to deliver the volumes of work required. This has been provided for incrementally in each of the scenarios used for the modelling.

Maintenance cost analysis has been carried out for different parts of the network (for example non-electrified or electrified, number of tracks, track configuration). The impact on the maintenance costs for the initial routes has been calculated by the application of this analysis.

The seven day railway investment over the eight routes with the best business cases would result 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 long term. We have also provided a baseline view of availability for the two routes that we have studied in detail and modelled the impact on the NAKPI of the proposed initiatives.

Given the potential revenue and other benefits, we believe that there is a good case for providing incremental funding for the move towards a seven day railway and we are seeking a discretionary fund of £300 million and further funding of £50 million to cover faster isolations.

We have developed detailed plans for the GEML and ECML and propose to spend £184 million from the discretionary fund on implementing the seven day railway on these routes. We have identified a further six routes where the current analysis indicates a positive business case.

The total identified expenditure associated with these routes (including GEML and ECML) is £336 million and we have provided for a further £50 million for streamlining our process for taking isolations. However, we would only expect to go ahead with these works where the business case remains robust. In line with the SBP we have therefore retained an allowance of £300 million plus the £50 million for faster isolations which was previously included in discretionary investment.

We have estimated that the revised access regimes will result in a reduction of Schedule 4 costs of £18 million and this would be used to offset our investment and operational costs to help bring this within the available funds.

It is important that there remains an element of flexibility on the use of these funds so that the greatest value can be obtained. The precise plans will need to evolve in the light of further discussion with operators at a local level.

Changes in market conditions and the willingness to embrace change and adopt new processes will also be influential. We will need to develop criteria to control how and when funds may be drawn down and we are proposing a mechanism similar to the Network Rail Discretionary Fund.

Deliverability

We have carried out a further assessment of our ability and the capability of the supply chain to support the delivery of the renewals and enhancement plans for each asset category. This was initially done during summer 2007 as part of a broad assessment for the SBP. We have reviewed and updated our original analysis to reflect the impact of Crossrail, which had not been confirmed at the time of publishing the SBP; a number of movements in renewals and enhancement programmes since publication of the SBP; the impact of our plans to move towards a seven day railway; a number of asset-specific elements commented upon by the ORR; and to challenge and validate our ability to deliver the planned volumes of work following the Christmas overruns.

Since publication of SBP we have revisited and refreshed the planned volumes of renewals. Furthermore, we have refined and improved the scope of our enhancements activity and overlaid these work volumes on to the individual renewals assets. This has allowed us to understand better the overall demand and identify resource issues that may occur through CP4. Taking into account the impact of Crossrail and of potential changes to the engineering access patterns that may occur through the move to a seven day railway this updated analysis has confirmed that the planned work volumes described in the SBP update are deliverable. However, we note that

the forecast volumes for Crossrail have been supplied by Cross London Rail Links (CLRL) and we have not yet had sufficient opportunity to independently verify these volumes. Also, there remains some risk associated with the deliverability of electrification works, specifically distribution and overhead line.

The impact of Crossrail and the enhancements portfolio is most significant in electrification. Here we are forecasting a steep ramp-up in planned activity in 2009/10. The work types most significantly impacted by ramp-up in activity volume are distribution and overhead line works. There is a significant external market available for distribution works and this mitigates much of the risk to deliverability. For overhead line there is a much greater need for specialist skills which are already in high demand. We are mitigating this risk by refining our contracts and unit price frameworks and are exploring greater use of high output options such as wiring trains. The market has demonstrated previously that it can accommodate a ramp up in distribution equipment, however, this is likely to have a detrimental impact on the efficiencies we plan to achieve in this area. These are likely to be further impacted upon by increased demand from other infrastructure providers, such as LUL and National Grid.

The enhancements portfolio accounts for around 37 per cent of the CP4 signalling programme. The profile of work is currently slightly uneven. This imports a potential risk around some areas of design and commissioning. However, we are confident that the overall volumes of activity required are deliverable with existing industry resources.

The impact of the enhancements portfolio is to double the demand for civils activity to around £1 billion per annum. However, there is no resultant negative impact as we believe that the supply market for this asset has sufficient resources available to deliver the CP4 programme of works.

There are a number of costs associated with the delivery of planned CP4 volumes within the context of the move towards a seven day railway. These costs include the additional capital expenditure which is required to facilitate new processes, and increased operational expenditure resulting from increased mobilisation and demobilisation to and from sites due to the more frequent and shorter possessions required. This transition will occur incrementally and for CP4 has been applied to specific routes.

Identification of the routes on which the move towards a seven day railway will be implemented will be based on a cost benefit analysis, with those routes that can demonstrate the greatest overall industry benefit being implemented earlier in the rollout plan. Overall, however, our plan for CP4 remains deliverable within the proposed seven day railway access pattern on the relevant routes.

Projects which require land acquisition, or the development of new structures, may require Transport and Works Act (TWA) and / or full planning permission. Where works on the existing infrastructure will be undertaken wholly within the existing Network Rail land ownership, the project should be within the existing permitted development rights. As each project develops through the GRIP process, risks will be identified and appropriate mitigation put in place to minimise such risks, which could include design modifications as a consequence of detailed discussion with local planning authorities and other key stakeholders. We have reviewed the portfolio and sought to identify schemes that require TWA powers, although further scope definition is required on some projects to clarify this. Where we are clear this is required, it has been reflected in the planned timescales for the project.

One significant external risk which could impact on the delivery of projects will be any changes to the planning system as a consequence of the passage of the current Planning Bill currently before Parliament and any changes in the devolved governments' systems. Any loss of permitted development powers or significant changes to the TWA process will have an impact on these projects as will any requirements for railway projects to become the subject of consideration by the proposed Infrastructure Planning Commission (IPC).

Since the SBP was published, we have reviewed our portfolio of enhancements with regard to interoperability. Our current policy is to apply the legal requirements, but not to move beyond them. Thus, we are not setting out to create dedicated interoperable lines. This approach is reflected in this plan.

The determination, as to whether a particular enhancement project is interoperable or not, is highly dependent upon the nature of the works envisaged in the project. This determination has to be made before a design is finalised, but cannot be made at optioneering as it is often found that some project options are in scope of

Figure 6.23 Revised variable charges compared with current charges

£m (2006/07 prices) for 2009/10 traffic	Passenger	Freight	Total
Current tarrifs[1]	240	100	**340**
Current tarrifs restated at end CP4 efficiency levels	136	94	**230**
SBP update at end CP4 efficiency levels	164	72	**236**

Notes:
1. Set at 2000 and 2001 reviews, based on different efficiency levels: passenger 2003/04, freight 2011/12

interoperability and others are not. Hence, a decision as to whether interoperability applies is not finally made until GRIP stages 3 and 4.

Interoperability is a part of the safety verification requirements under the Railway and Other Guided Transport Systems and Safety Regulations (ROGS) and as such our process for determining if a project falls within the scope of interoperability is documented in the company's safety management system. The Network Rail Acceptance Panel (NRAP) acts as the decision making body in determining if interoperability applies. These processes are subject to audit by ORR. To date one such audit has been carried out.

There are currently two projects underway in the company that fall within scope of interoperability; Cambrian ERTMS pilot and GSM-R national implementation.

As the schemes in the plan progress to later GRIP stages they can be assessed for interoperability requirements. However, the incremental cost of this is not material. Experience to date suggests that the key costs relates to employing and managing a Notified Body.

Income

Franchise access charges

This section summarises our charging proposals for the recovery of our efficient costs. Charges send important signals to users, funders and the industry as a whole. Our aim is to encourage optimal usage and development of the network, and to consequently facilitate the minimisation of whole-system costs.

We believe our proposals meet the ORR charging objectives, including improved cost reflectivity while retaining administrative ease and simplicity.

Since we set out our indicative charging proposals in the SBP we have undertaken significant further work to:

- refine the underlying cost modelling from the ICM;
- analyse and understand the impacts on stakeholders in detail; and
- modify and improve our proposed methodology where we have identified better ways of achieving our objectives.

The results of this work are summarised here. We have provided further details to ORR in a separate supporting document.

In a small number of instances work continues to identify the appropriate final solution, including, for example, consumption rates for the electricity traction charge.

Variable usage charge (including freight)

In keeping with the indicative charges we set out in the SBP, we propose to calculate variable charges based on the vertical and tangential forces created by a vehicle. Currently our charges only reflect vertical forces.

The charges reflect the additional wear and tear costs of additional vehicles running across our network. These costs are calculated by comparing the ICM cost output for forecast usage with calculated costs for a scenario involving a five per cent increase in traffic. We have tested the sensitivity of the variable cost for other marginal traffic changes and the variability in costs is broadly linear with such traffic changes.

The ICM output effectively provides an average vehicle cost. This is converted to specific vehicle charges via vehicle damage modelling. Vehicles causing greater damage to the track face higher charges. The damage is calculated in reference to vertical forces (speed, axle load, unsprung mass) and tangential forces (curving performance).

We have undertaken a major review of the way the ICM calculates the average vehicle cost, including the way that maintenance and renewals activities vary with usage, and the interaction between maintenance and renewals.

We have also reviewed the basis on which the model allocates costs across the vehicles reflecting relative vehicle characteristics.

Based on forecast usage we expect to recover £236 million through variable usage charges in 2009/10. This is split £72 million from freight operators and £164 million for passenger. We have calculated these on the basis of end CP4 efficiency following discussions with ORR. Forecast variable usage charge income in the first year of CP4 is set out in Figure 6.23 above. On an equivalent basis, i.e. same efficiency assumptions and same traffic volumes, the CP3 tariffs would total £230 million (£94 million for freight, £136 million for passenger). The change in sector shares is largely driven by the introduction of the new tangential forces term described below.

In completing these reviews we have addressed the challenges from ORR, Halcrow (the independent reporter), and the industry. We believe the resultant numbers are robust given the bottom-up process we have undertaken coupled with extensive checking. It is hard to compare our 'variability' estimates to those adopted by the previous top-down methodology. The top-down methodology relied on expert judgement around what percentage of costs 'vary with traffic'. This is quite different to investigating the extent to which costs vary with additional traffic at the margin, which is the basis of variable usage costs and charges.

Route-based charging

In its February 2008 document, ORR set out its decision that charges should not be based on route categories.

However, ORR said that there should be separate charges for Scotland, and England and Wales "*…if the material differences in cost remain once it [Network Rail] has undertaken its further calculations of costs and charges.*"

The cost differential between Scotland and England and Wales is due to the different route category mix in Scotland. Our refinement of the ICM has led to a substantial narrowing in this differential since the SBP. The latest estimates are shown in Figure 6.24 which compares variable costs for each route category for the network average, for England and Wales, and for Scotland. The costs on a route-category basis are not materially different. The higher overall average for Scotland is driven by Scotland having a higher proportion of secondary and tertiary route categories.

Moreover, we have concerns with the proposal for separate charges which are similar to the arguments for not introducing route-based charging. We believe that perverse incentives would arise as a result of higher charges for less heavily used parts of the network. As we have previously stated, route-based charging should be reviewed in the future as part of a broader consideration of the treatment of capacity. As a consequence we propose that charges be levied on a network-average basis. We believe this is the appropriate outcome.

Our structure of charges supporting document sets out full detail of prices calculated for three bases: network average, Scotland, and England/Wales.

Capability issues

The variable charges are based on unchanged capability – in the sense that significant changes in traffic can require step-changes in our maintenance and/or renewal regimes. By definition these 'step-changes' are beyond the marginal cost of additional traffic covered by the variable charges.

We have already proposed to enhance the capability definition to include a cumulative tonnage measure. However, it should be noted that this issue relates to any significant change that requires a change in capability.

Our supporting documentation sets out case-study examples that demonstrate why capability

Figure 6.24 Table of route category costs by geography

£/kgtkm (end CP4 efficiency)	England & Wales	Scotland	Network average
Primary	1.00	0.93	1.00
Secondary	2.25	2.03	2.21
Tertiary	3.89	3.75	3.87
Network	1.37	1.64	1.40

is a material issue and why significant changes in traffic can generate costs over and above what we would expect to recover over time through variable track access charges. For example, the Hellifield to Clitheroe line currently has timber sleepers and is used mainly as a diversionary route. With current tonnage levels this is sustainable within our current maintenance regime. However, there will be a ten-fold growth in freight tonnage from December 2008 requiring complete renewal with continuously welded rail track. This was not expected in our CP3 funding settlement and is not covered by marginal wear and tear costs recovered through variable charges and therefore represents a step-change for which we are not funded. The impact of step-changes was also highlighted by ORR in Annex E of its February document, but in this case in relation to a decrement in traffic rather than an increase.

We have previously proposed options to deal with this issue as and when it arises in the future. This will need to be resolved in the coming months. We believe it would be inappropriate to introduce the change in variable usage charges described above without addressing this issue.

Freight-only line charge

The Government's Future of Rail White Paper (July 2004) indicated that freight should pay the full costs of freight-only lines. ORR has subsequently determined that only two market segments have an ability to pay higher charges: electricity supply industry (ESI) coal and spent nuclear fuel.

We set out in substantial detail in our SBP and prior consultations the issues around implementing these decisions. They relate to defining and costing 'freight-only' lines. This is not straight-forward given the relatively small part of the network affected and the variety of use (for example how to treat occasional diversionary use). The SBP identified 24 freight-only lines, with a total track length of 189 kilometres, that carry ESI coal and spent nuclear fuel. This update is based on this list.

Since the SBP our main activity has been reviewing the cost estimates produced by the ICM. The freight industry has consistently said that the costs should be lower.

Our work has shown that there are lower unit costs for freight-only lines and our updated cost estimates include the impact this and the assumed level of efficiency at the end of CP4. The revised estimate is shown in Figure 6.25 and shows a total charge at the end of the control period of £5.39 million. This is a reduction of more than 30 per cent on the indicative SBP charge of £7.9 million. The charge in the first two years of the control period is limited by the caps determined by ORR.

Coal spillage charge

In our SBP we presented an initial estimate of the impact of coal spillage on the network at £7 million per year, compared to the current charge of £5 million. Some stakeholders considered the initial estimate was too high and thought it should be reviewed. Following discussion with ORR we agreed that the best way of determining the efficient cost would be to ask the independent reporter, Halcrow, to review the original estimate. Halcrow has recently produced its draft final report and estimates that the cost of coal spillage on the network is £4.1 million.

We propose implementing this by revising the coal-spillage factor applied to loaded coal wagons. Currently the mark-up on variable charges (track element only) for loaded coal wagons is 20 per cent; we have reduced this pro-rata to 16 per cent to recover the revised cost of £4.1 million per annum instead of the current figure of £5 million.

We wish to incentivise operators to reduce coal spillage across the network and therefore propose to offer a rebate against the mark-up for those operators who can demonstrate that they have minimised, and are continuing to minimise, spillage from their wagons. We propose to assess the eligibility and value of any rebate on the effectiveness of actions taken to reduce spillage on a case-by-case basis.

Figure 6.25 Freight-only line charges

£m (2006/07 prices)	2009/10	2010/11	2011/12	2012/13	2013/14
ESI coal	2.80	4.58	4.58	4.58	4.58
Spent nuclear fuel	0.30	0.60	0.80	0.81	0.81
Total	**3.10**	**5.18**	**5.38**	**5.39**	**5.39**

Electric traction charge

Network Rail procures electricity on behalf of operators and passes through the costs. Prior to April 2007, TOC charges were uplifted annually based on a published electricity price index, the Moderately Large Users Index (MLUI). To improve cost-reflectivity and flexibility, this was changed to a system of collective procurement and the pass-through of actual procurement costs.

In the SBP, we proposed that freight operators could retain MLUI if they wished, although acknowledging its inherent flaws. We also proposed rebasing the tariff. The general sentiment among FOCs was that whilst they wished to retain the MLUI they were not supportive of re-basing the tariff. Given that we are ready to accept some risk through a continuation of MLUI, we do not believe we should be exposed to any further risk by using a tariff matrix that was last updated in 1999/00. We continue to believe that the price matrix should be updated to reflect the structural changes in the electricity industry since then. These include the introduction of new trading arrangements, as well as the normal changes one would expect in distribution and transmission charges, and to changes in prices in the energy market. As proposed in our SBP, we continue to believe that freight operators should be included in the 'wash-up', so that the regime is fair and sends the correct signals in terms of energy efficiency.

The SBP proposed the continuation of a discount for regenerative braking, but that there should be a differentiation between AC and DC and within these categories where appropriate, to properly reward operators for investing in regenerative braking equipment. We continue to propose that this approach is implemented, as respondents were generally supportive of this approach.

Following the conclusion on the pricing aspects of traction electricity, the industry focus has now moved to the area of electricity volumes. DeltaRail was appointed by Network Rail and ATOC to conduct a thorough review of the processes in autumn 2007. DeltaRail put forward a number of recommendations in the report. Although acknowledging that on-train metering would be the optimal solution, in view of the low probability of it happening in the short-term, the recommendations are mainly focused on infrastructure metering. These recommendations are currently being evaluated by Network Rail and the industry. In addition to these developments, it was agreed at the Carbon Reduction Working Group (CRWG) in February 2008 that a group will be set up to formulate a draft metering project programme.

The electric traction asset charge will be included in variable usage charge for CP4 and will no longer form part of the electricity for traction charge.

Capacity charge

The capacity charge is intended to reflect the likely costs of different levels of reactionary delay caused by traffic on the network.

In our SBP we proposed a tariff applicable to passenger and freight services varying by location and time of day. Whilst a majority of respondents accepted in principle that a capacity charge is justified, there was much concern about the complexity of the proposed charges.

In light of stakeholder concerns we now propose to base the charge on an average tariff for each train service group for passenger operators and a single average tariff for freight operators, in each case differentiated by weekday and weekend. We are also proposing to retain the existing ten per cent discount for freight charges.

Given the changes we are proposing to the structure of the capacity charge and the further work on Schedule 8, which may require recalculation of the payment rates, we have not yet prepared a set of revised capacity charge tariffs. The capacity charge income assumption included in the tables shown in the Appendices is based on the traffic forecast applied to the current level of charge, plus the fixed CC term that is being transferred from the fixed track charge to the capacity charge.

Fixed charge

We have performed the fixed charge calculations in line with the methodology set out in the SBP and prior consultation documents. The charge for each franchised TOC reflects three components:

- allocation to TOCs of any directly attributable costs;
- ring-fencing and allocation to TOCs of specific enhancements; and
- using appropriate metrics to allocate remaining joint and common costs. Some costs are attributable within a given strategic route section and allocated on that basis, while other costs (for example head office costs) are allocated across the network as a whole.

The supporting document on the structure of charges sets out fixed track charges for each franchised TOC for each year of the control period. These figures are based on there being no direct government grant, but clearly the final calculations will need to take into account decisions on the approach to the level of grants.

We believe our approach is a useful improvement in the cost-reflectivity of the charge and gives helpful information to funders to provide transparency around the costs of operations across the network. Stakeholders have been supportive of our proposed approach.

Stations costs and charging

There is broad agreement within the industry that the question of how best to charge for stations should be seen as part of a wider set of station issues. In the SBP we proposed including station costs in the fixed track access charge. Working in conjunction with ATOC and industry we have refined and improved the proposal.

We are proposing to calculate a charge on a portfolio basis, where each franchisee would face a charge relating to the stations where it is the Station Facility Operator (SFO). This charge would be a new Station Fixed Charge rather than incorporated within the Fixed Track Access Charge. This improves the transparency of the charge, and will allow operators to have a reasonable expectation of spend at stations.

We will report actual portfolio expenditure each year in the Annual Return.

We will consult with the NSIP programme board on the best way to manage contingency. We are also continuing to work with ATOC to understand the implications for beneficiaries and will propose how to manage abatement under the proposed charging structure. We are also discussing some specific concerns raised by Transport for London and London Underground.

Details of the proposed franchised stations fixed charge are shown in the supporting document on the structure of charges. However, the new charge is intended to match planned expenditure and so the overall 5-year total (£691m) and annual profile is as shown earlier in this chapter. The breakdown by SFO is shown in the Appendices.

Incentive regimes

Schedule 4 of the Track Access Agreement requires us to pay compensation to franchised passenger train operators when we restrict access to sections of the track to allow for engineering work to be carried out.

In January of this year, an industry steering group presented to ORR recommendations for changes to Schedule 4. ORR is considering these changes as part of the periodic review. Based on these recommendations, and on the volumes of work proposed in this plan, we have included a provision of £926 million over CP4 as a whole to reflect the cost of the revised regime in relation to franchised passenger operators. This figure is in respect of maintenance and renewal activity only. It is subject to change to reflect ORR's conclusions on Schedule 4, on the recalibration of industry performance regimes and on the volumes of maintenance and renewal activity expected to be delivered in CP4. It is also dependent on the way in which the proposed engineering access pattern on the West Coast Main Line is reflected in operators' track access agreements.

Within this overall figure, the annual cost of the regime is expected to reduce over CP4, from approximately £210m in 2009/10 to approximately £170m in 2013/14, reflecting our plans to carry out work in ways that are less disruptive to train operators. If our proposed move towards the seven day railway is funded as part of this review, we would expect further savings in Schedule 4 costs of £18 million over CP4 as a whole.

Other single till income

Since the SBP we have aligned our assessment of single till income consistent with ORR's February 2008 assessment of the SBP. This moves the station and depot income from single till to franchised access charges.

Figure 6.26 Single till income

£m (2006/07 prices)	2009/10	2010/11	2011/12	2012/13	2013/14	CP4 total
SBP	**(461)**	**(463)**	**(474)**	**(465)**	**(471)**	**(2,333)**
Variances						
Freight income	22	24	26	27	29	128
Station income moved to franchised access charges	78	78	78	78	78	391
Depot income moved to franchised access charges	46	46	46	46	46	231
SBP update	**(314)**	**(314)**	**(323)**	**(313)**	**(318)**	**(1,583)**

Property

Commercial lettings and retail income

The assumptions and forecasts we made in the SBP were reviewed by Lambert Smith Hampton (LSH), which we appointed as an independent advisor. LSH produced a comprehensive report assessing the robustness of the methodology we had used and validating our overall forecasts. The outcome of this review was that LSH agreed that our methodologies and assumptions were sound, and provided a benchmark range for each of our main income categories. In all cases our forecasts were between the LSH medium and high forecasts, except sales and development where we were very slightly below the medium-level benchmark.

Following publication of the SBP, ORR commissioned DTZ Pieda to peer review the LSH analysis. In its review, DTZ Pieda questioned whether the growth in retail rentals should directly reflect the expected passenger growth, and whether generally our forecasts were too conservative.

Passenger growth will undoubtedly help us to achieve our forecasts, and this has already been taken into account fully in our forecasts, but the level of passenger growth forecast is not directly transferable into retail or rental growth. Over the last few years, our tenant mix has evolved to include more higher-yielding retailers. However, this process is now largely matured and future opportunities for improvement are likely to be limited. The amount of space available for new or expanded retail offerings on stations is very small and improved offerings are more likely to occur through retailer churn or consolidation rather than an increase in the absolute amount of space available.

In addition, the growth in passenger numbers in some cases ultimately reduces the new space available for retail outlets as measures are put in place to manage the increased numbers of people, for example, the removal of retail space from the concourse at Euston and to accommodate the provision of additional ticket barriers at Waterloo. We note that in the SBP we understated the forecast loss of income due to this particular project by around £0.5 million. Despite an increasing number of people passing -through stations, potential customers are less likely to pause and purchase if the retail outlets are crowded and have queues - a scenario which is becoming more frequently observed in many of our stations.

We note that our retail forecasts are at a level that outperforms both the Investment Property Databank (IPD) benchmark and the British Retail Consortium/KMPG index. However, the DTZ Pieda report for ORR regards our growth rates to be conservative. We are unable to ascertain why DTZ expect that we should be able to outperform the general retail market, but have detailed the assumptions underpinning our forecast in a supporting document.

We have identified a specific risk of a potential loss of rental property income in CP4. We have discussed this previously with ORR. However, we have not adjusted our property income forecast in this update.

Station developments

In its February document ORR raised concerns relating to the non-inclusion of benefits that may accrue from the planned future developments at Euston and Victoria. In the SBP we described at high-level the benefits that we believe may accrue from these schemes. A significant proportion of these benefits will be in the form of rail benefits whereby the developer provides improved facilities rather than cash payment. Although we quantified the potential value of these benefits, we assumed that no cash benefit would arise in CP4 as a result of the significant risk relating to the size and timing of these benefits as these projects are at an early stage in the planning and development processes. We did, however, recognise in the SBP that should these benefits accrue, in whole or part, in CP4 then they would be made available for investment in the railway. We have discussed this with ORR and have adopted the same approach in this plan.

Property sales and JVs

Since publication of the SBP we have been in discussion with ORR about the most appropriate method of treating the potential joint ventures described in the SBP. ORR has advised that it feels it would be more appropriate to deduct the cost of financing the joint ventures from the company's net profit rather than treating the investment as an addition to the regulatory asset base. The overall impact of this is a reduction in the gross property sales of around £1 million over CP4. We have some concerns about treating these investments in this way and we will continue to discuss this with ORR. We are not making any adjustment to our submission on the basis of this change.

Disaggregation between England & Wales and Scotland

Full details of the disaggregation of expenditure and income between England & Wales and Scotland are shown in the appendices. We have not made any changes to the principles by which costs are allocated, where this is necessary, between the two countries.

We have amended our forecasts in CP4 to allow for the incremental signalling operations and maintenance costs of a number of enhancements to the network in Scotland that are being completed late in CP3 or in CP4. These include Stirling - Alloa - Kincardine, Waverley, Airdrie to Bathgate, GARL and Glasgow - Kilmarnock. The overall impact of these schemes is an additional £22 million over CP4.

The other issues underlying the variances from the SBP described in this chapter generally apply equally to both countries and the impacts are broadly proportionate. However, the additional £9 million cost of the Elvanfoot grid supply point is specific to Scotland.

The detailed work on refining the franchised station forecasts described earlier has resulted in the Scottish share of the total projection falling from 11.4 per cent to 10.2 per cent. This reflects the use of more detailed information about actual asset volumes which has had a relatively large impact on forecasts costs for smaller stations.

Summary of changes to CP3 Plan

Figure 6.27 summarises the changes to our expenditure forecasts for the remainder of CP3 since the SBP. The main changes as noted earlier are:

- increase in maintenance expenditure due to the impact of the new access regime on the WCML and the impact of additional traffic;
- increased expenditure on track renewals as we are not going to achieve the efficiency target;
- deferral of commissioning of some signalling schemes into CP4 in order to support WCRM project work;
- reprofiling of expenditure on the national telecoms programme with deferral from 2007/08 to 2008/09 and into CP4;
- deferral of electrification expenditure into CP4; and
- increase in WCRM expenditure to enable delivery of the December 2008 timetable.

Supporting documents

We are providing the following supporting documents to the ORR:

- updated copy of the ICM and the functional specification;
- updated copy of the ICM inputs log;
- a copy of Halcrow's ICM V2 audit report;
- the latest full investment appraisal and authority paper for the Great Eastern overhead line renewal project;
- a set of data sheets setting out scope and other details for schemes within the enhancements portfolio;
- an input price book detailing the methodology

Figure 6.27 Comparison of SBP update with business plan 2007

£m (2006/07 prices)	BP07		SBP update		Variance	
	2007/08	2008/09	2007/08	2008/09	2007/08	2008/09
Operating costs	**1,134**	**1,121**	**1,132**	**1,153**	**-2**	**32**
Controllable	814	784	833	798	19	14
Non-controllable	320	337	298	355	-22	18
Maintenance	**1,094**	**1,025**	**1,081**	**1,056**	**-13**	**32**
Renewals	**3,163**	**2,908**	**2,714**	**3,217**	**-449**	**309**
Track	843	770	879	784	36	14
Signalling	478	572	471	458	-7	-114
Civils	393	388	390	402	-2	13
Operational property	223	195	197	269	-26	74
Telecoms	249	239	176	350	-72	112
Electrification	111	122	93	96	-18	-26
Plant and machinery	109	114	75	120	-34	5
Other renewals	391	329	77	310	-314	-19
WCRM	368	179	356	428	-12	249
Enhancements	**1,030**	**1,411**	**691**	**1,385**	**-339**	**-26**
Total OMR&E	**6,421**	**6,465**	**5,617**	**6,811**	**-804**	**347**

and assumptions used in preparing our enhancement cost estimates;
- estimate review papers setting out estimate details for schemes within the enhancements portfolio;
- a risk analysis report setting out our methodology for the enhancements portfolio including a copy of the risk model;
- an enhancements programme contracting strategy;
- where available, an updated or additional set of GRIP products;
- a paper explaining details of the Scottish Tier 3 schemes;
- documents setting out high level analyses of the business cases for discretionary investments and optional enhancement schemes;
- a deliverability presentation and supporting analysis;
- a document that sets out our proposals for the structure of charges for CP4;
- a description of the methodology we have used to estimate Schedule 4 costs during CP4, with copies of the relevant models;
- our approach and proposals for the seven day railway;
- explanation of the drivers for retail income at stations.

7 Expenditure and financing

In October, we were in the process of developing our financing plans. The SBP was therefore primarily an expenditure plan rather than a full business plan. However, the SBP made explicit assumptions on the financial parameters and set out the implications for our revenue requirements and financial ratios. Pending further consideration of these issues, the input assumptions adopted were in line with ORR's emerging views.

CP4 financing plan

Our financing plan for CP4 is, therefore, based on the assumption that from 1 April 2009:

- any debt we require to fund our investment programme will be on a corporate basis; and
- we use our government guarantee, known as the Financial Indemnity Mechanism (FIM), only to refinance debt that already benefits from the FIM.

This means that during CP4, we expect to operate two parallel debt programmes:

- our existing Network Rail Infrastructure Finance Debt Issuance Programme ("NRIF DIP"), backed by the FIM; and
- a corporate debt programme issued without a government guarantee and based on standalone credit ratings for Network Rail.

Our net debt at 31 March 2008 was £19.6 billion (summarised in Figure 7.1), which represents 70 per cent of the regulated asset base, well below the 85 per cent indebtedness limit set out in Network Rail's licence. All Network Rail's debts are currently guaranteed by the Secretary of State for Transport through the FIM.

Figure 7.1 Net debt at 31 March 2008

Source	GBP hedged equivalent (£bn)
NRIF DIP	16.5
Medium Term Notes (MTN)	3.9
Investments inc Captive Insurance Company	(0.8)
Total net debt	19.6

Based on our financial projections in the SBP update, our financing requirements for the period to 2013/14 are summarised in Figure 7.2. This shows that we expect to be raising, on average, over £4 billion for each year for the next six years, of which over half will finance new investment and the remainder will refinance existing borrowings. This is likely to represent a bigger programme of sustained, regular issuance than almost any other UK borrower. Financing investment on this scale will present particular challenges, especially if the current difficult conditions in the financial markets persist. To do so, we will, like other large utilities, need a robust financial framework which allows us to achieve and maintain a strong investment grade rating throughout the next control period.

NRIF Debt Issuance Programme

NRIF's gross debt currently stands at £16.5 billion, and is summarised in Figure 7.3.

Figure 7.3 Gross debt at 31 March 2008

	£bn
GBP nominal	7.1
GBP Index Linked(including £200m accretion)	4.9
USD	3.0
CAD	0.3
AUD	0.6
Other	0.6
Total:	16.5

We have to date issued £4.7 billion of index-linked debt (excludes accretion), largely in public benchmark issues supplemented by private placements. Network Rail currently has approximately 25 per cent of its debt in index linked format and expects to increase this proportion to approximately 35 per cent by 31 March 2009.

The index-linked programme complements our conventional sterling, US dollar, Australian dollar and Canadian dollar programmes.

We expect to issue approximately £7 billion under the NRIF Debt Issuance Programme in the next financial year, of which £5 billion will

Figure 7.2 Financing requirements to 2013/14

Year	Source	Purpose	Amount (£bn)
2008/09	NRIF DIP	Finance new investment	2
2008/09	NRIF DIP	Refinance maturing debt	5
2009/14	NRIF DIP	Refinance maturing debt	6
2009/14	Corporate debt	Finance new investment	12
Total			25

refinance existing debts and a further £2 billion will finance investment in the network.

We currently expect that, in addition, about £6 billion of NRIF debt will fall due for refinancing during CP4. We expect to refinance these redemptions through further issuance under the NRIF DIP. The exact amounts and timing of redemptions will depend to some extent on the size and tenor of our issuance over the next financial year. Our present projections are set out in Figure 7.4.

During 2008/09 and through CP4, we expect to continue to issue both conventional and index linked bonds under the DIP.

Our financing requirements, based on the financial projections, for new investment under the corporate debt programme are summarised in Figure 7.5.

To finance these amounts, we expect to put in place a multi product corporate debt programme which is likely to include both bank debt and capital markets issuance. The programme is being designed to meet short, medium and long term requirements. Given the scale of funding requirement, it will be important for Network Rail to have the ability to tap the broadest range of markets to maximise capacity and optimise pricing.

Hedging

The current interest rate hedging policy was designed to meet the requirements of the CP3 business plan and financial framework. This policy is designed to provide:

- short term budget stability by fixing the interest rate on a minimum of 80 per cent of forecast debt during the control period; and
- medium term risk management by fixing interest rates on a target of 50 per cent of debt beyond the end of the control period.

Network Rail has adopted a prudent approach to implementing its interest rate hedging strategy for CP3 and it is anticipated that by the end of CP3 the fixed debt percentage for CP4 debt (both actual and forecast) will be at or above the 80 per cent level.

All cash flows associated with foreign currency debt issued in CP4 (both in NRIF and in the corporate debt programme) will be swapped back to sterling. This maintains the company's policy of hedging 100 per cent of foreign exchange risk on non sterling denominated borrowings.

Impact of current conditions in the financial markets

The current market conditions are extremely challenging and have stemmed predominantly from the sub prime crisis that emerged in August 2007. Conditions have persisted since August and have deteriorated rather than improved. Market rumours and bank loss positions continue and the markets remain extremely volatile, making new debt issue conditions difficult even for high quality AAA issuers. It is difficult to predict whether market conditions will improve in the near term. If conditions deteriorate further, it may be difficult even with an A range rating to implement a corporate debt programme of this size.

Financial assumptions

The SBP assumed an allowed rate of return on the RAB equal to 4.5 per cent based on ORR's assumptions. In response to ORR's consultations, however, we highlighted the need for a rate of return which reflects Network Rail's cost of capital going forward as a standalone private sector business and consistent with the approach adopted by other regulators.

Figure7.4 Projected redemption of NRIF debt

£m	2009/10	2010/11	2011/12	2012/13	2013/14
DIP debt to be refinanced	1,400	2,200	1,000	300	1,100
Cumulative	1,400	3,600	4,600	4,900	6,000

Figure 7.5 Projected financing requirements under corporate debt programme

£m	2009/10	2010/11	2011/12	2012/13	2013/14
Corporate debt	2,700	3,000	2,700	2,000	1,800
Cumulative	2,700	5,700	8,400	10,400	12,200

Our proposal to raise additional debt in CP4 without a government guarantee does not change the required rate of return implied by our proposed approach. However, it does make it more important that we get this right, since setting the return too low would mean that Network Rail is unable to finance its activities. As emphasised by ORR, setting an appropriate rate of return would create "hard budget constraint" which would further reinforce the company's existing incentives for efficiency and cost control.

Since October, there have been further relevant precedents from other regulators, including the Competition Commission., which have allowed us to refine our views on an appropriate cost of capital. There have also been significant changes in market conditions arising from the international credit crisis, which have increased the cost of capital.

We have submitted to ORR as part of this update a detailed analysis of the required rate of return based on an economic analysis, a financeability analysis and comparison with other utilities. In setting the rate of return for our updated SBP, we have assumed that:

- we finance all future railway investment through corporate debt without government guarantee;
- we pay a fee of 0.5 per cent to government in return for the guarantee on existing debt, which we understand is in line with the assumption used by DfT in the SOFA;
- any amounts in excess of our financing costs and risk buffer go into the ring-fenced fund and reduce the amount of investment which needs to be financed by borrowing. This therefore reduces the RAB and future revenues; and
- our revenue will be profiled over CP4 to achieve broadly flat interest cover ratios.

The resulting annual rate of return over the control period averages 4.8 per cent. This is close to the top end of the range identified by ORR (4.7 per cent). However, it is lower than the return set for other utilities in recent regulatory reviews and reflects the benefit of our CLG structure and FIM arrangements associated with existing debt.

The SBP assumed a risk-buffer of £250 million per annum. This was at the top end of the ORR conclusions. However, we emphasised that the manageability of the business with this level of risk-buffer is dependent on the regulatory treatment of risk. We have discussed this matter further with ORR but it has yet to reach firm conclusions. We have retained this assumption pending further clarification from ORR in response to our proposed approach.

The amortisation assumptions underlying the SBP were consistent with the approach applied at the last review. For the purposes of this update, however, we have adopted the approach used by ORR in its assessment of the SBP. This sets the level of amortisation based on a view of the steady state level of renewals. Our projections are based on the upper bound assumptions used by ORR. Using lower amortisation would reduce the revenue requirement and increase the debt requirement over the next control period. We will continue to review whether this would be more appropriate over the next few months.

Revenue and financial projections

Figures 7.6 and 7.7 below set out the revenue requirement for England & Wales and Scotland respectively. These tables are prepared on the same basis as the expenditure tables in Chapter 6. The incremental revenue requirement associated with the additional outputs represents the combined effect of the proposed additional spend on allowed maintenance, amortisation and returns.

This shows that the income which we believe is necessary to fund the HLOS outputs is higher than the high end of the ORR range. For England & Wales this difference is £917 million and for Scotland it is £152 million. Additional revenue of £235 million and £15 million respectively would be required to deliver the additional outputs contained in this plan. However, this would also generate extra value for the industry and wider economic benefits.

In addition to the outputs which are funded through the periodic review and the Transport Innovation Fund (TIF), we expect to deliver and/or finance additional enhancements worth around £2 billion over the next control period. This includes third party funded investments across the network and around £1.2 billion of the "on-network" works which we are expected to deliver during CP4 as part of the Crossrail programme. We have assumed that these investments will be debt financed but that we will receive an income reflecting the amortisation and return on the incremental asset value. We also assume that there is an appropriate balance between risk and incentive for these projects. We have assumed that the Scottish ring-fenced fund will contribute to Tier 3 schemes.

Taking account of the financial assumptions described above and these additional enhancements, the level of debt is projected to increase from nearly £22 billion at the end of the current control period to around £35 billion by 2014.

Figure 7.6 England & Wales revenue requirement

£ million (2006/07 prices)	ORR Low	ORR High	SBP	SBP update
Maintenance	3,810	4,250	4,646	4,506
Controllable opex	2,920	3,480	3,429	3,429
Non-controllable opex	1,460	1,930	1,690	1,649
Schedule 4 and 8	410	770	450	871
Amortisation	5,830	7,620	8,682	7,620
Allowed return	7,550	6,950	7,704	7,947
Tax	0	0	68	68
Gross revenue requirement	**21,980**	**24,980**	**26,671**	**26,090**
Third party income	(1,790)	(1,390)	(2,133)	(1,472)
Schedule 4 and 8	(410)	(770)	-	(871)
Revenue requirement to deliver the HLOS	**19,790**	**22,830**	**24,538**	**23,747**
Revenue for additional outputs	-	-	-	235
Total revenue requirement	**19,790**	**22,830**	**24,538**	**23,982**

Figure 7.7 Scotland revenue requirement

£ million (2006/07 prices)	ORR Low	ORR High	SBP	SBP update
Maintenance	410	460	473	483
Controllable opex	290	350	342	348
Non-controllable opex	120	180	152	147
Schedule 4 and 8	50	90	50	56
Amortisation	700	1,070	1,065	1,070
Allowed return	870	770	870	909
Tax	0	0	19	17
Gross revenue requirement	**2,440**	**2,910**	**2,971**	**3,029**
Third party income	(140)	(110)	(177)	(111)
Schedule 4 and 8	(50)	(90)	-	(56)
Revenue requirement to deliver the HLOS	**2,250**	**2,710**	**2,794**	**2,862**
Revenue for additional outputs	-	-	-	15
Total revenue requirement	**2,250**	**2,710**	**2,794**	**2,877**

8 Outputs

This section describes the expected outputs that we will deliver based on the activity and expenditure projections included in Chapter 6. The key outputs in the following areas are discussed:

- safety;
- environment;
- reliability and punctuality;
- capacity and capability;
- asset reliability and stewardship;
- stations; and
- network availability.

Safety

In its assessment of the SBP, ORR has sought assurances that we have robust change mechanisms in place to ensure that safety is not compromised as a result of the development of new and innovative ways of working.

The activities to achieve the delivery of safety improvements are embedded within the overall plan for operating, maintaining, renewing and enhancing the network. The forecast safety improvement for CP4, for both passengers and the railway workforce, in the October SBP remains our view of what will be delivered by our plan.

The safety content of the SBP has been developed in accordance with the principles and processes set out in our Health and Safety Management System (H&SMS) which forms a key part of our safety authorisation under the Railways and Other Guided Transport Systems (Safety) Regulations 2006 (ROGS). The SBP is therefore based on:

- a thorough understanding of our health and safety risks;
- the planning and implementation of effective controls; and
- measuring results to inform continuous learning and improvement.

Central to the H&SMS is the role of strong and committed leadership and cooperation across the industry to drive that continuous improvement.

The next control period is the first for which we have the role of infrastructure manager under ROGS rather than infrastructure controller. A consequence of this is that the responsibility for the delivery of safety of the railway system as a whole has shifted, with no one organisation having this entire accountability. System safety and achievement of the HLOS safety outputs therefore depend even more on cooperation between Network Rail, train operators and ORR in its role as national rail safety authority. With this in mind, we have worked closely with other duty holders, through RSSB, in developing an industry guide to this duty of cooperation.

This includes the arrangements which we applied during 2007 to develop the industry Railway Strategic Safety Plan for 2008-10, to which the safety content of our SBP was a major input. In particular, this was used to develop the quantified safety trajectories that demonstrate the ability of the industry to meet the HLOS safety outputs for CP4. We have now agreed with the industry to align the timescales of the next Railway Strategic Safety Plan with those of CP4 and to use the annual planning cycle associated with that plan to review actions and trajectories throughout CP4. We are currently undertaking the first review of these trajectories. This will include applying the revised injury weightings recently agreed across the industry.

To meet the demands of CP4 will require us to implement some significant changes to the infrastructure, technology and the way we work. Our H&SMS describes the processes we have in place to assess the impact of changes like these on safety. We will apply these processes, when required, to these changes. Implementation of the changes will be dependent on safety risks being identified, assessed and appropriate mitigation being applied. In some cases this may result in modifications to our plans.

The HLOS safety outputs are based on a measure of safety risk, the industry safety risk model, at the start and finish of CP4. To allow monitoring of performance against these outputs throughout each year, we have restructured our suite of safety key performance indicators, including a new indicator to track Network Rail's own performance against each of the HLOS safety outputs every four weeks. RSSB will apply similar metrics to monitor the overall industry performance quarterly.

We recognise that delivery of the SBP will require a high level of performance by Network Rail and our contractors, against the background of increased usage of the railway and the required performance and efficiency outputs. This delivery will be highly dependent on maintaining the right safety culture at all levels of the organisation and particularly at the front line. Our plans include a number of initiatives in this area and we will continue to review the impact of these and adjust them where appropriate.

Our H&SMS sets out our arrangements for safety assurance, including a comprehensive regime of integrated audit, line management monitoring and self assurance. This assurance regime systematically assesses compliance with the system and its effectiveness in managing health and safety. The results of this are regularly reviewed at our Tactical Safety Group, Strategic Safety Group, and Safety, Health and Environment Committee. We will continue to apply these arrangements to inform our learning, amending our plans and arrangements, when appropriate, to meet our outputs and to drive continuous improvement in health and safety performance throughout CP4.

Punctuality and reliability

The CP4 industry outputs specified by the HLOSs are set out in Figure 8.1. Since the HLOSs do not generally relate to freight, their requirements are considered separately. However, it is clearly essential that the overall requirements are considered holistically as part of the overall network.

England and Wales

To achieve the HLOS outputs, Network Rail is required to reduce its delay minutes to franchised operators by over 1.5 million minutes by the end of CP4 compared to 2008/09.

The October SBP indicated that we thought the industry could achieve a national PPM of 91.6 per cent without additional performance-specific expenditure. To achieve the outputs, we included additional infrastructure enhancement expenditure and performance-specific initiatives.

Figure 8.1 HLOS reliability outputs

	HLOS	
Sector	2013/14 PPM	Reduction in significant lateness / cancellations
Long distance	92.0%	36.0%
London & the south east	93.0%	21.0%
Regional	92.0%	27.0%
Scotland	92.0%	

Since October we have undertaken further work on a number of issues including:

- incorporation of the agreed JPIP position for 2008/09;
- validation of the contribution to reliability improvements of our core operating, maintenance and renewals activities;
- greater understanding of the contribution to reliability improvements of the HLOS specified and other capacity enhancements;
- the extent to which train operators may improve their performance beyond franchise commitments;
- better understanding of FOC–on-TOC and TOC-on-TOC delay;
- delivery of the significant lateness outputs; and
- development of a freight reliability measure.

We have re-examined the impact of the baseline plan. As a result of this analysis, we have concluded that we can achieve greater improvements in asset reliability than assumed in the SBP by 0.1 per cent national PPM by the end of CP4.

We have met with each of the train operators on a number of occasions. We have developed a draft long term plan for each operator which covers the next control period. The long term plan format and content was piloted with National Express East Anglia (formerly 'one'). We have since developed an equivalent plan for each train operator. We have updated our assumptions based on the feedback received from each operator. All operators are satisfied with the direction the plans are taking and believe having such plans is a significant step forward for the industry.

We have made an assumption of a small continuous improvement in TOC-on-self delay for those TOCs where train operators are forecasting to better their franchise commitments. Compared to the October SBP, this increases the assumed TOC contribution to the baseline PPM by 0.1 per cent.

We believe therefore that our core plan will achieve 92.0 per cent national PPM by the end of CP4. Our internal benchmarking analysis shows that this is equivalent to improving the performance of the average delivery unit to the best current levels by the end of CP4.

We have constructed an improved financial model that evaluates the cost, benefit, cause and effect certainty and diminishing benefit effect of particular schemes to improve performance beyond the baseline improvements. We have used the model for two purposes: firstly, to calculate the amount of additional expenditure required and secondly, to produce our portfolio of preferred schemes.

The schemes in the model are not limited to just Network Rail activities and we identified the most

appropriate options irrespective of whether the improvement is in Network Rail or train operator attributed delay.

We summarise below our updated performance projections which have been informed by this further work.

The starting point

The starting point for CP4 has been taken as the agreed 2008/09 JPIP position. This will achieve a national PPM of 90.6 per cent. This is a higher start point than assumed in the SBP of 90.4 per cent national PPM. This is as a consequence of further analysis of what the plans can deliver in 2008/09 from improvements in asset and fleet reliability.

CP4 risks

For the purposes of determining the level of improvement required we have first adjusted the baseline to deal with the effect of the risks that will occur in CP4 and reduced the figures for each TOC accordingly. We have then built up the improvement initiatives until the HLOS target is attained. We believe that significant risks that can be quantified will reduce overall PPM by 0.87 per cent. There are three major components:

- more and longer passenger trains and more freight trains (0.38 per cent reduction in PPM);
- Thameslink enhancement works (0.26 per cent reduction); and
- overall volume of engineering and resignalling work (0.23 per cent reduction).

The baseline plan

We estimate that, under the baseline plan, Network Rail delays will be 1.1 million minutes less than in 2008/09 by the end of CP4. This equates to 92.0 per cent PPM. Figure 8.2 provides a summary of where we expect these improvements to come from.

Our asset management regimes are expected to deliver a reduction in delay minutes of 770,000 minutes by the end of CP4 compared to 2008/09. This forecast is in line with our long term trend for improvement in infrastructure and operations related delays of 6.4 per cent per year. This will be delivered through a combination of our renewals programme (particularly of plain line track and points related works) and an expansion of remote condition monitoring (particularly to key

Figure 8.2 England & Wales CP4 baseline performance improvements

Baseline initiative	Activities	PPM improvement
Management and process improvements	Maintenance benchmarking to encourage best practice Seven day railway initiatives Right time railway initiatives	0.39 %
More robust timetables	Introduction of new integrated train planning system and continued use of Railsys	0.59 %
Asset renewals	Key improvement areas are: Track renewals on primary network Points renewals on primary network Signal renewals based on asset age Track circuit based on asset age OLE component renewal and GE main line rewiring	0.14 %
Enhancements	Enhancements in the baseline plan including those specified in the HLOS and those necessary to deliver HLOS capacity metric including Bletchley Milton Keynes, Reading, Gatwick, Finsbury Park to Alexandra Palace, Hitchin, York Holgate, Shaftholme, Barry Cardiff, King's Cross and platform lengthening and power supply strengthening	0.14%
Incident prevention ("stop it")	Remote condition monitoring and intelligent infrastructure Additional drainage in high risk locations Fixed telecoms Network Improved patrolling and New Measurement Train	0.13 %
Improved control	Faster isolations process More access points GSM-R Improved signaller aids Train management systems Improved fatality incident management Improved contingency and scenario planning	0.33 %
Train operator improvements	Continued good management and improved planning	0.54 %
Risks		-0.87 %
Total baseline improvement		**1.39 %**

points and track circuits).

In terms of external and weather-related factors, we believe the incidence of severe weather will increase but that we will become better at managing these types of incident and external factors. Our recent improvement in the management of cable theft is a case in point. We have therefore assumed no net change in delay minutes attributed to these categories.

We have also included improvements delivered through:

- the launch of a substantially improved performance management system across the industry;
- introduction (with TOC support) of TOC specific long term performance plans;
- maturing of the industry JPIP process; and
- improvements in data and analysis.

In addition, the enhancements required to deliver the HLOS capacity metric will aid performance to some extent. Our forecasts assume that most of the increased flexibility is used, as intended, to run more, longer or faster services.

Train operator improvements

This is an industry plan and necessarily includes assumptions about the level of performance TOCs will deliver by the end of CP4. We have made an assumption in the plan that where TOCs are currently exceeding their franchise commitments that they will continue to do so, and that this level of performance will be delivered by a future franchise if the current franchise expires during the control period. This is based on continued good management by the TOCs.

We have also assumed that closer working with the freight operators will enable operators to make a 12.5 per cent improvement in FOC-on-self delay.

Overall impact of the baseline plan

Figure 8.3 provides a breakdown by sector and also the impact compared to the significant lateness outputs.

Figure 8.3 Baseline plan and HLOS targets

PPM (%)	Baseline plan	HLOS target	Gap
Long distance	90.7	92.0	1.3
LSE	92.2	93.0	0.8
Regional	91.2	92.0	0.8
Significant lateness (% reduction)			
Long distance	25	36	11
LSE	19	21	2
Regional	21	27	6

Achieving the HLOS outputs

Clearly there is still a gap between what can be achieved within baseline funding and the HLOS outputs as shown by sector in Figure 8.3.

The biggest challenge is to achieve the long distance sector target of 92 per cent PPM and the further substantial significant lateness target.

We have undertaken analysis of the most cost-effective way of closing the gap based on analysis of the rate of return of opportunities for improvement in terms of cost per PPM percentage point improvement.

Our analysis indicates that the lowest cost necessary to close the gap between that which can be achieved within the baseline funding and the HLOS outputs is £250 million. Our analysis suggests that about £210 million of this is required to meet the PPM outputs and around £40 million to then incrementally achieve the significant lateness outputs.

We have identified a number of schemes that we have confidence in their cost and impact that will deliver the required improvement to meet the outputs. However we have also analysed a number of other options to have confidence that £250 million is sufficient to deliver the change required.

A number of options have been identified that require further analysis to improve the robustness of their possible cost and impact. These may, ultimately, prove better value for money in delivering the HLOS outputs. We intend to work over the summer with train operators to refine our proposals and this will be reflected in our 2009 Business Plan for delivery in CP4.

The National Fleet Reliability Improvement Programme (NFRIP) team has developed proposals in response to a challenge to reduce PPM by the end of CP4 through fleet reliability improvements. These proposals have been presented to the industry National Task Force. NFRIP has shared its analysis of the cost effectiveness of various initiatives and we have used this to justify the inclusion of funding for these initiatives in our plan.

Our asset policies are developed on the basis of minimising whole life and whole system costs. We believe additional investment above this will deliver cost-effective improvements in performance, particularly by focussing

expenditure on track to avoid increased risk of performance failures from poor track quality.

Thunderbirds are standby locomotives to rescue failed trains. They are used to recover services when trains are immobilised either by locomotive or power supply failure. We have made provision in the plan for deployment of more Thunderbirds on the network at key locations.

Mobile operations managers (MOMs) provide the first response to incidents. Increasing the number of MOMs is expected to deliver performance benefits from faster response times thus reducing the delay per incident.

Hot spares is an initiative to provide additional rolling stock and crew resources on stand by to assist in the recovery from disruption. Hence the initiative is designed to reduce the overall number of incidents and delays per incident through quicker service recovery. This requires the identification of key locations to best exploit these resources and can potentially cover more than one operator on a route.

CP4 trajectory

Figure 8.4 shows the trajectory in CP4 of the sector level PPM performance for England and Wales.

Significant lateness

The trajectory for significant lateness improvement over CP4 is shown in Figure 8.5 Since this is a new measure there will inevitably be some uncertainty around the precise outturn. However, we believe that the broad trend is soundly based.

Poor performing services

In its HLOS, the DfT attached importance to narrowing the gap between poor performing services and other services, without specifying an actual target. We have interpreted this ambition as getting all operators to at least 90 per cent PPM by the end of CP4. The most challenging areas to achieve this on will be long distance services on the East Coast and Great Western main lines.

We have included in the plan investments that, although not necessary to achieve the HLOS outputs, contribute to the HLOS metrics and offer good value for money. Within this portfolio of optional investments, two schemes in particular have been identified that contribute to improving performance of long distance operators on the East Coast and Great Western main line. These are ECML overhead line works and Cotswold line re-doubling respectively. These schemes have the strong support of train operators and wider stakeholders. The optional investments are explained further in Chapter 6.

Individual TOC outputs

The DfT HLOS contains sector outputs but it does not contain outputs for individual TOCs. Network Rail believes the flexibility this offers is necessary to avoid expenditure on performance improvement that is not cost effective. We recognise that our customers require confidence that, in achieving sector level outputs, we also achieve acceptable levels of performance at an individual operator level. We therefore propose to establish a lower bound target that a TOC can expect while still meeting the sector target. These will form the basis for reasonable requirements in our March 2009 Business Plan.

Scotland

Transport Scotland's HLOS specifies achievement of 92 per cent PPM by the end of CP4. The HLOS performance outputs for Scotland are entirely based on the performance of First ScotRail.

First ScotRail PPM performance has been improving over the last 4 years, with both First

Figure 8.4 England & Wales CP4 PPM trajectory

PPM (%)	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
Long distance	87.6%	88.6%	89.8%	90.9%	91.5%	92.0%
LSE	91.2%	91.5%	92.0%	92.4%	92.7%	93.0%
Regional	90.1%	90.5%	91.0%	91.5%	91.9%	92.0%
Total England & Wales	90.6%	91.0%	91.5%	92.0%	92.3%	92.6%

Figure 8.5 England & Wales CP4 significant lateness reduction per annum by sector

	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
Long distance	6.0%	5.6%	5.3%	4.9%	4.5%	4.2%	4.0%	3.8%
LSE	2.6%	2.3%	2.3%	2.3%	2.2%	2.1%	2.0%	2.0%
Regional	3.1%	2.8%	2.7%	2.6%	2.5%	2.4%	2.3%	2.2%

Figure 8.6 Scotland CP4 baseline performance improvements

Baseline initiative	Activities	PPM improvement
Management and process improvements	Maintenance benchmarking to encourage best practice Seven day railway initiatives Right time railway initiatives Operation flagship – world class pilot scheme	0.26 %
More robust timetables	Introduction of new integrated train planning system and continued use of Railsys	0.24 %
Asset renewals	Key improvement areas are: Removal of PSRs on Edinburgh to Glasgow main line Reduced age of rail Reduced age of overhead line Removal of obsolete signaling equipment	0.10 %
Enhancements	Assuming any performance risk during construction is successfully mitigated, then the expected high levels of reliability of the new services delivered by the introduction of Tier 2 schemes such as GARL will be significantly higher than average.	0.10 %
Incident prevention ("stop it")	Remote condition monitoring and intelligent infrastructure Additional drainage in high risk locations Fixed telecoms Network Improved patrolling and New Measurement Train	0.30 %
Improved control	Faster isolations process More access points GSM-R Improved signaller aides Train management systems Improved fatality incident management Improved contingency and scenario planning	0.25 %
Train operator improvements	Continued good management and improved planning	0.35 %
Risks		-0.20 %
Total baseline improvement		**1.4 %**

ScotRail and Network Rail delivering some of the best level of performance since the late 1990s when the traffic volumes were significantly lower. Train numbers in 2008/09 will be 13 per cent more than in 1997/98 and will continue to rise throughout CP4 with the introduction of new services such as Glasgow Airport Rail Link (GARL).

The start point for FirstScotrail is delivery of the jointly developed plan for delivery of the 90.6 per cent PPM by the end of CP3.

A major risk to delivery of 92 per cent in CP4 is an unusual number of extreme weather events such as incidents involving the imposition of speed restrictions due to high winds on the network or severe flooding causing line blockages. Historically there are typically two or three days per annum of significant disruption. Flooding and landslips can be mitigated in terms of asset management and by emergency timetabling after the event. Going forward the focus will be on a quicker return to normal service. In the future as weather forecasts become more accurate amended timetables could be agreed on the previous day when severe weather is forecast, thus managing the impact on passengers of extreme seasonal variations more effectively.

The plan includes an allowance of -0.2 per cent PPM to allow for the impact of passenger growth across the Scottish network and the consequential increase in dwell times and sub-threshold delay.

However given the sustained improvement in PPM over the last few years, it is thought that the HLOS target of 92.0 per cent can be delivered without additional investment. Figure 8.6 provides a summary of where we expect these improvements to come from. Figure 8.7 sets out the trajectory for for Scotland for CP4.

Freight

The plan is forecast to reduce total freight delay minutes per 100 kilometres by 25 per cent over CP4.

Network Rail and the Rail Freight Operators Association (RFOA), which represents all but one of the freight operators, have agreed to introduce a Freight Performance Measure (FPM) as soon as practically possible. We are agreed on the principles of such a measure:

- the measure will record freight trains arriving at destination more than nine minutes late provided they entered the Network Rail infrastructure on time (i.e. in their booked path); and
- where the freight trains enter the Network Rail infrastructure late this will be recorded as a sub measure (for internal monitoring only) and the number of minutes they entered the Network Rail infrastructure late deducted from the time late at destination.

This therefore measures the delay imported to the train while on Network Rail infrastructure. We believe that such a measure is important because it will encourage the freight community to actively involve itself in cross industry performance improvement practices which in turn will have a positive effect on FOC-on-TOC delay.

Network capacity

The enhancements programme in the plan is aimed at delivering the capacity outputs specified in the DfT and Transport Scotland HLOSs. This objective remains unchanged from the October SBP.

Network capability

In the SBP, we explained our improvement plan for the measurement of network capability, which aims to develop a new definition for capability, improve internal processes related to data accuracy, and implement an improved approach to publishing capability information more consistent with operators' needs in terms of delivering and planning their businesses.

Our plan is to improve provision of this information by way of a systems-based approach that will replace the current reliance on the Sectional Appendices as the publication medium. A systems-based approach will permit the presentation of the capabilities of the network as a set of 'data layers' built on a geo-spatial model of the network. With appropriate external access to the model it is our intention that stakeholders will have the ability to call upon accurate representations of the network that can be configured at differing levels of aggregation, depending on the particular need. A key requirement is the ability to provide metrics at an appropriate level of aggregation for establishing the base capability of the network for the next control period, as at April 2009.

Our plan, as advised in the SBP, is to publish the baseline measures for capability by the end of June 2008, except those metrics for gauge and length limits which will be published by the end of 2008. In the development and delivery of this work we continue to consult with stakeholders on their views, particularly on representations of the network that will facilitate their business needs, through engagement at regular meetings and industry workshops where appropriate.

Tonnage capability

In the SBP we proposed enhancing the measure of network capability by including cumulative tonnage. This is because significant changes in relation to tonnage on routes – even without any change in other measures of capability such as axle load or line speed – can necessitate a step-change in maintenance and renewal workload and associated costs. It can also impact on our ability, in the short-term, to develop the network in response to such possible changes in our customers' traffic plans. In chapter 6 we provide some case studies to illustrate the materiality of such related issues.

We have, therefore, been working with the industry in order to develop an agreed measure and we have reached a broad consensus, but further development is still required to finalise the cumulative tonnage parameter. This work involves further populating the tonnage capability model so that it will be able to present outputs at various levels of dis-aggregation, depending upon the particular need.

We continue to work with industry stakeholders to develop appropriate business procedures and processes to govern how the capability measure will be managed. This should enable customers to plan their businesses more effectively over time, and Network Rail to manage and develop the network efficiently in a way that is consistent with end-customer requirements.

We are developing a plan that will rely upon

Figure 8.7 Scotland CP4 PPM trajectory

PPM (%)	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
Scotland	90.6%	90.9%	91.3%	91.7%	91.9%	92.0%

stakeholder involvement, with the aim of implementing the procedures on a collaborative basis and being in place by the beginning of CP4.

Asset reliability and stewardship

The relationships between asset management activities and the condition and reliability of the assets on the network are complex and difficult to predict with any degree of certainty. Reliability is clearly dependent on the absolute volume of maintenance and renewal activity carried out, the quality of work and the extent to which it is accurately targeted. Various external factors, the impacts of which are not completely controllable, are also important, weather being the most significant. In fact, for some assets, as we improve their condition these external factors will become a more significant component in the overall cause of failure.

In our October SBP we provided a summary of how we expected the key asset condition measures to change over CP4. However, we are aware that more visibility of the assumptions that have underpinned our forecasts would be helpful to our funders and stakeholders, particularly with regard to the asset reliability forecasts used in determining the performance trajectory discussed earlier.

The forecasts for the key components of the revised asset stewardship index (ASI) for CP4 are included in the appendices to this update, together with a number of other important reliability related measures.

CP3

The asset stewardship incentive index (ASII) used in CP3 is a basket of measures that are intended to provide a measure of the overall condition of our assets. This index continues to be significantly better than the ORR target for CP3 and the more challenging target in our management incentive plans. Our forecast for 2007/08 shows a considerable improvement from the target we set for ourselves in the 2007 Business Plan, partly as a result of a significant reduction in the number of broken rails.

Although we expect our asset management activities to deliver continued reductions in the number of signalling, points and track circuit failures, these improvements are counter-balanced in our ASII projection for 2008/09 by our broken rail forecasts. The weather has an impact on broken rails and as the number of incidents has continued to fall over recent years, the weather effect is becoming increasingly significant.

Our 2008/09 broken rail forecasts, at 270, is, we believe, more reflective of the underlying trend, rather than the extremely low levels experienced over the last two years.

Consequently, for 2008/09 we are forecasting a very marginal deterioration of this index, from 0.66 to 0.67.

For CP4 there are three changes planned which will affect the way track geometry information is handled:

- the introduction of the new track geometry reporting (TGR) system;
- more rigorous handling of missing data; and
- changes to company standard TRK/001 which defines track geometry criteria.

These changes will be fully implemented by the start of CP4. However, due to the way data is collected and processed the new measures will imply a deterioration in track condition. As a consequence we have provided ORR with data using both measurement methodologies.

CP4 asset condition and reliability forecasts

We have revised the structure of our stewardship index for CP4, bringing together a number of condition related measures across all asset groups. The ASI forms a key component of our suite of balance scorecard measures discussed in Chapter 4.

Consistent with the other indicators in our balanced scorecard, the convention we have adopted is that the indicator for the base year is set to zero. A positive number indicates an improvement in condition, and a negative number a deterioration.

Some of these measures are only just being implemented (or the measurement methodology has been refined) and we do not yet have a baseline against which we can forecast actual condition or reliability. However, we can be confident about the relative change we expect to achieve over the control period as a result of our asset management plans.

As a result on the maintenance and renewal actions described below we expect to see a continued improvement in the reliability of all of our key assets, in particular for points failures where we expect our plans for the widespread

implementation of remote condition monitoring to improve asset reliability considerably.

We expect the ASI to reach 0.078 by the end of CP4, and have provided ORR with a full breakdown of the condition forecasts for each component of the ASI.

Maintenance

We explained in the SBP that considerable attention is being given to improving the effectiveness of our maintenance activities. There are a number of initiatives currently underway to address this and to deliver significant improvements in asset reliability. These include:

- continuous improvement initiatives (including internal benchmarking to assist in the replication of good practice);
- the use of league tables;
- six sigma analysis;
- dedicated points system teams;
- specialist on site training;
- reliability centred maintenance of signalling equipment (ROSE);
- the maintenance function reorganisation; and
- the use of remote condition monitoring (RCM).

A number of these initiatives are currently underway and are targeted at providing significant improvements over the remainder of CP3. Opportunities also exist for further improvements in CP4, and these are reflected in our plans.

The initiative having the most impact on asset reliability during CP4 will be the installation of RCM equipment across a significant number of assets, as discussed in Chapter 4. We are forecasting a 3,000 per annum reduction in failures of points and track circuits as a result of this initiative by the end of the control period compared with current levels of failure. Benefits will also be realised as a result of fitment to other assets, for example points heaters and signalling power supplies.

As discussed in Chapter 4, RCM provides an opportunity to improve asset reliability. However, to achieve the full benefits of RCM it is also necessary to implement process and behavioural changes within the maintenance arena. As a consequence it is likely that the full benefits of this technology will not be delivered until the second or third year of CP4.

Our reliability centred maintenance initiative will also help deliver asset reliability improvements, primarily by releasing resources to those assets whose failure would have a significant impact on performance.

Figure 8.8 shows the expected reduction in asset failures as a result of these initiatives. We have used 2006/07 as a base, as this is the most recent full year for which failure information is available.

Figure 8.8 Reduction in failures from 2006/07

Asset	By end of CP3 %	By end of CP4 %
Signals	25	26
Points	32	57
Track circuits	35	54
Track	12	28

Track

For track, we are generally targeting our activities at maintaining existing track geometry quality as we believe that further improvements would be particularly expensive and bring about little benefit in passenger ride comfort or reduced whole life, whole system asset management costs. This is also true for rail breaks as we believe that following the substantial reductions in the incidence of broken rails over recent years further significant reductions are unlikely to be cost effective.

We are also focussing our attention on reducing the number of individual geometry faults. This is being achieved by our plans for the replacement of pre-1976 and jointed rail and timber bearer switches and crossings (S&C), particularly on primary and key London and South East commuter routes.

Rail of the age and type we are planning to renew in CP4 experiences significantly higher rail breaks and immediate-action defects than new rail, in particular CEN60 rail. Although it is relatively difficult to produce definitive data on underlying failure, due in part to inter-related causes of failure, our estimates indicate that this rail is typically experiencing a failure rate of between 0.5 and 0.6 instances per track kilometre. Our experience of this type of rail shows that once it has seen high volumes of traffic this failure rates starts to increase (at about 0.1 defect per kilometre per year). The impact on train services and access difficulties on the busier parts of the network means that such failure rates cannot be tolerated.

As we plan to renew approximately 2,500 kilometres of pre-1976 and jointed track on

primary and key London and south east commuter routes during CP4, by the end of the control period we expect to see a reduction of approximately 1,300 immediate-action defects on these routes compared with the number being experienced at the start of the control period. It is worth noting that if this rail is not renewed we would expect the number of immediate-action defects to grow by in excess of 1,350 over the control period. This would result in potentially significant disruption to traffic, exacerbated by difficulties in gaining access to carry out the required remedial work.

A similar analysis for our S&C renewal plans shows a reduction in immediate-action defects over the control period of approximately 1,250. As with track, if this renewal work was not to be carried out the number of S&C faults is likely to grow by at least 1,300 over the control period.

Our renewal programme on the secondary and rural and freight only routes will, we believe, have only a modest impact on reliability, generally only compensating for the gradual deterioration of the infrastructure that is not being renewed.

The expected result of this work will be a gradual improvement in the track stewardship condition indices for all three route categories, with the greatest increase on primary and key London and south east routes. We are forecasting a further 10 per cent reduction in broken rails over the control period, although the actual incidence of broken rails in any particular year will be highly dependent on the weather.

Signalling

For signalling we have age-based failure rate profiles for the four key types of interlocking:

- mechanical interlocking;
- route relay interlocking (RRI)
- solid state (SSI); and
- computer based interlocking (CBI).

The infrastructure cost model (ICM) contains the age detail of each of the over 1,600 interlockings on the network. Interlocking failure forecasts can be produced by the ICM by mapping the age of the interlocking with the appropriate fault rate profile. Asset renewal is allowed for by returning the age of the asset to zero. This enables the failure impact of different renewal scenarios to be predicted.

Our analysis has shown that, if no interlocking renewals were to be carried out during CP4 the number of signalling failures would be expected to increase by approximately 12 per cent to around 20,000 per year. Our CP4 renewal programme delivers reliability improvements that are generally equivalent to this background level of deterioration.

Overall, our renewal programme, the work we are doing on improving the effectiveness of our maintenance work described above, including remote condition monitoring, results in a net decrease in signalling failures of approximately 24 per cent over CP4.

In the appendices we have provided a breakdown of the likely number of signal, points and track circuit failures, as these form the majority of signalling failures. It should be noted that whilst we can be confident of the scale of overall reduction in signalling failures, the actual number of signal, points or track circuit failures cannot be estimated with the same level of accuracy, and should be considered as indicative forecasts.

Civils

For our civils asset portfolio we have introduced a new measure, assets subject to special investigation or inspection. We believe this provides a better measure of changing condition of our civils assets, due to the inertia in the change in any conventional condition assessment. At present approximately 1,500 assets are subject to special investigation and we are forecasting that this will reduce by 5 per cent over CP4.

We also expect to see a moderate reduction in the number of temporary speed restrictions (TSRs) as a result of the condition of civils assets. Clearly extreme weather conditions are likely to impact on this. In future we will use the severity index as our key TSR measure, rather than a simple count of the number of TSRs, as this takes account of the severity of the speed restriction and the length of track affected.

These forecasts are based on funding being made available to support the implementation of the policy combinations described in the October SBP, i.e. £1,979 million for CP4. Should an alternative funding regime be adopted, these output forecasts would need to be revised.

Operational property

During CP3, the funding available generally allowed us to maintain the functionality of the assets at our stations. However, this was not on the basis of minimum whole life, whole system asset management costs, with a patch and repair

approach often adopted, especially on the more lightly used stations. This situation was not reflected in a change in the station condition index (SCI) used during CP3 due to limitations in the measuring system. We have now addressed these limitations and are confident that the station stewardship measure (SSM) which replaces the SCI, will provide a more robust mechanism to track the overall condition of each of our stations.

The asset management policies we have developed for CP4 will now allow us to manage these assets on a minimum whole life, whole system cost basis.

For stations in categories E to F, the application of policy C will mean that in some circumstances selected assets on these stations will be allowed to degrade in a controlled manner, until replaced by a more appropriately sized asset. As a consequence, for some stations there may be a gradual deterioration in the condition measure until the particular asset is replaced. We do not believe, however, that these changes will be material over the portfolio of stations in categories E and F during CP4.

For the larger stations, we believe that even though policy B is designed to maintain overall condition, the improved information we have on the condition and remaining life of the assets at these stations will improve our effectiveness in targeting work at these stations. As with the smaller stations, however, we do not believe that the impact of this will be material across the station portfolio.

We are currently implementing the new stewardship measure for each of the six categories of stations (i.e. A to F). The result of this exercise will be shared with ORR as soon as it is available and will be published in our 2008 annual return. As our asset management policies are targeted at addressing, but not reversing, the gradual deterioration of our stations that has been prevalent for a number of years and for the reasons set out above, we do not expect to see a measurable change in the overall condition of our station portfolio over CP4, or the average stewardship measure for each of the station categories.

Electrification and plant

Our detailed analysis of our electrification and plant asset management policies has resulted in an acceleration of our overhead line component replacement programme. As a result we are forecasting a considerable reduction in power supply incidents causing train delays, down by approximately 22 per cent over the next control period. We are also currently predicting a gradual improvement in the condition of our sub-station and contact systems as a result of better condition data and improved targeting of work.

Network availability

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 on the seven day railway.

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 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.

Network planning and timetabling

ORR presented the conclusions of its review of stakeholder expectations at the Rail Industry Planning Conference in June 2007 in the following key areas:

- systems;
- competence and experience;
- working together; and
- timescales.

We responded in part to these concerns through industry consultation with our customers through to the end of January 2008. The key proposals put forward are summarised below.

Systems

We are committed to the replacement of legacy access planning tools with a suite of modern integrated systems and processes within the industry. Our objective is to make the industry access planning simple, effective and timely in order to support the demands of a diverse customer base, and provide improvements to the customer service experience. The introduction of workflow management will provide a more streamlined front-end to the access planning customers, as well as strengthening the management controls in delivery of the service. The suite of modern tools will remove the need for duplication of data maintenance that exists in this area throughout the industry today, and new logic within the systems will remove conflict and release available capacity from today's timetable.

Competencies and experience

Historically there have been concerns that the operational planning teams in the rail industry had a wealth of competence and experience locked in the heads of an ageing workforce. Over the last few years, this situation has been reversed through a considerable change in emphasis in recruitment and through the introduction of an effective induction, training and development framework. These changes, coupled with the replacement of the legacy systems and processes, will enable our planners to focus more on analysis and problem solving rather than low value data manipulation within the system.

Working together

We have outlined our aspiration to work more closely with our customers in order to better understand the underlying business drivers that lead to changes in the timetable. Through a better understanding of our customers' businesses, and from a more collaborative approach to planning, we believe that there is a real opportunity to develop the best possible timetable plan for the UK rail industry. The changes required to support the move towards a seven day railway will also see more stability and quality built into the access plans for the delivery of engineering works, and this will bring closer alignment within Network Rail.

Timescales

It is recognised across the industry today that the timescales associated with the timetable development cycle are unacceptably long. The new systems and processes will enable changes to the timetable to be developed faster, and tested before implementation to understand the potential impact to performance and capacity. The travelling public still require stability in the timetable in terms of controlled change, but the process for supporting the development of the timetable will reduce.

Appendices

Appendix 1 Network total operating expenditure, maintenance and renewal projections

£m (2006/07 prices)	Control period 3					Control period 4					CP3	CP4	Control period averages				
	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	total	total	CP3	CP4	CP5	CP6	CP7
Operating expenditure																	
Controllable opex	994	899	878	833	798	776	765	751	745	739	4,401	3,776	880	755	732	721	719
Non-controllable opex	263	275	343	298	355	332	353	364	371	376	1,535	1,796	307	359	386	402	417
Total opex	**1,257**	**1,174**	**1,221**	**1,132**	**1,153**	**1,108**	**1,118**	**1,114**	**1,116**	**1,115**	**5,936**	**5,572**	**1,187**	**1,114**	**1,117**	**1,123**	**1,135**
Maintenance	**1,352**	**1,238**	**1,146**	**1,081**	**1,056**	**1,041**	**1,002**	**968**	**945**	**931**	**5,874**	**4,889**	**1,175**	**978**	**872**	**837**	**839**
Renewals (non-WCRM)																	
Track	648	839	897	879	784	759	720	690	667	645	4,047	3,481	809	696	573	469	455
Signalling	195	298	436	471	458	473	470	447	455	493	1,857	2,338	371	468	509	464	407
Civils	280	312	377	390	402	434	428	393	368	355	1,761	1,979	352	396	351	338	336
Operational property	183	235	241	197	269	325	305	265	233	210	1,125	1,337	225	267	186	184	184
Telecoms	214	140	182	176	350	292	235	160	113	57	1,062	856	212	171	73	65	82
Electrification	28	55	82	93	96	128	148	146	104	97	354	623	71	125	61	68	61
Plant and machinery	82	70	84	75	120	127	85	54	54	54	430	373	86	75	78	74	81
Other renewals	92	129	118	77	310	252	146	98	99	75	726	670	145	134	91	84	78
Total	**1,721**	**2,078**	**2,416**	**2,358**	**2,789**	**2,790**	**2,536**	**2,253**	**2,092**	**1,987**	**11,361**	**11,658**	**2,272**	**2,332**	**1,922**	**1,746**	**1,684**
Renewals (WCRM)																	
Total	**1,101**	**686**	**348**	**356**	**428**	**0**	**0**	**0**	**0**	**0**	**2,920**	**0**	**584**	**0**	**0**	**0**	**0**
Total renewals	**2,822**	**2,764**	**2,764**	**2,714**	**3,217**	**2,790**	**2,536**	**2,253**	**2,092**	**1,987**	**14,281**	**11,658**	**2,856**	**2,332**	**1,922**	**1,746**	**1,684**
Total O, M and R	**5,431**	**5,176**	**5,131**	**4,927**	**5,426**	**4,940**	**4,657**	**4,336**	**4,154**	**4,033**	**26,091**	**22,119**	**5,218**	**4,424**	**3,911**	**3,706**	**3,657**

Appendix 2 England and Wales operating expenditure, maintenance and renewal projections

£m (2006/07 prices)	Control period 4								CP4	Control period averages			
	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	total	CP4	CP5	CP6	CP7
Operating expenditure													
Controllable opex	797	756	726	705	695	682	676	671	3,429	686	664	654	653
Non-controllable opex	317	275	321	306	323	334	341	345	1,649	330	354	370	383
Total opex	**1,114**	**1,031**	**1,047**	**1,011**	**1,018**	**1,015**	**1,017**	**1,016**	**5,077**	**1,015**	**1,018**	**1,024**	**1,035**
Maintenance	**1,038**	**981**	**962**	**941**	**905**	**872**	**851**	**838**	**4,406**	**881**	**788**	**757**	**759**
Renewals (non-WCRM)													
Track	813	799	709	690	648	619	598	573	3,127	625	508	408	387
Signalling	404	415	409	450	435	414	422	462	2,182	436	447	404	337
Civils	312	329	331	345	340	312	301	291	1,589	318	285	274	272
Operational property	227	187	234	274	244	217	188	187	1,110	222	167	165	165
Telecoms	136	132	301	251	206	137	98	53	746	149	62	57	68
Electrification	72	88	95	115	138	126	95	90	563	113	57	63	56
Plant and machinery	80	70	108	114	76	49	49	48	337	67	69	66	73
Other renewals	105	69	284	228	132	88	89	68	606	121	83	76	70
Total	**2,148**	**2,090**	**2,471**	**2,467**	**2,220**	**1,962**	**1,840**	**1,772**	**10,260**	**2,052**	**1,678**	**1,515**	**1,428**
Renewals (WCRM)													
Total	**320**	**322**	**388**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Total renewals	**2,468**	**2,412**	**2,860**	**2,467**	**2,220**	**1,962**	**1,840**	**1,772**	**10,260**	**2,052**	**1,678**	**1,515**	**1,428**
Total O, M and R	**4,620**	**4,424**	**4,868**	**4,419**	**4,143**	**3,849**	**3,708**	**3,625**	**19,744**	**3,949**	**3,484**	**3,295**	**3,222**

Appendix 3 Scotland operating expenditure, maintenance and renewal projections

£m (2006/07 prices)	Control period 4								CP4	Control period averages			
	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	total	CP4	CP5	CP6	CP7
Operating expenditure													
Controllable opex	81	77	72	71	70	69	69	68	348	70	67	66	66
Non-controllable opex	26	24	34	26	30	30	31	31	147	29	32	33	34
Total opex	**107**	**101**	**107**	**98**	**100**	**99**	**99**	**99**	**495**	**99**	**99**	**99**	**100**
Maintenance	**108**	**99**	**95**	**101**	**98**	**96**	**94**	**94**	**483**	**97**	**84**	**80**	**80**
Renewals (non-WCRM)													
Track	84	80	75	70	72	72	69	72	355	71	66	61	68
Signalling	32	56	49	23	34	33	33	31	155	31	62	60	71
Civils	65	61	70	89	88	80	67	65	390	78	66	63	63
Operational property	14	10	35	51	60	48	46	23	227	45	19	19	19
Telecoms	46	44	49	40	29	23	14	4	110	22	11	7	14
Electrification	10	5	1	13	10	20	9	8	59	12	4	5	5
Plant and machinery	4	4	12	12	9	5	4	5	36	7	8	8	9
Other renewals	13	9	26	24	14	9	9	7	64	13	9	8	7
Total	**268**	**268**	**317**	**322**	**316**	**291**	**253**	**215**	**1,397**	**279**	**244**	**232**	**255**
Renewals (WCRM)													
Total	**28**	**34**	**40**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Total renewals	**296**	**302**	**357**	**322**	**316**	**291**	**253**	**215**	**1,397**	**279**	**244**	**232**	**255**
Total O, M and R	**511**	**502**	**558**	**521**	**514**	**486**	**446**	**408**	**2,375**	**475**	**427**	**411**	**435**

Appendix 4 Network total income projections

£m (2006/07 prices)	Control period 3			Control period 4					CP4	Control period averages			
	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	total	CP4	CP5	CP6	CP7
Incentive regimes													
Schedule 8	87	69	41	0	0	0	0	0	0	0	0	0	0
Schedule 8 access charge supplement	8	5	4	0	0	0	0	0	0	0	0	0	0
Schedule 4	(94)	(96)	(97)	(209)	(193)	(192)	(164)	(169)	(926)	(185)	(169)	(169)	(169)
Schedule 4 access charge supplement	87	90	92	209	193	192	164	169	926	185	169	169	169
Total	**88**	**69**	**39**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Franchised access charges													
Variable track access	229	235	259	153	154	158	159	159	784	157	161	163	163
Electric asset usage	31	31	0	9	9	9	9	9	46	9	10	10	10
EC4T income	131	157	235	166	169	175	183	187	879	176	190	193	193
Capacity charge	7	9	10	148	149	151	152	152	752	150	154	156	156
Station income (incl. QX)	306	302	307	78	78	78	78	78	391	78	78	78	78
Station fixed charge	0	0	0	147	142	137	133	131	691	138	131	131	131
Depots income	49	49	46	46	46	46	46	46	231	46	46	46	46
Total	**753**	**783**	**857**	**747**	**748**	**755**	**760**	**763**	**3,774**	**755**	**771**	**776**	**776**
Other single till													
Freight income	95	86	92	77	79	81	83	86	406	81	95	99	99
Open access income	62	65	46	19	19	19	19	19	94	19	19	19	19
Property income	206	209	190	190	188	187	190	187	943	189	187	187	187
Property sales	48	61	55	26	25	34	18	24	128	26	24	24	24
Other income	3	3	3	2	2	2	2	2	12	2	2	2	2
Total	**414**	**424**	**387**	**314**	**314**	**323**	**313**	**318**	**1,583**	**317**	**327**	**331**	**331**
Total income	**1,255**	**1,276**	**1,283**	**1,062**	**1,062**	**1,078**	**1,073**	**1,081**	**5,357**	**1,071**	**1,098**	**1,108**	**1,108**

Appendix 5 England and Wales income projections

£m (2006/07 prices)	Control period 3			Control period 4					CP4	Control period averages			
	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	total	CP4	CP5	CP6	CP7
Incentive regimes													
Schedule 8	84	66	40	0	0	0	0	0	0	0	0	0	0
Schedule 8 access charge supplement	7	5	4	0	0	0	0	0	0	0	0	0	0
Schedule 4	(91)	(91)	(88)	(197)	(182)	(180)	(154)	(158)	(871)	(174)	(158)	(158)	(158)
Schedule 4 access charge supplement	80	83	84	197	182	180	154	158	871	174	158	158	158
Total	**81**	**63**	**40**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Franchised access charges													
Variable track access	218	224	246	141	143	146	147	147	724	145	149	150	150
Electric asset usage	29	29	0	8	8	9	9	9	43	9	9	9	9
EC4T income	126	150	223	156	158	164	171	175	825	165	179	181	181
Capacity charge	7	8	10	144	145	146	147	148	729	146	150	151	151
Station income (incl. QX)	281	277	282	73	73	73	73	73	364	73	73	73	73
Station fixed charge	0	0	0	132	127	123	120	118	620	124	118	118	118
Depots income	43	43	41	41	41	41	41	41	205	41	41	41	41
Total	**704**	**733**	**803**	**695**	**696**	**703**	**707**	**710**	**3,511**	**702**	**718**	**723**	**723**
Other single till													
Freight income	85	77	83	68	70	72	74	77	361	72	84	88	88
Open access income	62	65	46	19	19	19	19	19	94	19	19	19	19
Property income	192	195	177	179	177	175	179	175	884	177	175	175	175
Property sales	43	55	50	25	23	33	17	24	122	24	24	24	24
Other income	3	3	3	2	2	2	2	2	11	2	2	2	2
Total	**385**	**394**	**359**	**292**	**291**	**301**	**291**	**296**	**1,472**	**294**	**304**	**308**	**308**
Total income	**1,170**	**1,190**	**1,202**	**987**	**987**	**1,004**	**998**	**1,006**	**4,982**	**996**	**1,022**	**1,031**	**1,031**

Appendix 6 Scotland income projections

£m (2006/07 prices)	Control period 3			Control period 4					CP4	Control period averages			
	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	total	CP4	CP5	CP6	CP7
Incentive regimes													
Schedule 8	3	3	1	0	0	0	0	0	0	0	0	0	0
Schedule 8 access charge supplement	0	0	0	0	0	0	0	0	0	0	0	0	0
Schedule 4	(3)	(5)	(10)	(13)	(12)	(12)	(10)	(10)	(56)	(11)	(10)	(10)	(10)
Schedule 4 access charge supplement	7	7	7	13	12	12	10	10	56	11	10	10	10
Total	**7**	**6**	**(1)**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Franchised access charges													
Variable track access	11	11	12	12	12	12	12	12	60	12	12	13	13
Electric asset usage	1	1	0	1	1	1	1	1	3	1	1	1	1
EC4T income	6	7	11	10	10	11	11	12	54	11	11	11	11
Capacity charge	0	0	0	4	4	5	5	5	23	5	5	5	5
Station income (incl. QX)	25	25	25	5	5	5	5	5	27	5	5	5	5
Station fixed charge	0	0	0	15	15	14	14	13	71	14	13	13	13
Depots income	6	6	5	5	5	5	5	5	26	5	5	5	5
Total	**49**	**51**	**54**	**52**	**52**	**52**	**53**	**53**	**263**	**53**	**53**	**53**	**53**
Other single till													
Freight income	10	9	10	9	9	9	9	10	46	9	10	11	11
Open access income	0	0	0	0	0	0	0	0	0	0	0	0	0
Property income	14	14	13	12	12	12	12	12	59	12	12	12	12
Property sales	5	6	6	2	2	1	1	0	6	1	0	0	0
Other income	0	0	0	0	0	0	0	0	1	0	0	0	0
Total	**29**	**29**	**28**	**22**	**23**	**22**	**22**	**22**	**111**	**22**	**23**	**23**	**23**
Total income	**85**	**86**	**81**	**74**	**75**	**74**	**75**	**75**	**375**	**75**	**76**	**76**	**76**

Appendix 7 Network total asset stewardship performance indicators

		Control period 4				
	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
Asset Stewardship Index	0.000	0.020	0.035	0.050	0.064	0.078
Primary and key L&SE track stewardship index	0.000	0.019	0.038	0.057	0.078	0.101
Other L&SE and secondary track stewardship index	0.000	0.019	0.040	0.059	0.079	0.097
Rural and freight only track stewardship index	0.000	0.003	0.007	0.010	0.014	0.017
Civils assets subject to special investigation	1473	1458	1444	1429	1415	1401
TSRs on civils assets (severity index)	114	113	112	111	110	108
Station stewardship index	0.000	0.000	0.000	0.000	0.000	0.000
Light maintenance depot stewardship index	0.000	0.000	0.000	0.000	0.000	0.000
Signalling infrastructure condition assessment (SICA)	2.40	2.40	2.40	2.40	2.40	2.40
Signalling failures causing train delays of more than 10 minutes per incident	17,766	16,130	15,319	14,637	13,985	13,544
Sub station and contact systems condition index		0.010	0.020	0.030	0.039	0.049
Power incidents leading to incidents of greater than 500 train delay minutes	74	71	67	64	61	58
Key asset reliability measures						
Signal failures	5,600	5,558	5,545	5,539	5,536	5,542
Points failures	6,427	5,126	4,488	3,830	3,242	2,857
Track circuit failures	5,530	4,841	4,476	4,256	3,999	3,838
Track failures	8,710	7,245	6,938	6,702	6,468	6,238
Broken rails	270	264	258	252	246	240

Appendix 8 England and Wales asset stewardship performance indicators

		Control period 4				
	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
Asset Stewardship Index	0.000	0.017	0.028	0.045	0.063	0.080
Primary and key L&SE track stewardship index	0.000	0.020	0.039	0.058	0.080	0.103
Other L&SE and secondary track stewardship index	0.000	0.020	0.042	0.061	0.083	0.102
Rural and freight only track stewardship index	0.000	0.004	0.007	0.009	0.012	0.016
Civils assets subject to special investigation	1372	1358	1345	1331	1318	1305
TSRs on civils assets (severity index)	114	113	112	111	110	108
Station stewardship index	0.000	0.000	0.000	0.000	0.000	0.000
Light maintenance depot stewardship index	0.000	0.000	0.000	0.000	0.000	0.000
Signalling infrastructure condition assessment (SICA)	2.40	2.40	2.40	2.40	2.40	2.40
Signalling failures causing train delays of more than 10 minutes per incident	15,686	14,241	13,525	12,923	12,348	11,958
Sub station and contact systems condition index		0.010	0.020	0.030	0.039	0.049
Power incidents leading to incidents of greater than 500 train delay minutes	69	66	63	60	57	54
Key asset reliability measures						
Signal failures	4,709	4,673	4,663	4,658	4,655	4,660
Points failures	5,627	4,488	3,929	3,353	2,838	2,501
Track circuit failures	4,893	4,284	3,960	3,765	3,539	3,396
Track failures	8,319	6,919	6,626	6,401	6,177	5,958
Broken rails	247	236	230	225	220	214

Appendix 9 Scotland asset stewardship performance indicators

		Control period 4				
	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
Asset Stewardship Index	0.000	0.007	0.029	0.042	0.053	0.069
Primary and key L&SE track stewardship index	0.000	0.014	0.029	0.045	0.060	0.075
Other L&SE and secondary track stewardship index	0.000	0.012	0.022	0.032	0.042	0.050
Rural and freight only track stewardship index	0.000	0.002	0.005	0.034	0.036	0.038
Civils assets subject to special investigation	101	100	99	98	97	96
TSRs on civils assets (severity index)	0	0	0	0	0	0
Station stewardship index	0.000	0.000	0.000	0.000	0.000	0.000
Light maintenance depot stewardship index	0.000	0.000	0.000	0.000	0.000	0.000
Signalling infrastructure condition assessment (SICA)	2.40	2.40	2.40	2.40	2.40	2.40
Signalling failures causing train delays of more than 10 minutes per incident	1,936	1,889	1,794	1,714	1,637	1,586
Sub station and contact systems condition index		0.010	0.020	0.030	0.039	0.049
Power incidents leading to incidents of greater than 500 train delay minutes	5	5	4	4	4	4
Key asset reliability measures						
Signal failures	891	884	882	882	881	882
Points failures	800	638	559	477	404	356
Track circuit failures	637	558	516	490	461	442
Track failures	391	325	312	301	290	280
Broken rails	23	28	28	27	26	26

Appendix 10 Enhancement projections

£m (2006/07 prices)	Control period 4					
	2009/10	2010/11	2011/12	2012/13	2013/14	CP4 total
HLOS						
DfT projects						
Baseline projects	268	189	208	311	276	1,251
Specified projects	973	1,085	679	685	719	4,141
HLOS capacity	295	535	532	253	70	1,685
Performance funds	50	50	50	50	50	250
Total	**1,586**	**1,860**	**1,469**	**1,299**	**1,114**	**7,328**
TS projects						
Airdire - Bathgate	124	60	1	0	0	185
Glasgow Airport rail link	17	61	94	1	0	173
Borders Rail	0	0	1	1	1	3
Glasgow to Kilmarnock	12	0	0	0	0	12
Tier 3	3	3	3	2	2	13
Small projects	4	4	4	4	4	20
Total	**160**	**128**	**103**	**8**	**7**	**406**
Non-HLOS Investment						
EEA / 7day railway (E&W)	64	64	64	64	64	320
EEA / 7day railway (Scotland)	6	6	6	6	6	30
Schemes to close performance gap	41	49	4	3	2	99
Capacity / performance	20	55	33	18	2	128
Journey time improvements	29	48	31	22	10	140
Enhancements linked to renewals	7	38	49	36	28	159
Longer-term development work	7	22	53	63	95	240
Transport Innovation Fund (TIF)	79	39	0	0	0	117
Third party	305	302	97	35	40	779
Crossrail	95	130	225	312	463	1,225
Policy choices	26	34	45	50	23	179
Total	**679**	**786**	**607**	**609**	**734**	**3,416**
Total enhancements	**2,425**	**2,773**	**2,179**	**1,916**	**1,855**	**11,150**

Appendix 11 Expenditure projections for franchised stations by station facility owner

	Control period 4					
£m (2006/07 prices)	**2009/10**	**2010/11**	**2011/12**	**2012/13**	**2013/14**	**CP4 total**
Arriva Trains Wales	8	8	8	7	7	**38**
c2c	3	3	2	2	2	**13**
Chiltern Railways	2	2	2	2	2	**11**
East Midlands Trains	5	5	5	4	4	**23**
First Capital Connect	8	7	7	7	7	**36**
First Great Western	12	12	11	11	11	**56**
First ScotRail	15	14	14	14	13	**70**
First/Keolis TransPennine	3	3	3	3	3	**13**
London Midland	9	8	8	8	8	**41**
London Overground	1	1	1	1	1	**6**
London Underground	1	1	1	1	1	**6**
Merseyrail	5	5	4	4	4	**22**
National Express East Anglia	11	11	10	10	10	**52**
National Express East Coast	3	3	3	3	3	**15**
Northern Rail	15	14	14	14	13	**70**
Southeastern	14	14	13	13	13	**66**
South West Trains	16	15	15	14	14	**73**
Southern	11	11	11	10	10	**54**
Virgin Trains	5	5	5	5	5	**24**
Other	0	0	0	0	0	**1**
Total	**147**	**142**	**137**	**133**	**131**	**691**

Appendix 12 Forecast PPM MAA – CP4 plan

		Control period 4				
	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
England and Wales						
Franchised TOC						
Arriva Cross Country	87.3%	87.9%	88.7%	89.7%	90.4%	90.9%
Arriva Trains Wales	92.5%	92.7%	92.9%	93.2%	93.4%	93.5%
c2c	94.5%	94.8%	95.1%	95.2%	95.3%	95.3%
Chiltern Railways	95.0%	95.2%	95.5%	95.7%	95.8%	96.0%
East Midlands Trains	87.6%	88.3%	89.1%	89.9%	90.4%	90.8%
First Capital Connect	90.7%	89.9%	90.4%	90.7%	91.1%	91.4%
First Great Western	86.0%	87.0%	88.2%	89.1%	89.7%	90.1%
First/Keolis TransPennine	92.5%	92.8%	93.3%	93.7%	94.0%	94.2%
London Midland	89.0%	89.7%	90.5%	91.2%	91.6%	92.0%
London Overground	91.7%	92.5%	93.4%	94.3%	94.7%	94.9%
Merseyrail	94.6%	94.8%	94.9%	95.1%	95.2%	95.2%
National Express East Anglia	91.2%	91.8%	92.4%	93.1%	93.6%	94.0%
National Express East Coast	85.4%	86.8%	88.4%	89.5%	90.5%	91.1%
Northern Rail	90.0%	90.5%	91.0%	91.5%	91.9%	92.2%
South West Trains	92.2%	92.5%	92.8%	93.0%	93.2%	93.3%
Southeastern	91.6%	91.7%	92.2%	92.2%	92.6%	92.8%
Southern	90.2%	90.7%	91.0%	91.2%	91.7%	92.0%
Virgin Trains	86.8%	88.1%	89.6%	90.8%	91.5%	92.0%
Sector						
Long distance	87.6%	88.6%	89.8%	90.9%	91.5%	92.0%
London & south east	91.2%	91.5%	92.0%	92.4%	92.7%	93.0%
Regional	90.1%	90.5%	91.0%	91.5%	91.9%	92.0%
Total	90.6%	91.0%	91.5%	92.0%	92.3%	92.6%
Scotland						
First ScotRail	90.6%	90.9%	91.3%	91.7%	91.9%	92.0%

Appendix 13 Forecast PPM MAA – proposed local commitments

	Control period 4				
	2009/10	2010/11	2011/12	2012/13	2013/14
England and Wales					
Franchised TOC					
Arriva Cross Country	86.7%	87.4%	88.4%	89.1%	89.7%
Arriva Trains Wales	91.7%	91.9%	92.2%	92.3%	92.5%
c2c	93.4%	93.7%	93.8%	93.9%	93.9%
Chiltern Railways	93.8%	94.1%	94.3%	94.4%	94.5%
East Midlands Trains	87.2%	88.0%	88.9%	89.4%	89.8%
First Capital Connect	88.9%	89.4%	89.6%	90.0%	90.4%
First Great Western	86.1%	87.3%	88.2%	88.8%	89.2%
First/Keolis TransPennine	92.2%	92.6%	93.1%	93.4%	93.6%
London Midland	88.7%	89.4%	90.2%	90.6%	91.0%
London Overground	91.6%	92.5%	93.3%	93.7%	93.9%
Merseyrail	93.6%	93.8%	93.9%	94.0%	94.0%
National Express East Anglia	90.9%	91.5%	92.2%	92.7%	93.1%
National Express East Coast	85.2%	86.7%	87.9%	88.9%	89.5%
Northern Rail	89.9%	90.4%	90.9%	91.3%	91.6%
South West Trains	90.7%	91.0%	91.2%	91.3%	91.5%
Southeastern	90.4%	91.0%	91.0%	91.3%	91.6%
Southern	89.0%	89.3%	89.6%	90.0%	90.4%
Virgin Trains	85.8%	87.3%	88.5%	89.2%	89.7%
Sector					
Long distance	88.6%	89.8%	90.9%	91.5%	92.0%
London & south east	91.5%	92.0%	92.4%	92.7%	93.0%
Regional	90.5%	91.0%	91.5%	91.9%	92.0%
Total	91.0%	91.5%	92.0%	92.3%	92.6%
Scotland					
First ScotRail	90.9%	91.3%	91.7%	91.9%	92.0%

Appendix 14 Delay minutes per 100 train km

		Control period 4				
	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
England and Wales						
Franchised TOC						
Arriva Cross Country	1.90	1.78	1.64	1.49	1.38	1.30
Arriva Trains Wales	1.34	1.31	1.26	1.20	1.16	1.11
c2c	0.75	0.70	0.64	0.60	0.59	0.57
Chiltern Railways	1.00	0.94	0.87	0.82	0.79	0.77
East Midlands Trains	1.69	1.58	1.46	1.35	1.28	1.20
First Capital Connect	1.14	1.17	1.08	1.03	0.98	0.94
First Great Western	1.65	1.49	1.28	1.15	1.07	1.01
First/Keolis TransPennine	1.64	1.56	1.44	1.35	1.29	1.25
London Midland	2.24	2.09	1.90	1.76	1.67	1.60
London Overground	2.24	2.13	2.00	1.89	1.86	1.82
Merseyrail	1.02	0.98	0.94	0.91	0.90	0.89
National Express East Anglia	1.76	1.66	1.56	1.44	1.35	1.28
National Express East Coast	1.05	0.94	0.83	0.74	0.67	0.61
Northern Rail	2.21	2.11	2.00	1.89	1.83	1.78
South West Trains	1.31	1.21	1.10	1.03	0.99	0.94
Southeastern	1.47	1.42	1.31	1.27	1.22	1.17
Southern	1.74	1.63	1.52	1.43	1.33	1.26
Virgin Trains	2.10	1.88	1.63	1.43	1.34	1.26
Sector						
Long distance	1.69	1.54	1.37	1.23	1.14	1.07
London & south east	1.47	1.39	1.28	1.21	1.15	1.09
Regional	1.91	1.83	1.72	1.63	1.57	1.52
Total	1.65	1.54	1.42	1.32	1.25	1.19
Scotland						
First ScotRail	1.21	1.15	1.06	1.00	0.98	0.95
Open access TOCs						
Hull Trains	1.36	1.26	1.14	1.04	0.98	0.93
Heathrow Express	2.09	1.95	1.78	1.64	1.56	1.49
Grand Central	0.99	0.92	0.83	0.77	0.73	0.69
Other passenger	0.57	0.53	0.49	0.46	0.44	0.43
Freight						
Freightliner	4.63	4.34	4.00	3.73	3.56	3.42
GB Rail	3.77	3.50	3.19	2.92	2.77	2.64
EWS	3.71	3.49	3.24	3.04	2.92	2.82
DRS	2.27	2.13	1.97	1.84	1.77	1.70
Other Freight	2.31	2.17	2.01	1.88	1.80	1.73
Total	**3.92**	**3.68**	**3.41**	**3.18**	**3.05**	**2.94**
Total	**1.84**	**1.72**	**1.58**	**1.48**	**1.41**	**1.35**

Appendix 15 Projected Network Rail delay

Minutes (000's)		Control period 4				
	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14
England and Wales						
Franchised TOC						
Arriva Cross Country	489	532	492	446	415	390
Arriva Trains Wales	291	286	279	267	260	253
c2c	43	40	37	35	34	33
Chiltern Railways	88	84	79	75	73	70
East Midlands Trains	320	301	280	259	246	233
First Capital Connect	253	261	244	235	225	217
First Great Western	652	587	506	454	424	399
First/Keolis TransPennine	251	242	229	218	213	209
London Midland	384	362	333	310	298	286
London Overground	68	71	67	88	87	86
Merseyrail	57	55	54	53	53	53
National Express East Anglia	537	511	486	451	430	409
National Express East Coast	198	181	162	149	136	127
Northern Rail	892	859	819	784	766	750
South West Trains	478	446	409	387	373	360
Southeastern	410	401	370	363	349	336
Southern	511	481	452	431	404	384
Virgin Trains	577	591	514	450	421	396
Sector						
Long distance	2,117	2,071	1,850	1,669	1,564	1,477
London & south east	2,567	2,450	2,278	2,174	2,075	1,991
Regional	1,816	1,746	1,662	1,583	1,540	1,499
Total	6,500	6,268	5,794	5,434	5,189	4,978
Scotland						
First ScotRail	455	436	410	391	386	382
Open access TOCs						
Hull Trains	19	17	16	14	14	13
Heathrow Express	31	29	26	24	23	22
Grand Central	9	9	8	7	7	6
Other passenger	31	29	27	25	24	23
Freight total	1,678	1,580	1,491	1,430	1,418	1,424
Total	8,900	8,537	7,930	7,476	7,205	6,989

Appendix 16 Proportion of trains which are significantly late or cancelled

	Control period 4								
	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	Improvement from 06/07
Sector									
Long distance	6.0%	5.6%	5.3%	4.9%	4.5%	4.2%	4.0%	3.8%	36.1%
London & south east	2.6%	2.3%	2.3%	2.3%	2.2%	2.1%	2.0%	2.0%	24.1%
Regional	3.1%	2.8%	2.7%	2.6%	2.5%	2.4%	2.3%	2.2%	27.3%

Appendix 17 Balance sheet

	Control period 4				
£m (nominal prices)	2009/10	2010/11	2011/12	2012/13	2013/14
Net fixed assets	40,780	45,373	49,041	52,275	55,354
Net current and long term assets/liabilities	(2,744)	(2,894)	(2,671)	(2,581)	(2,563)
Net debt	(24,603)	(27,877)	(30,794)	(33,131)	(35,163)
Provisions	(4,548)	(5,056)	(5,383)	(5,687)	(6,015)
Net Assets	**8,885**	**9,546**	**10,194**	**10,876**	**11,613**
Share capital and other reserves	1,639	1,639	1,639	1,639	1,639
Revaluation reserve	4,825	4,875	4,977	5,113	5,275
Retained earnings	2,422	3,032	3,578	4,124	4,699
Capital and reserves	**8,885**	**9,546**	**10,194**	**10,876**	**11,613**

Appendix 18 Profit and loss

	Control period 4				
£m (nominal prices)	**2009/10**	**2010/11**	**2011/12**	**2012/13**	**2013/14**
Income					
Fixed track access income	4,859	5,253	5,625	5,966	6,291
Other track access income	817	840	871	902	930
Schedule 8	-	-	-	-	-
Schedule 4	(230)	(217)	(220)	(194)	(206)
Revenue grant income	-	-	-	-	-
Other income (inc property sales)	344	353	373	371	388
Total income	5,790	6,229	6,649	7,044	7,403
Expenditure					
Controllable operating expenses	(848)	(860)	(867)	(883)	(901)
Non-controllable operating expenses	(363)	(397)	(420)	(440)	(458)
Maintenance (includes reclass.)	(1,291)	(1,283)	(1,279)	(1,287)	(1,306)
Depreciation and amortisation	(1,491)	(1,664)	(1,823)	(1,962)	(2,090)
Total expenses	(3,994)	(4,204)	(4,389)	(4,573)	(4,754)
Operating profit	1,796	2,026	2,261	2,472	2,649
Revaluation of investment portfolio					
Extraordinary income (expenses)	-	-	-	-	-
	-	-	-	-	-
PBIT	1,796	2,026	2,261	2,472	2,649
Net Interest (including FIM fee)	(1,063)	(1,256)	(1,468)	(1,645)	(1,789)
PBT	733	770	793	827	860
Tax	(123)	(160)	(247)	(281)	(284)
Retained profit	610	610	546	545	576

Appendix 19 Comparison of SBP update with SBP projections

£m (2006/07 prices)	CP4 total (Network total)			CP4 total (England & Wales)			CP4 total (Scotland)		
	SBP	SBPU	% change	SBP	SBPU	% change	SBP	SBPU	% change
Operating costs	**5,613**	**5,572**	**-1%**	**5,119**	**5,077**	**-1%**	**494**	**495**	**0%**
Controllable	3,770	3,776	0%	3,429	3,429	0%	342	348	2%
Non-controllable	1,842	1,796	-3%	1,690	1,649	-2%	152	147	-3%
Maintenance	**4,819**	**4,889**	**1%**	**4,356**	**4,406**	**1%**	**463**	**483**	**4%**
Renewals	**12,487**	**11,658**	**-7%**	**11,002**	**10,260**	**-7%**	**1,485**	**1,397**	**-6%**
Track	3,468	3,481	0%	3,108	3,127	1%	359	355	-1%
Signalling	2,415	2,338	-3%	2,251	2,182	-3%	164	155	-5%
Civils	1,979	1,979	0%	1,589	1,589	0%	390	390	0%
Operational property	1,465	1,337	-9%	1,216	1,110	-9%	249	227	-9%
Telecoms	856	856	0%	745	746	0%	111	110	0%
Electrification	467	623	33%	425	563	33%	43	59	40%
Plant and machinery	356	373	5%	321	337	5%	35	36	4%
Discretionary investment	885	0	-100%	807	0	-100%	78	0	-100%
Other renewals	596	670	13%	539	606	12%	57	64	13%
TOTAL OM&R	**22,919**	**22,119**	**-3%**	**20,477**	**19,744**	**-4%**	**2,441**	**2,375**	**-3%**

Appendix 20 Fixed track access charges

£m (2006/07 prices)	Control period 4					
	2009/10	2010/11	2011/12	2012/13	2013/14	CP4 total
Arriva Cross Country	315	334	347	359	365	1,720
Arriva Trains Wales	235	248	258	268	273	1,283
c2c	48	51	53	55	56	264
Chiltern Railways	53	56	58	60	61	288
East Midlands Trains	205	218	228	236	240	1,127
First Capital Connect	141	150	152	158	162	762
First Great Western	364	385	400	414	423	1,986
First ScotRail	475	504	533	548	554	2,614
First/Keolis TransPennine	131	138	144	148	151	712
Gatwick Express	14	15	15	16	16	77
London Midland	166	177	185	193	197	918
London Overground	21	23	24	25	25	118
Merseyrail	40	42	44	46	48	220
National Express East Anglia	254	268	277	287	292	1,378
National Express East Coast	216	226	245	252	256	1,194
Northern Rail	409	431	450	468	480	2,238
South West Trains	301	318	328	340	346	1,632
Southeastern	290	308	320	332	340	1,589
Southern	213	226	233	242	248	1,162
Virgin Trains	336	352	362	373	379	1,802
Total	**4,230**	**4,470**	**4,655**	**4,817**	**4,913**	**23,085**