Review of Network Rail's Performance Improvement Plans for Control Period 4 with the Strategic Business Plan

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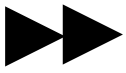

Title	**Review of Network Rail's Performance Improvement Plans for Control Period 4 with the Strategic Business Plan**
Customer	**John Larkinson, ORR**
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EXECUTIVE SUMMARY

WPA was commissioned by ORR to review the performance element of the strategic Business Plan. This final report examines the April update of the performance plan following a challenge to the original submission.

NR was asked to produce plans which delivered the HLOS performance targets by the end of CP4 (2013/2014) which are:

Public Performance Measure (MAA)

92% PPM MAA	-	Long Distance Services
92% PPM MAA	-	Regional Services
93% PPM MAA	-	London and South East Services
92% PPM MAA	-	Scotland (First ScotRail Services)

Significant Lateness (trains more than 30 minutes late at destination or are cancelled)

36% reduction	-	Long Distance Services
27% reduction	-	Regional Services
21% reduction	-	London and South East Services

The main conclusions drawn by WPA are:

England & Wales

Delivery within the base OMR

The assessors conclude that the forecast PPM improvements in each of the categories within the base OMR spend are based on reasonable assumptions, with the exception of Maintenance and Renewals. The assessors believe that the full benefits of the NR commitments from Maintenance and Renewals are not being realised in the April 08 SBP Refresh, and that an additional 0.12% points improvement in National PPM could be realised.

Treatment of Risk

The forecast risk impact of -0.86% points PPM over CP4 is a reasonable assumption based on the impact of growth, Thameslink programme and the volume of engineering work planned.

NR should ensure mitigation plans form a core part of all project plans and TOC JPIPs/LTPPs.

Benefits from Enhancement Spend

The benefit of 0.14% points PPM improvement represents a significant improvement from the original submission. The assessors felt this reflected the enhancement programme and the timing of many of the schemes and appears to be a robust conclusion.

TOC Contributions

The assessor's view is that 0.54% points improvement represents a reasonable assumption and no additional improvement can be sensibly expected. This represents a 0.2% points improvement on the original position.

Does the funding deliver the HLOS?

NR believe they can deliver 92.01% PPM MAA within the base funding. The assessors believe that the overall level of deliverable PPM without recourse to any additional funding is 92.13% PPM MAA and that the gap which needs to be bridged is not as high as NR have outlined in the April 08 SBP Refresh.

Proposals to Close the Gap

The assessors concluded that:

- Overall, the initiatives described are a logical and reasonable suite of plans for achieving the necessary performance improvement
- The use of the basket approach by NR has made it difficult to be definitive about the likely cost/benefit relationship of any given combination of schemes as described by NR
- In any of the baskets, including the assessors suggested alternative, the biggest benefits come from the N-FRIP proposal which is as yet not fully defined making any definitive view on costs difficult
- Based on the VFM model the WPA view on the cost to fill the gap between the forecast of OMR spend and the HLOS is £177m not the £250m put forward by NR. This excludes any wider view from ORR on the application of general efficiency savings and is based entirely on the costs put forward by NR
- The deliverability of some of the initiatives remains doubtful at this stage, and the risks to implementation must be considered to be high
- More detailed work is necessary to scope the N-FRIP project to validate the extra benefits of this scheme
- Further work is needed to validate the benefits and costs of the two schemes to improve performance on FGW and NXEC

Scotland

Delivery within the base OMR

The assessors conclude that, given current performance trends and the relative size of the challenge, the level of delivery forecast within the OMR looks achievable at 92% PPM MAA.

Treatment of Risk

The fact that there is no risk factor for the engineering programme in Scotland is a little surprising so NR must therefore ensure each scheme has a robust plan.

However the overall risk factor of -0.2% points PPM appears to cover the other key issues and is appropriate in finalising the forecast for Scotland.

Benefits from Enhancement Spend

The assumption of a 0.1% points benefit looks sensible based on firm knowledge at this moment. NR, the TOCs and TfS must look at the impact of individual schemes within the enhancement programme in Scotland as soon as practical to identify both upside and downside.

TOC Contributions

The forecast of 0.35% points improvement in TOC led initiatives appears valid based on the levels of current delivery and the plans described.

Does the funding deliver the HLOS?

Current performance in Scotland is ahead of the NR forecasts. ScotRail achieved 90.6% at the end of 2007/8 and the current JPIP is seeking to achieve in excess of 91% by the end of 2008/9. This suggests that the delivery of 92.0% PPM MAA is readily achievable from the base OMR settlement

Freight

The proposed measure for freight performance represents a significant step forward for the industry. A trajectory based around the new FPM 0-10 measure is fully supported and NR should complete the work to propose a final sector trajectory. The required delay minute trajectory must be completed alongside this.

Trajectories

The trajectories for attaining the PPM MAA targets and the underpinning ones including delay minutes are sensible. They reflect the early delivery of some key initiatives and do not rely on a steep improvement in the last two years of CP4. This means that for any shortfall identified in the early part of the control period NR will have the opportunity to react. A trajectory which relied on a back end loaded trajectory would make recovery more difficult.

1. INTRODUCTION

Winder Phillips Associates (WPA) was commissioned by the Office of Rail Regulation (ORR) to review the performance plans within Network Rail's (NR) Strategic Business Plan.

The project commenced in October 2007 and the key dates were as follows:-

29 October 2007	-	Start up meeting with ORR
30 October 2007	-	SBP published by NR
12 November 2007	-	Initial questions supplied to NR
14 November 2007	-	Formal Challenge meeting ORR/NR/WPA
27 November 2007	-	Interim Report issued by WPA
February 2008	-	ORR Assessment Report published
03 April 2008	-	NR publish updated SBP
May 2008	-	WPA publish final report

The WPA team consisted of Keith Winder and Phil Dargue. They were assisted initially by Martin Thornley of DeltaRail who provided the analytical review of NR's forecasts and methodologies. Following Martin's departure from DeltaRail in January 2008, he was succeeded by Matt Ablett who undertook the analytical review of the April re-submission in particular.

During the initial phase of the project the amount of direct interface with NR was limited due to the tight timescales, but post the initial report there has been regular and open dialogue with NR including fortnightly update meetings.

The basic remit to which WPA has been working is to assess the NR performance plans against the high level output specifications (HLOS) set by the Department for Transport (DfT).

Those HLOS requirements are:-

Public Performance Measure (MAA)

92% PPM MAA	-	Long Distance Services
92% PPM MAA	-	Regional Services
93% PPM MAA	-	London and South East Services
92% PPM MAA	-	Scotland

Significant Lateness (trains more than 30 minutes late at destination or are cancelled)

36% reduction	-	Long Distance Services
27% reduction	-	Regional Services
21% reduction	-	London and South East Services

In addition, whilst no individual TOC targets are specified within the HLOS, the Secretary of State has stated that she attaches importance to narrowing the gap between the poorest performing services and the rest. Whilst no clear definition is given of what this means, a working assumption has been adopted with ORR that all TOCs should reach 90% PPM MAA by the end of CP4 subject to this not involving disproportionate cost.

The initial report produced by WPA[1] reviewed the October SBP and the associated performance documentation provided by NR. This final report is a review of the final NR submission which is in part a response to the issues and concerns raised in the initial report. It does not seek to repeat the interim report although where relevant and to aid clarity, the changes from the original submission are highlighted in the text.

The following sections set out the approach and methodology adopted throughout the work and the key findings. The findings are set out separately for England & Wales, and Scotland. In the case of the latter, the HLOS requirements are set by Transport for Scotland, not DfT.

Against each of the key headings, the sections are set out identically for ease of understanding. The NR position is set out in summary, the assessors findings based on the evidence presented and the conclusions reached.

[1] An Assessment of Performance Improvement in the Network Rail Strategic Business Plan – WPA 27 November 2007

2. APPROACH AND METHODOLOGY

2.1 Key Meetings and Events

- SBP received by the assessors 29.10.07.
- Disc received 01.11.07 with a large number of documents, notably:
  - historical analysis
  - project plans and supporting quantification documents (TOC Consolidation Model, Long Term Performance Model (LTPM) spreadsheets etc)
  - Notes of TOC consultations
- The performance documents, their contents and the inter-relationship between documents were explained in more detail at a clarification meeting with NR/ORR on 05.11.07.
- A further information pack was received on 06.11.07, in response to issues raised at the 05.11.07 meeting.
- The TOC Consolidation Model was examined in detail, and documents were sampled to sense check and establish the key issues.
- Questions (33 in all) were constructed and submitted in draft to ORR on 07.11.07.
- A teleconference was held with John Larkinson to finalise questions on 08.11.07.
- Questions were formally submitted to NR on 09.11.07.
- A formal Challenge Meeting took place on 14.11.07 at which ORR and WPA discussed in detail with NR their responses to the submitted questions.
- A telephone conversation between Martin Thornley and Stephen Draper took place on 19.11.07, as agreed at the Challenge Meeting, to fill in detail not available at the Challenge Meeting, and to clarify certain cost/ performance issues in the NR responses to the formal questions.
- Specific written answers were received from NR on 19.11.07 to address:
  - The pre-advised questions not answered at the Challenge Meeting
  - Supplementary questions asked at the Challenge Meeting
- Assessor meetings to review the results of the engagements above, discuss the analysis, and clarify and plan the contents of this report, were held on 19 & 20.11.07.
- A teleconference was held with John Larkinson to discuss the draft interim report including its structure on 20.11.07.
- An email summary of the telephone conversation between Martin Thornley and Stephen Draper on the 19.11.07 was received from NR on 21.11.07.
- A telephone conversation between Martin Thornley and Stephen Draper took place on 28.11.07 to clarify the basis of the Scotland forecast. 2 documents relating to the Scotland forecast were received from Stephen Draper on the same date.
- Assessor's interim report submitted on 24.11.07.

- Regular Performance Meetings with NR, ORR and WPA took place on 25.01.08 and 11.02.08 to provide updates on responses to the ORR's challenges.
- A meeting between Keith Winder, Matt Ablett and Stephen Draper took place on 28.02.08 to preview the Value for Money model.
- Regular Performance Meeting with NR, ORR and WPA took place on 04.03.08. A presentation of the core issues which would be described within the refresh document was provided by Network Rail.
- Individual TOC CP4 projection spreadsheets supplied by Stephen Draper on 06.03.08.
- Regular Performance Meeting with NR, ORR and WPA took place on 18.03.08.
- Final Performance Meeting with NR, ORR and WPA took place on 03.04.08, where Richard O'Brien provided the assessor's with a preview of the April 08 Refresh document.
- April 08 Refresh SBP received by the assessors on 03.04.08.
- Clarification Meeting held with NR, ORR and WPA on 15.04.08.
- A meeting between Matt Ablett and Stephen Draper took place on 17.04.08 to clarify the maths behind the Asset Maintenance and Renewal projections.
- The assessors have kept a project file containing all written and email communications with NR, and comprehensive notes of all meetings, telephone conversations and any informal discussions.
- The assessors have also kept records of the methodology used for analysing NR data, the documents used and any assumptions made.

2.2 Summary of the Analysis undertaken by NR and the Assessors

To support the initial submission, NR undertook specific analysis to understand the impact of performance improvement activities and other factors. The long term performance model (LTPM) was run many times with savings in different categories, to assess the PPM impact on each TOC of different types of delay minute change and to test sensitivities. It was also used to assess the impact of traffic growth.

The results of the performance analysis, combined with the results of the LTPM runs, were presented to TOCs in individual spreadsheets with PPM improvements shown against each action, and a TOC forecast. TOCs were able to provide feedback and add any local schemes they were aware of, which were accepted by NR where provided.

The TOC spreadsheets were combined into the TOC Consolidation Model, which provides PPM forecasts for each TOC, the three sectors and the whole of England & Wales. No specific analysis was supplied to support Scotland.

The initial assessor review of NR's forecasts was centred on the TOC Consolidation Model. The relationship between the individual actions, their

costs, and the estimated benefits were clarified through discussions with NR, and through examination of the workings of the TOC Consolidation Model.

For the April 08 Refresh, NR reworked this analysis following the challenges raised by the ORR, as outlined in the Assessor's report. In particular NR challenged Asset teams to deliver greater improvements from maintenance and renewals and challenged TOCs on their plans.

The LTPM was re-run based on the outcomes of these challenges, plus further amendments to the initiatives to be included in the "base" case and their assumed impact. The start point for CP4 was also revised based on information contained within the Joint Performance Improvement Plans (J-PIPs). J-PIPs are the annual performance plans produced jointly by NR and each TOC and form the basis for planning and delivery of train performance.

Individual TOC spreadsheets with PPM improvements against each action, and a TOC forecast were re-produced. These were also combined into a revised TOC Consolidation Model. A separate model was supplied for First ScotRail, and this TOC was included within the Consolidation Model.

The improvements in the Refresh could be compared directly with the original submission, enabling a clear view of the impact of the challenges laid out by the ORR following the initial submission.

In addition to PPM and delay impacts, NR developed a methodology to forecast significant lateness and cancellations over CP4 by TOC. This information was provided in each individual TOC spreadsheet and the TOC Consolidation Model.

Two consolidation models were supplied:

- A "Base" Model based on core initiatives which are funded, i.e. those included in NR's core business plan submission
- A "Funded" Model based on further non-funded initiatives required to achieve the HLOS target

The justification for the additional funding required to achieve the HLOS target was based on a Value for Money model provided by Network Rail. For a range of schemes, this model provided an estimate of the performance benefit and the cost. The model allowed the evaluation of combinations of schemes to identify the cost and PPM benefit of each 'basket'.

A detailed description of the models described is contained in Appendix A.

3. ENGLAND & WALES

3.1 Delivery of the HLOS within the OMR Expenditure

3.1.1 Network Rail's Position

The original NR submission suggested that within the base OMR spend they could achieve 91.6% PPM MAA nationally against a requirement of 92.6% specified by the HLOS. This included a requirement for a £368m expenditure on performance schemes.

This figure was revised to 91.77% PPM MAA following the initial review[2]. This gave sector forecasts as follows:-

Table A NR sector target delivery predictions post initial WPA review

	Forecast	Target
London and South East	92.1	93.0
Regional	91.5	92.0
Long Distance	90.4	92.0

These forecasts left a considerable gap against the DfT requirements which the original submission suggested could be closed by spending £400m on a portfolio of schemes.

The HLOS requirement on significant lateness was acknowledged but not specifically addressed within the initial SBP.

Following the initial review ORR concluded "overall we do not believe that the plans provide a clear, consistent and robust approach to delivering the targets"[3]. In particular NR was asked to reconsider what level of performance improvement was deliverable within the base spend, particularly when set against the considerable investment in ongoing maintenance and renewals funded through the base settlement.

This process was reinforced at the ongoing series of meetings held between the initial ORR findings and the publication by NR of their update on 3 April 2008.

NR undertook a fresh round of internal 'challenge' reviews with the infrastructure and route teams to identify any additional areas of savings above those in the initial submission within the base OMR spend.

The April submission supporting evidence provided a comparison table (Table B) of changes made since the original NR SBP. The formatting of this table has been slightly amended for ease of reference within this report but the numbers remain the same.

[2] An Assessment of Performance Improvement in the Network Rail SBP – WPA November 2007 (section 3.3)
[3] Update on the framework for setting outputs and access changes update. Feb 2008 ORR

Table B Comparison of PPM Change April Refresh v. October 07 SBP

	April Refresh				October SBP			
	England & Wales	LSE	Regional	Long Distance	England & Wales	LSE	Regional	Long Distance
08/09	**90.6%**	**91.3%**	**90.1%**	**87.6%**	**90.4%**	**91.1%**	**89.9%**	**87.3%**
CORE INITIATIVES								
PROCESS	0.24%	0.21%	0.26%	0.32%	0.26%	0.25%	0.26%	0.33%
M&R	0.29%	0.25%	0.29%	0.65%	0.48%	0.42%	0.58%	0.58%
TIMETABLE	0.59%	0.51%	0.61%	1.08%	0.58%	0.51%	0.58%	1.15%
STOP	0.13%	0.14%	0.08%	0.19%	0.09%	0.08%	0.03%	0.22%
CONTROL	0.33%	0.32%	0.31%	0.51%	0.18%	0.18%	0.14%	0.31%
SUBTOTAL	1.58%	1.44%	1.55%	2.74%	1.59%	1.44%	1.59%	2.59%
RISKS	-0.86%	-1.08%	-0.52%	-0.57%	-0.80%	-0.99%	-0.54%	-0.51%
TOC	0.54%	0.47%	0.65%	0.69%	0.34%	0.39%	0.26%	0.26%
ENHANCE	0.14%	0.20%	0.03%	0.13%	0.08%	0.07%	0.05%	0.25%
SUBTOTAL	-0.17%	-0.40%	0.16%	0.24%	-0.38%	-0.53%	-0.23%	0.00%
End CP4	**92.01%**	**92.31%**	**91.79%**	**90.61%**	**91.61%**	**92.01%**	**91.26%**	**89.89%**

This shows that the overall NR forecast now puts national PPM delivery at 92.01% MAA at the end of CP4 leaving a gap of 0.59% points PPM MAA to bridge. However, it should be noted that the size of the shortfall is significantly higher on the long distance sector at 1.39% points.

Process changes, primarily the introduction of the 7-Day Railway initiative (0.06% points) and the roll out of Right Time Railway/Challenge 90 style of joint initiatives with TOCs on a wider basis (0.18% points) is expected to deliver 0.24% points PPM MAA improvement

The overall PPM improvement forecast for maintenance and renewals impact is 0.29% points. This is made up of 0.12% points improvement from benchmarking maintenance delivery units across NR and 0.17% points improvement from infrastructure renewals. This compares to an initial submission which showed a 0.48% points improvement from maintenance renewals.

The maintenance and renewals forecast is supported in the April refresh with a table showing the forecast reductions in NR infrastructure incidents during CP4 based on the asset strategy put forward elsewhere in the SBP. This showed infrastructure incidents were forecast to reduce significantly during CP4. For example, points failures show a 56% reduction with the overall level falling by around 29.6%.

Improvements in timetable structure were forecast to deliver a 0.59% points PPM improvement through designing more robust, error free plans. This will be achieved partly by the implementation of a new train planning system but will be supported by other work streams such as detailed analysis of poorly performing trains and implementing plan changes to improve them. The main aim appears to be to remove inherent design faults such as substandard sectional running times and clashes at key junctions as opposed to simply extending journey times.

A series of specific initiatives were developed with both route and infrastructure teams and in consultation with TOCs. These were grouped into 2 separate sets of initiatives – "stop it" and "control it".

'Stop it' contains initiatives around remote condition monitoring, drainage, the fixed telecoms network and patrolling. These are about preventing the initial cause of delay.

The 'control it' initiatives are about mitigating the implications of incidents. This includes the use of GSMR, better quality assistance to signallers, better systems in control, fatality management and contingency planning.

In total 'Stop It' is forecast to improve PPM MAA by 0.13% points and 'Control It' by 0.33% points.

The predicted improvement from TOC initiatives is discussed in section 3.4.

The final savings category shown is the impact of the enhancement projects which are predicted to deliver a 0.14% points PPM benefit. This is discussed in detail in section 3.3.

In addition to the improvements, NR predict a negative effect from risks of -0.86% points PPM. This improvement factor is considered in section 3.2.

3.1.2 Summary of Assessors Review Findings

The assessors have carefully considered the NR submission and have concentrated on the principal changes in forecast performance between the October SBP and the April refresh. In respect of the changes highlighted in 3.1.1 above, the key tests are:-

- Is the change explained and justified by NR?
- Is the analysis and modelling of the change appropriate and relevant?
- Overall, is the change supported by the evidence?

In respect of the range of initiatives developed in the October SBP and further reviewed in the April refresh, the assessors are generally satisfied that the described improvements in the areas chosen by NR meet the key tests. The PPM improvements forecast for the process, timetable, 'stop it' and 'control it' initiatives are broadly in line with the assessors expectations, although it is noted that NR have admitted that the groups of initiatives are not directly comparable between October and April.

In one area, the 3 tests could not, in the assessors view, be wholly met:- in that Maintenance & Renewal (M&R) which in the April refresh is 0.17% points PPM (England & Wales) lower than October submission.

The challenge handed out by ORR following the publication of the SBP was to extract greater performance benefit from the extensive funding for M&R in the base OMR settlement. In accepting this challenge, NR has secured commitments from its Infrastructure Maintenance and Route teams to significant reductions in the volume of incidents in all infrastructure categories, based on asset renewals and a suite of asset management

policies, such as remote condition monitoring. However, the improvement in England & Wales PPM has reduced from 0.48% points in the October SBP to 0.29% points in the April refresh. NR has sought to justify this position as a consequence of:-

- Better definition of initiatives – location, impact etc.
- A greater preponderance of initiatives impacting on the Long Distance sector, where the effect on national PPM is less pronounced
- Some initiatives now falling in other categories, such as Enhancement
- Some improvements being brought forward into CP3

The reductions in incident volumes proposed are shown in Table C which is taken from the April SBP refresh.

Table C CP4 Targeted Infrastructure Failure Improvement Rates

	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	improve in cp4
Failures									
Track	9,903	8,710	8,710	7,245	6,938	6,702	6,468	6,238	28%
Points (with RCM)	9,127	7,826	6,427	5,126	4,488	3,830	3,242	2,857	56%
Tk Circ (with RCM)	7,993	6,676	5,530	4,841	4,476	4,256	3,999	3,838	31%
Signals	7,367	6,577	5,600	5,558	5,545	5,539	5,536	5,542	1%
Change from 06/07									
Track		-12%	-12%	-27%	-30%	-32%	-35%	-37%	
Points (with RCM)		-14%	-30%	-44%	-51%	-58%	-64%	-69%	
Tk Circ (with RCM)		-16%	-31%	-39%	-44%	-47%	-50%	-52%	
Signals		-11%	-24%	-25%	-25%	-25%	-25%	-25%	

Two issues emerge from this work:-

(i) NR have not yet secured fully underwritten performance commitments from their Infrastructure Maintenance teams to support the improvements detailed in Table C. Whilst there is confidence that this gap will be closed, Table B in this report reflects only the commitments secured to date and <u>not</u> the totals shown in Table B of the April refresh. The difference is approximately B 0.08% points of England & Wales PPM, and this PPM effect should be added to the 92.01% PPM total.

(ii) Of all the incident reduction categories identified "Signals" remains a disappointment. It appears incongruous that NR should have achieved a 25% improvement in signalling related incidents during CP3, but the commitment for CP4 to be only 1% - 8,000 minutes in 5 years, in a category carrying over 800,000 minutes delay per annum in England & Wales. However, as part of the NR HQ challenge seeking a 'bottom up' assessment this has actually forecast a 10% improvement in this category, around 84,000 minutes. The LTPM assesses the impact of this as a 0.04% points improvement in the England & Wales PPM MAA. The assessors are minded to reflect this effect in the England & Wales aggregate PPM.

3.1.3 <u>Conclusion</u>

The assessors conclude that the forecast improvements in each of these categories are based on reasonable assumptions, with the exception of Maintenance and Renewals. The assessors believe that the full benefits of the commitments from NR from Maintenance and Renewals are not being

realised in the April 08 SBP Refresh, and that an additional 0.12% points improvement in National PPM could be realised.

3.2 Identification of Risks

3.2.1 Network Rail's Position

The April submission increased the risk element within the performance forecasts from 0.80% points in the original submission to 0.86% points.

The risk element is basically made up of three elements although others are considered.

These are:-

- Passenger and traffic growth - 0.38% points
- Thameslink - 0.26% points
- Engineering work - 0.23% points

The other risk factors considered are all presumed capable of mitigation via action plans whereas the impact of those listed above are post any mitigation plans.

Passenger and traffic growth takes into account the impact of more trains, therefore more congestion and the increase in station dwell times because of the volume of passengers getting on and off trains.

The impact of Thameslink is based on the work done by FCC and Southeastern to look at the impact of phase 0 on their services backed up by more recent modelling done in RailSys which broadly supports the same conclusions. This takes into account the growth in traffic volumes through the core tunnel section and the increased level of delay impact north and south of the Thames. Phase 0 of the Thameslink Programme is now expected to commence in March 2009 although enabling works have already started. Phase 0 will involve some major service changes including Southeastern and FCC services being joined together, reduction in infrastructure availability such as the bay platforms at Blackfriars and an increase in the number of trains passing through the central tunnel section. This phase will run through until December 2011 when services will again be amended to allow the major works east of London Bridge to be completed with the project due to end in 2015. The service impact is based on the risks created by the reduced infrastructure and complexity of service not the likelihood of possession overruns.

The impact of the wider level of engineering work takes into account some increased risk of overruns but again mainly focuses on the impact of reduced flexibility during the construction phase of projects. This latter point can be a particular issue on resignalling schemes. The increase in this risk level since the October submission follows a review of the high levels of work planned during CP4 at key locations such as Reading and Birmingham New Street, and the consequent amount of infrastructure restriction and the recent experiences of the impact of engineering work.

3.2.2 Summary of Assessors Review Findings

It is very important that any credible performance plan addresses the likely impact of factors which have the capacity to make performance worse. This means that plans must not just address opportunities for performance improvement but should attempt to mitigate the impact of all identified risks.

NR have effectively produced two separate lists of risks. The much longer set of risks which includes the Olympic Games, introduction of ERTMS, cable theft amongst others, are all assumed to be neutral. This is partly because on a national level the PPM impact of each is small, but the main assumption is that NR will develop mitigation plans to eliminate any impact. To achieve this it is important NR ensures these are fully reflected in the individual TOC long term performance plans and subsequent JPIPs. The assumption against the list, given the state of knowledge currently, appears valid.

The second set of risks is much shorter but represents those issues which NR believes that even post mitigation plans leave a considerable residual risk.

The growth forecast within the SBP and the work to improve network capacity will impact on performance. Running more trains, longer trains and carrying more people, can all lead to increased delays although the mechanisms are not the same.

Increased train services can lead to increased levels of reactionary delays post incidents. This is simply the impact of volume. In many cases this increase will be mitigated by infrastructure schemes but there will be some residual impact. By the end of CP4, there is predicted to be around 25m extra passenger train kms per annum compared to at the end of CP3 (an increase of 6%).

The longer trains mean clearing key junctions and stations will take longer. This will cause small increases in sub-threshold delay which will impact on daily performance, particularly during perturbed operation.

Increased numbers of passengers will increase station dwell times, again particularly in disruption. NR looked at the difference between high passenger loading days and lower ones (during school summer holidays for example). This showed a marked difference between the two and NR have used these results in calculating the impact of growth.

The Thameslink enhancement work will be in progress throughout CP4 and will have a major impact on services in the South East. During the project there will be significant changes to both infrastructure and timetable design as well as service frequency.

On the latter point, there will be a significant increase in services through Snow Hill tunnel on the core north-south section. To this will be added the complication of FCC and Southeastern services joined together at Blackfriars. This presents a considerable opportunity for delay importation between the Midland Mainline and the Kent network.

During the project there will be limitations on the available infrastructure. For example, the bay platforms at Blackfriars will be out of use restricting the service recovery opportunities during disruption.

NR's figures reflect the work done by the affected TOCs to forecast their performance during Phase 0 of the project. This impact is particularly significant on FCC and Southeastern, but also on Southern and East Midlands Trains. The number and nature of the operators involved means a significant impact on national PPM.

The final element reflects the sheer scale of the engineering work planned during CP4. Major schemes such as at Reading, South Wales and West Midlands resignalling, for instance, will require disruptive possessions, infrastructure taken out of use and the risks of problems arising during the work. It is inevitable with a programme so large that there will be a performance impact no matter how well planned. The NR focus has been on the loss of flexibility rather than the level of overruns since the former will be a feature of every project.

Overall the assessors believe the NR approach in this area is sound and the numbers as put forward form a reasonable basis for planning CP4.

It is worth pointing out that the major difference between the ORR advice to DfT on the HLOS and NR's original submission was the treatment of risk. ORR did not include any risk element in their forecast.

3.2.3 Conclusion

The forecast risk impact of -0.86% points PPM is a reasonable assumption on PPM in CP4.

NR should ensure mitigation plans form a core part of all project plans and TOC JPIPs/LTPPs.

3.3 Benefits from Enhancement Spend

3.3.1 Network Rail's Position

In the original submission, NR only proposed to save 0.08% points PPM MAA from the enhancement schemes put forward in the SBP. This included the schemes being developed for capacity increases.

NR were asked to revisit this forecast since it appeared to the assessors to be lower than could be expected given the nature of many of the schemes put forward.

In the April submission NR have increased the potential savings to 0.14% points PPM MAA from the schemes listed in tables 6.17 and 6.18 of the SBP update. The following were identified as having a PPM benefit:-

Bletchley/Milton Keynes	-	Increased line speed, platforming at Milton Keynes
Reading	-	More through platforms
Gatwick Airport	-	Better layout reducing conflicts
Alexandra Palace	-	3rd track reducing conflicts

Hitchin	-	New flyover
York Holgate	-	2nd track on southern approach
Shaftholme	-	Humber freight traffic off ECML
Barry Cardiff	-	Improved capacity
Kings Cross	-	Additional platforms
Platform lengthening, Increased power supplies	-	Mitigates some of risks from longer dwell times

The other schemes were seen as either performance neutral on impact or likely to deliver benefits only at the end of CP4 (this will also apply to many of the benefits at Reading).

3.3.2 Summary of Assessors Review Findings

The assessors carried out an independent review of the projects put forward by NR in the enhancements section of the SBP and in particular the tables 6.17 and 6.18 of the April refresh.

Of the schemes included many are about capacity enhancement and facilities improvements. These include the National Stations Improvement Programme (NSIP) and schemes for longer train operations. Other schemes will be completed towards the latter part of CP4 and whilst they will deliver performance benefits they will not significantly affect PPM MAA until the first year of CP5. A good example of this is the scheme in the Stafford – Colwich area. Of the schemes listed in 3.3.1 some will only have a partial effect during the control period, particularly Reading which will not be substantially complete until the end of CP4.

The end result of the review was a list of schemes broadly similar to the NR assumptions in 3.3.1. Each individual scheme has the potential to significantly improve specific TOC PPM forecasts, but this impact is clearly diluted on a national basis. The assessment of the NR calculations on impact broadly agrees with the conclusions produced.

3.3.3 Conclusion

The benefit of 0.14% points PPM improvement represents a significant improvement from the original submission and based on the enhancement programme and the timing of many of the schemes appears to be a robust conclusion.

3.4 TOC Contributions

3.4.1 Network Rail's Position

In the original submission the TOC contribution to PPM improvement during CP4 was calculated to be 0.34% points. This was based on the declared commitments from TOCs within their franchise agreements (for those that would run through all or most of the control period) and the figures put forward during TOC consultation.

NR admitted that there had been no challenge to TOCs during the consultation meetings regarding the SBP and that TOC improvements had been the aggregate of only what had been offered – hence the observation by NR that TOCs are reluctant to commit beyond their franchise targets.

This modest contribution was challenged by the assessors and ORR, and NR were asked to consider if more could be achieved. In particular NR were asked to demonstrate that this was fully understood in light of the request for £400m to make up the shortfall in the original numbers.

Following the ORR response, NR undertook another round of TOC consultations both on a one-to-one basis and through National Task Force (NTF).

Following this, NR reported there was still reluctance from TOCs to vary from their franchise commitments. Following these discussions, NR simply built a baseline improvement of 10% in TOC-on-Self delay for every TOC over the life of CP4. This has lead to a similar increase in National PPM to the original submission of 0.35% points.

Following the challenges laid out by the assessors and ORR, NR has also included two additional elements to the TOC contribution.

- An additional 0.14% points increase in National PPM to account for TOC-on-TOC delay savings. This calculation is based on the assumption that TOC-on-TOC delay tracks TOC (and FOC)-on-Self.
- An additional 0.05% points increase in National PPM through improvements to FOC-on-Self delay (which are assumed to reduce by 12.5%). This reduction is assumed to follow closer working between NR and the FOCs through the implementation of the Freight Performance Measure (as outlined in Section 5).

The overall TOC contribution is expected to now deliver 0.54% points improvement in National PPM, an increase of 0.20% points. This additional PPM benefit is recognised to be at NR's risk and if it does not deliver then they will have to find additional schemes to bridge the gap.

3.4.2 Summary of Assessors Review Findings

The challenge to NR has been to secure additional performance benefits from TOCs where these can be realistically targeted and where the costs of delivering such benefits is lower, overall, than costs of achieving similar performance benefits from NR. It is recognised that the risk of non-delivery, in the context of the HLOS targets, rests with NR as NR would be faced with identifying additional performance enhancing schemes to cover any TOC shortfall. However, NR accepts and ORR supports the view that a publicly funded organisation must secure the most cost effective solutions, from wherever these can be secured and however challenging these may be.

Whilst the assessors are minded to recommend that an additional marginal performance benefit be attached to TOC additional commitments, to reflect the contribution not yet secured following the review of the October SBP, they are also conscious that TOC on Self performance has generally been exceptional during CP3, and a significant further commitment is likely in CP4

for fleet remote condition monitoring (the N-FRIP project), which could require additional funding.

The assessors noted that NR have introduced a flat rate of 10% reduction in TOC-on-Self delays for all TOCs over CP4, rather than savings based on individual TOC plans, as assumed in the initial submission. The challenge to NR was to establish the extent that TOCs are likely to improve their performance beyond franchise commitments that were reflected in the SBP.

NR's rationale behind this change follows extensive consultation between the TOCs and NR. NR plans to develop Long Term Performance Plans with each TOC in the summer of 2008. In the meantime, NR has assumed the flat rate based on their view of the benefits from a number of TOC led initiatives (e.g. continued good management). The assessors note that this rate has not been accepted by each TOC, hence NR carrying the risk should each TOC not deliver as mentioned above.

It is noted that the overall impact on National PPM remains broadly the same under the new assumptions in the April 08 SBP Refresh as in the initial submission, indicating that the flat rate improvement applied is likely to have contained an element of "reverse engineering". Therefore, the outcome of the TOC challenge is that it has not uncovered any further benefit in terms of TOC-on-Self delay.

The additional benefit in terms of National PPM in the April 08 SBP Refresh compared to the Initial Submission is 0.2% points is driven by the inclusion of benefits to be derived from TOC-on-TOC and on FOC-on Self savings. The assessors welcomed the introduction of these additional measures in the NR Plan.

The introduction of a Freight performance measure is expected to provide a good platform to improving the level of delay on the network as a result of late running freight trains. The assessors recognise that the principles of this measure are only just being established, but agree with the benefits of this, particularly through encouraging the freight community to become more involved in cross-industry performance improvement measures.

In the circumstances, the assessors believe that the maximum potential benefit has therefore been factored into the NR calculations and no additional improvement can be reasonably expected.

3.4.3 Conclusion

The assessor's view is that 0.54% points improvement represents a reasonable assumption and no additional improvement can be sensibly expected. This represents a 0.2% points improvement on the original position.

3.5 Significant Lateness and Cancellations

3.5.1 Network Rail's Position

The table below shows the required improvement in Significant Lateness and Cancellations by Sector. This measure includes all trains that are more than 30 minutes late as well as full and part cancellations.

	2006/07 % of Trains	2013/14 % of Trains	% Reduction Required
LSE	2.62%	2.07%	**21%**
Regional	3.07%	2.24%	**27%**
Long Distance	5.99%	3.83%	**36%**

Within the baseline, Network Rail project to achieve the following reductions in significant lateness by sector during CP4:

- LSE: 19.8% (to affect no more than 2.10% of trains by 2013/14)
- Regional: 21.8% (to affect no more than 2.40% of trains by 2013/14)
- Long Distance: 23.7% (to affect no more than 4.57% of trains by 2013/14)

To help identify which schemes are likely to deliver the most benefits (and so where possible should be included in the baseline), NR has:

- Developed statistical relationships between delay savings and significant lateness savings based on analysis of historical data by Industry Period Performance Report (IPPR) category. This analysis indicates that the greatest savings in trains running significantly late or being cancelled would be achieved through schemes to reduce the number of incidents caused by bad weather, power supply failures (such as overhead line and 3rd rail faults), external events, points failures and fleet failures.
- Identified which events have led to more than 50 full cancellations over the past three years. This demonstrates that overhead line incidents are the most predominant with 61 major incidents in the past 3 years. This allowed NR to focus on the prevention or management of such major incidents, such as the inclusion of Great Eastern (GE) overhead line renewal within the base asset policy.

The remaining gap between the target and the funded position would then be filled via the non-funded items included in the basket of initiatives identified by NR, such as consideration of hot spares and "thunderbird" locomotives. According to the figures shown in Network Rail's models, as shown in the figures above, the size of the gap is:

- LSE: 0.03% points
- Regional: 0.16% points
- Long Distance: 0.74% points

Following consultation with the TOCs, NR has outlined concerns with respect to this measure. In particular, the concerns raised by NR following consultation with the TOCs surround the inclusion of cancellations within this measure, given that full and partial cancellations are an integral part of PPM. While this is less of an issue in the London and South East sector (since TOCs routinely 'step up' services to avoid significantly late trains), for more geographically dispersed TOCs, it is not so easy to step up services, and so one train will fail two separate measures. NR are unsure how this might effect TOCs behaviour with respect to service recovery. As a result NR are keen to work with NTF to ensure that the introduction of this measure into the industry achieves its aims without resulting in any potentially perverse behaviours.

3.5.2 Summary of Assessors Review Findings

The assessors recognise the challenge of achieving this target, particularly for the Long Distance sector. It is recognised that this is a new measure and as such a great deal of development work has been required by NR to calculate the forecast projections. It is also recognised that there are some concerns as raised by NR, but that the plans to set up an NTF sub-group to ensure that this target is introduced into the industry smoothly is entirely sensible as it is not clear how real these concerns would be in reality.

In validating the modelling behind this measure, the assessors are unable to match the numbers supplied within the SBP with the numbers included in the models supplied by Network Rail.

Firstly, the Significant Lateness figures for 2006/07 in the Consolidated Model supplied by NR differ from those included in the SBP and shown in the table in Section 3.5.1. The differences in this start point are summarised in the table below.

	2006/07 NR SBP Refresh	2006/07 NR Models
LSE	2.62%	2.63%
Regional	3.07%	2.91%
Long Distance	5.99%	6.16%

Based on the numbers in the NR model, this would indicate that the target position for Significant Lateness by the end of CP4 would be slightly different to that quoted in Section 3.5.1 based on the HLOS requirements. However, the assessor's calculate that this would make little difference to the size of the gap between the target and the funded position.

Secondly, the assessor's note that the calculated size of the gap between the target and the funded position in the Consolidated Model (and shown in Section 3.5.1) differs from that shown in the SBP and subsequently used for NR's analysis of baskets of initiatives to fill the gap in the Value for Money model.

For the Long Distance Sector, the size of the gap to reach the Significant Lateness target in the Value for Money model is 0.6% points. This is the figure used by NR to calculate the required additional funding. The

calculations by the assessor's based upon the NR Consolidation Model is that this gap is slightly higher at 0.74% points (as shown in Section 3.5.1).

3.5.3 Conclusions

The figures quoted in the SBP for Significant Lateness do not directly match those provided in the detailed workings from NR, as shown in Section 3.5.2 above.

The assessors have therefore taken the committed numbers from the SBP, which look reasonable, to represent the baseline position for Network Rail. The assessor's review of Network Rail's proposals for filling the gap between the target and the funded position for Significant Lateness is based on these committed values.

3.6 Do the Base Plans Deliver the HLOS?

3.6.1 Network Rail's Position

The April submission predicts that national PPM MAA will rise to 92.01% by the end of CP4 within the base spend. This would suggest a gap of 0.59% points from the HLOS requirement of 92.6%.

It is important to break this down against the individual sector targets as it is these that the DfT has set. They are:-

	Forecast	Target
LSE	92.3%	93.0%
Regional	91.79%	92.0%
Long Distance	90.61%	92.0%

These forecasts are based on the forecasts for each individual TOC from the predicted start point at the end of CP3. This clearly shows that the gap predicted for long distance operators is 1.39% points PPM MAA against only 0.21% points for regional TOCs.

3.6.2 Summary of Assessors Review Findings

As outlined in Section 3.1.2, the assessors believe that the assumptions behind the PPM improvements projected by NR during CP4 are reasonable in all categories with the exception of Maintenance and Renewals.

The assessors believe that NR have not stated the full benefits which they can expect to achieve from Maintenance and Renewals work over CP4, but simply the position which has been agreed to date with the Infrastructure Maintenance teams.

Analysis undertaken by NR following the April 08 Refresh indicates that an additional improvement in National PPM of 0.08% points could be achieved once NR meet the incident reduction commitments stated in the Refresh document. In the assessor's view, further benefits could be achieved through

NR meeting these commitments, plus the additional agreed benefits through signalling maintenance and renewals, as outlined in Section 3.1.2.

The assessment indicates that these can deliver additional improvements in projected PPM by Sector over and above that indicated in the April 08 Refresh. Table D below shows a comparison of the figures from the NR April 08 SBP Refresh compared with the assessor's view.

Table D: Comparison of NR and WPA view of April Refresh

	April Refresh (WPA View)				April Refresh (NR)			
	England & Wales	LSE	Regional	Long Distance	England & Wales	LSE	Regional	Long Distance
08/09	**90.6%**	**91.3%**	**90.1%**	**87.6%**	**90.6%**	**91.3%**	**90.1%**	**87.6%**
CORE INITIATIVES								
PROCESS	0.24%	0.21%	0.26%	0.32%	0.24%	0.21%	0.26%	0.32%
M&R	0.41%	0.35%	0.46%	0.72%	0.29%	0.25%	0.29%	0.65%
TIMETABLE	0.59%	0.51%	0.61%	1.08%	0.59%	0.51%	0.61%	1.08%
STOP	0.13%	0.14%	0.08%	0.19%	0.13%	0.14%	0.08%	0.19%
CONTROL	0.33%	0.32%	0.31%	0.51%	0.33%	0.32%	0.31%	0.51%
SUBTOTAL	1.70%	1.54%	1.73%	2.82%	1.58%	1.44%	1.55%	2.74%
RISKS	-0.86%	-1.08%	-0.52%	-0.57%	-0.86%	-1.08%	-0.52%	-0.57%
TOC	0.54%	0.47%	0.65%	0.69%	0.54%	0.47%	0.65%	0.69%
ENHANCE	0.14%	0.20%	0.03%	0.13%	0.14%	0.20%	0.03%	0.13%
SUBTOTAL	-0.17%	-0.40%	0.16%	0.24%	-0.17%	-0.40%	0.16%	0.24%
End CP4	**92.13%**	**92.41%**	**91.97%**	**90.69%**	**92.01%**	**92.31%**	**91.79%**	**90.61%**

This would indicate that the overall PPM MAA gap to bridge is 0.47% points, and at a sector level is:

- LSE - 0.59% points
- Regional - 0.03% points
- Long Distance - 1.31% points

While this closes the gap slightly, further initiatives are clearly required, in particular to address the Long Distance sector.

3.6.3 Conclusions

The assessors believe that the overall level of deliverable PPM without recourse to any additional funding is 92.13% PPM MAA and that the gap which needs to be bridged is not as high as NR have outlined in the April 08 SBP Refresh.

3.7 Proposals to Close any Gap

3.7.1 Network Rail's Position

Within the October SBP submission NR proposed a portfolio of schemes with which it intended to bridge the gap between what they believed was achievable within the OMR and the HLOS requirements. This portfolio consisted of over 40 schemes and was costed at £400m.

The initial assessment of these schemes highlighted that the value for money when measured against PPM delivery was highly variable. Some of the schemes were shown as having no cost and were subsequently absorbed into the base. Others showed a very poor return on a very high cost.

In the light of the revision of the base position NR re-visited the schemes which they believe could bridge the gap and offer the best value in terms of PPM improvement for the investment.

As a result of this work the original list of initiatives has been reduced to 15 schemes. Original schemes were dropped because:-

- They are now in the funded base e.g. higher quality Automatic Route Setting (ARS)
- Deliverability is likely to be difficult and not within strong NR control e.g. increased running speed past faults
- They were poor value for money e.g. motorised switches

The final list of schemes put forward is in Table E which is taken from the supporting evidence provided by NR[4]. This table gives a comparison between the benefits predicted in the October submission and the April Refresh by scheme and additional schemes that have also been considered. In brief summary the suggested schemes are:

- Autumn Management
  Improved methods of managing autumn/leaf-fall

- Reduced bridge strikes
  Bridge protection/warning systems at more locations

- Security
  Use of security teams at high risk sites to prevent vandalism/theft

- Mobile Operations Managers
  More MOMS at key locations to respond to incidents quicker to reduce delays once incidents have occurred

- Hot Spares
  Provision of standby train sets to mitigate delays at key locations

- Track renewals
  Additional track renewals ahead of engineering requirement to deliver improved performance

- Fencing
  Improved fencing at key sites to protect against vandalism

- RCM - Track Circuits/Points
  The use of remote condition monitoring equipment on critical track circuits and points to prevent failures

[4] Value for Money Performance Initiatives – Supporting Information for Strategic Business Plan NR, April 2008

- Thunderbirds
  Provision of additional emergency locos on key routes to quickly clear failed trains

- NFRIP - Best in Class MPC
  Fitment of on train monitoring equipment as part of an overall programme of improving the reliability of TOC train fleets

- UPS
  Fitting uninterrupted power supplies

- Level Crossings
  Use of attendants to prevent road accidents at high risk sites

East Coast OLE and North Cotswolds Doubling are described later in this section.

Table E essentially provides a list of the potential schemes that Network Rail has brought forward for consideration to fill the gap. This provides an example of the potential costs and benefits of each scheme for information purposes only. It should be noted that this does not represent a preferred basket of schemes put forward by Network Rail (these are shown in Table G of Section 3.7.2).

For clarity, the final column in this table shows the value for money of each scheme, measured as the cost in £millions of increasing National PPM by one percentage point.

The cost base in this table is different for the October 2007 initiatives compared to April 2008 initiatives. This is because the costs for the October 2007 initiatives were based mostly on national implementation, whereas the costs for the April 2008 initiatives are mostly directed in specific areas (for example, NFRIP for National Express East Anglia, Hot Spares at Birmingham New Street) and are provided in this table for illustration purposes only.

Table E: Comparison of Initiatives – October 2007 (mostly national) and April 2008 (mostly directed)

		October			April		
Initiative	**Ref**	**Cost (£M)**	**Benefit**	**£M/ PPM**	**Cost (£M)**	**Benefit**	**£M/ PPM**
Autumn Management	OCT	7	0.25%	20	7	0.05%	133
Reduce Bridge Strikes	OCT	5	0.03%	192	4	0.03%	163
Security	OCT	5	0.06%	82	23	0.09%	249
Mobile Operations Managers (MOMs)	OCT	50	0.03%	1,667	60	0.24%	254
Hot Spares	OCT	51	0.05%	929	3	0.01%	282
Track Renewals	OCT	28	0.05%	513	28	0.10%	292
Fencing	OCT	20	0.06%	329	4	0.01%	391
RCM – Track Circuits	OCT	100	0.13%	790	11	0.03%	335
RCM – Points					49	0.10%	463
Thunderbirds	OCT	50	0.03%	1,829	16	0.03%	519
NFRIP Best in Class mpc	NEW				18	0.09%	209
Universal Power Supply (UPS)	NEW				14	0.03%	517
Level Crossings	NEW				6	0.01%	836
East Coast OLE	NEW				31	0.01%	2243
North Cotswolds Line Doubling	NEW				64	0.04%	1639

In looking at the costs, NR have also looked at the levels of return on each initiative against the proportion of locations completed. This is designed to show how the VfM varies by spend and to enable them to gain the biggest benefit for the optimum spend. Table F gives an example of this for track renewals[5]. Autumn management and the MOMs initiative are both treated purely as a national requirement.

Table F: Diminishing Returns of Directed Track Renewal (Cost = £28M per 10%[6])

Worst Incident Sites	National PPM	£M / PPM
0% - 20%	0.10%	292
20% - 30%	0.05%	597
30% - 40%	0.04%	794

In producing a final cost for bridging the 0.59% point gap NR have looked at a mixture of baskets which using their VfM model gives the greatest return on investment. The preferred basket put forward suggests a total cost of £250m to achieve the HLOS punctuality targets and the significant lateness requirements.

[5] Figures taken from outputs from Network Rail's Value for Money Model – "VFM1 Analysis Consolidation" NR, April 2008

[6] Cost of Track Renewal based on an overall average of £250K per km, one km of track renewed per incident site and just over 100 sites per 10% of worst incident sites. NR Figures

However, this would leave two TOCs, First Great Western (FGW) and National Express East Coast (NXEC), still below 90% PPM at the end of CP4. The Secretary of State has placed importance on ensuring there are no TOCs significantly behind the HLOS targets and, whilst no firm definition was provided, 90% PPM has been taken to be a working assumption provided costs are not disproportionate.

To deliver 90% on both TOCs, NR has put forward 2 schemes. These are:-

OLE works on the ECML	£35m
North Cotswold Doubling	£51m
Risk for both schemes	£13m
	£99m

Note: These numbers were taken from the SBP, different numbers were quoted in other documents supplied although £99m was consistently quoted for both projects combined.

Both of these schemes give poor VfM results in the NR model on a national basis but offer more specific benefits to the target TOCs. The OLE scheme is designed to reduce the number of OLE incidents on the East Coast Main Line by 50% whilst the North Cotswold scheme is predicted to improve FGW long distance performance by 0.8% points and by 0.5% points on FGW as a whole (increasing PPM MAA to 90.1% from 86.6%).

3.7.2 Summary of Assessors Review Findings

The assessors have reviewed the extensive analysis undertaken by NR since the October SBP, and have noted that:-

- The original scheme list has been re-worked against value for money criteria (VFM), as recommended following the October review
- Various groupings of initiatives have been formulated – NR terms these groupings as "baskets" – to test a range of cost and benefit scenarios
- Poor value for money schemes, those with little or uncertain performance benefit and those which now fall into the funded base, have been excluded from the "baskets"
- NR have concluded that there is a 'best' option based on VFM criteria – derived from the scheme list of 15 initiatives shown in Table E – although several baskets generate broadly similar costs and benefits

The assessors note, however, Network Rail admittance that there is a high degree of uncertainty around the associated costs, benefits and deliverability of a number of the schemes put forward. In particular, there are concerns surrounding Bridge Works, Universal Power Supply, Security, Manned Level Crossings, Fencing and Autumn Management which increases the risk that these schemes can deliver the required benefit for the costs supplied. Benefits are estimated based on focusing on sites with highest delay first, while costs are based on the likely extent of work at an average site multiplied by a unit cost.

In respect of deliverability, the assessors have observations on 3 of the schemes:-

- Security - the practical application and implementation of any initiative to 'guard' the railway and provide a human deterrent to thieves and vandals, will be difficult and is likely to be the least robust scheme in terms of predictability of benefits. Whilst the logic of patrolling the worst 10% of sites is sound, an outcome may be displacement of activity to other sites – even if these new sites were less damaging from a performance perspective, the benefits of the scheme may not be as high as claimed.
- Hot Spares – the practical application of this initiative will require very detailed discussion with TOCs, and will have less certain benefits at multi-TOC locations where traincrew traction and route knowledge will be key issues. Similarly, the practical mechanics of when and how one TOC would provide contingency resources cover for other TOCs will require very clear understandings, if the benefits described are to be captured. Given the high costs of implementing this initiative, and the ongoing opex required to support it, the risks to performance achievement may be higher than currently anticipated.
- N-FRIP – whilst work is acknowledged to be in its infancy, the scope of this project is not currently clear, and the assessors have sought assurances that the costs and benefits are properly aligned against an appropriate project scope. NR have recognised the difficulties in managing such a project and are proposing to look at pilot TOCs to implement the project chosen on the basis of likely impact and deliverability. The anticipation from NR is that they would initially fund a

small directed initiative to work through the contractual matrix implications and ensure that the desired benefits are being realised. The 'project by project' gateway to funding is intended to ensure that they can either increase or decrease the funding directed towards the fleet challenge depending on the success of the project. It is expected that this arrangement will encourage NTF to continue their good work in seeking performance improvement through benchmarking, process change and management focus.

As stated in 3.6.3 the assessors view is that the gap is smaller than put forward by NR. It therefore follows that the funding required to bridge the gap should be lower. However, because of the way NR have presented the initiatives in baskets it does make it difficult to specify what schemes would close the gap and at what cost. NR are seeking a flexible solution to allow them to best target spend at schemes which prove themselves through pilots. The additional concern over the uncertainty of the costs, benefits and deliverability of some of these schemes adds to the risk that they can deliver the benefits required under the HLOS, and makes it difficult to fully validate.

The assessors have looked in detail at the baskets produced by NR to bridge the gap. By producing an alternative set of baskets using the VfM model supplied by NR, the original NR gap could be bridged for £197m using the data provided. This analysis also shows that about 15% of the costs are required to bridge the significant lateness gap. A number of initiatives in this table are included in the baskets since they have a significant effect in helping to meet the significant lateness gap (for example, N-FRIP on Northern).

The cost of meeting the HLOS against the smaller gap predicted by WPA is £177m. This is shown in more detail in Table G, which gives the schemes included in each of the 3 baskets.

Table G: **WPA view of costs**

Initiative	Where	Cost	NR Preferred Basket	WPA View (NR Gap)	WPA View (NR Gap)
Bridge Strikes	0% - 10%	4,419,600	1	1	1
Fencing	0% - 10%	4,464,448	1		
Hot Spares	Birmingham New Street	3,000,000		1	
Hot Spares	London North East	3,000,000		1	1
Hot Spares	London South East	3,000,000	1	1	
Hot Spares	Manchester	3,000,000	1	1	1
Hot Spares	National	7,000,000	1	1	1
MOMs	National	60,268,750	1	1	1
N-FRIP	Arriva Trains Wales	6,581,197		1	1
N-FRIP	Cross Country	5,299,145	1	1	1
N-FRIP	East Midlands	1,880,342	1	1	1
N-FRIP	First Great Western	9,743,590	1	1	1
N-FRIP	Northern Rail	15,811,966	1	1	1
N-FRIP	NXEC	2,905,983	1	1	1
N-FRIP	One	17,948,718	1	1	1
N-FRIP	Southeastern Trains	22,564,103	1		
N-FRIP	Southern	20,683,761	1		
N-FRIP	Transpennine Express	3,333,333		1	1
N-FRIP	Virgin West Coast	3,760,684		1	1
N-FRIP	West Midlands	9,401,709	1	1	1
RCM – Trk Circuits Base – 20%		11,209,512	1		
Security	0 – 10%	22,741,440	1	1	1
Track	Base – 20%	28,224,875	1		
UPS	0% - 10%	14,381,460		1	
Total Cost (£m)			250.57	197.48	177.10

The "where" column in the table indicates either the specific locations or TOCs where the scheme would be implemented or the percentage of sites to be tackled.

Of the figures within the table it is worth noting that the WPA view of purely achieving the PPM HLOS would be approximately £150m whilst the NR cost would be around £170m based on the £197m column.

It is also worth noting that the schemes included in the assessors' basket are particularly focused on those that Network Rail believe are more clearly defined (with the notable exceptions of Bridge Strikes, Security and Autumn Management which also appear in Network Rail's preferred basket). It is also important to note that as with the NR preferred basket the WPA basket is indicative and may look different in practice.

A large proportion of the cost in each basket (circa 40%) is the N-FRIP initiative since, according to Network Rail's model, this provides very good value for money compared to other initiatives. However, as mentioned above, there is a high degree of uncertainty over this scheme, as the scope of this project is not currently clear. The benefits from this scheme have simply been taken from ATOC estimates of how delay minutes by TOC change. Until the project is clearly scoped, it is difficult to validate the full benefits of this initiative. Whilst the scheme undoubtedly has merits and would build on a proven industry success it is not possible for the auditors to state it will deliver the required benefits for the suggested costs. A more appropriate step may be to fund the initial pilot to verify likely benefits whilst a more definitive business case is produced.

The main differences between the NR preferred basket and the WPA basket, providing a projected saving of £50m are:

- The majority of the PPM and Significant Lateness gap for the Long Distance sector is filled via NFRIP schemes and Hot Spares as opposed to Track Renewals. Introducing NFRIP on Virgin West Coast and Transpennine Express, and Hot Spares at Birmingham New Street and London North East provides similar benefits for this sector for £15m less than using track renewals.
- NFRIP introduction for South Eastern and Southern was replaced with NFRIP introduction on Arriva Trains Wales (the most cost effective scheme in terms of National PPM). This leads to a projected saving of £37m. The suggested NR schemes over deliver against the required PPM improvements whilst the use of ATW will deliver the required benefits including significant lateness. This shows that, based on the NR model, £37m of cost was suggested which is not required to deliver the HLOS.

The requirement to ensure no TOCs are left significantly adrift of the overall HLOS is clearly important. NR have supplied figures which suggest that NXEC will achieve 89.9% PPM without the additional funding whilst FGW will achieve 89.6%. The question of whether this gap is significant is a matter of judgement given the £99m cost of rectifying it.

In respect of the two schemes to deal with performance issues at FGW and NXEC, the assessors felt that:-

- The performance benefit deriving from the North Cotswold doubling scheme appears high. The calculations were based on existing general performance levels on FGW and whilst it will create a robust network it won't tackle the causes of late presentation on the route.
- The quoted North Cotswold scheme costs appear to be on the low side for a scheme of this magnitude.
- The OLE scheme on East Coast Main Line (ECML) is a logical improvement borne out by recent very disruptive OLE incidents on the route.

The chosen ECML scheme, albeit the least expensive of the suggested options for mitigating the impact of OLE failures on the route, still only leads to a 50% reduction in OLE incidents. The funding required to deliver improved infrastructure appears to be excessively high, especially as there will be considerable funding available in the base settlement for such works. NR should be advised to consider improvement by other means, for example introducing an inspection regime aimed at preventing incidents not simply complying with current standards.

3.7.3 Conclusion

The assessors conclude that:-

- Overall, the initiatives described are a logical and reasonable suite of plans for achieving the necessary performance improvement
- The use of the basket approach by NR has made it difficult to be definitive about the likely cost/benefit relationship of any given combination of schemes as described by NR
- In any of the baskets, including the assessors suggested alternative, the biggest benefits come from the N-FRIP proposal which is as yet not fully defined making any definitive view on costs difficult
- Based on the VfM model the WPA view on the cost to fill the gap between the forecast of OMR spend and the HLOS is £177m not the £250m put forward by NR. This excludes any wider view from ORR on the application of general efficiency savings and is based entirely on the costs put forward by NR
- The deliverability of some of the initiatives remains doubtful at this stage, and the risks to implementation must be considered to be high
- More detailed work is necessary to scope the N-FRIP project to validate the extra benefits of this scheme
- Further work is needed to validate the benefits and costs of the two schemes to improve performance on FGW and NXEC.

4. Scotland

4.1 Delivery of the HLOS within the OMR Expenditure

4.1.1 Network Rail's Position

The HLOS requirement for Scotland is 92.0% PPM MAA by the end of CP4. Performance in Scotland has been on an upward trajectory for the last four years and the 08/09 JPIP is targeting delivery of 90.6% by the end of CP3. This means that to deliver the HLOS performance must improve by 1.4% points.

Within the base OMR spend NR are proposing a similar grouping of actions as in the rest of the UK to improve performance.

- Management and process requirements (0.26% points)
  This includes the benefits of benchmarking maintenance areas in England & Wales as the Operation Flagship initiative targeting punctuality on the vital Glasgow to Edinburgh route.

- Renewals (0.10% points)
  This is the benefit gained in performance terms from the funded renewals programme in Scotland and will include the impact of removing PSRs and linespeed improvements following engineering Line of Route Reviews.

- Timetable (0.24% points)
  The implementation of the new train planning systems and the reviews of timetable robustness are seen as critical in delivering 92%. Both are expected to have a significant impact although NR does report that the TfS scheme for reduced journey times has, on occasions, clashed with the plans for most robust timetables.

- Enhancements (0.10% points)
  This is the predicted performance benefit from the enhancement schemes in Scotland. See section 4.3 for more details.

- TOC Improvements (0.35% points)
  Both NR and First ScotRail are forecasting a 10% reduction in TOC on Self delay minutes during CP4.

- Stop It (0.30% points)
  A similar set of initiatives is proposed to those for England & Wales looking at:
  - Remote condition monitoring
  - Improved drainage at high risk sites
  - Improvements to fixed telecoms network
  - Improved patrolling methods

- Control It (0.25% points)
  Again a similar set of proposals designed to mitigate delays, including:
  - More and better infrastructure access points
  - Improved ARS and signaller aids
  - Better decision tools in controls

- Better contingency planning and scenario testing

This programme is a forecast therefore to deliver a total improvement of 1.6% points PPM MAA during CP4.

In calculating the final PPM forecast NR have applied a risk impact of -0.20% points which is covered in Section 4.2.

4.1.2 Summary of Assessors Review Findings

Performance in Scotland has shown strong improvement over the last 2 years and there is a good deal of evidence of a strong working relationship between ScotRail and NR that has underpinned this. This means that the level of improvement required to deliver the HLOS is expected to be 1.4% points PPM MAA by the start of CP4, a good deal less than some of the challenges elsewhere in the UK.

That said the strategy adopted by NR is similar to England & Wales with specific Scottish initiatives added.

The timetable in Scotland does have known issues and the full review forecast to produce error free and a more robust design should have a significant impact. The issue for NR will be delivering this against a background of expansion and the desire for faster journey times. These are not necessarily incompatible needs and actually reinforce the need for a robust, deliverable timetable.

The use of benchmarking from other routes within NR is important and Scotland must be able to both benefit and contribute to this work. The move towards initiatives like Operation Flagship, a scheme designed to improve performance on the critical Edinburgh to Glasgow route is very important. Evidence of the impact of similar joint NR and TOC performance projects such as Challenge 90 on NXEA and Right Time Railway on SWT show that concerted joint focus does produce excellent results.

The suite of prevention and mitigation actions are all sensible initiatives. It is important that these are fully reflected within the LTPP and the JPIPs to ensure there is a focus on delivery. By the nature of the initiatives they will have very different delivery lead times but it ought to be relatively simple in Scotland to manage them through to conclusion.

4.1.3 Conclusion

The assessors conclude that, given current performance trends and the relative size of the challenge, the level of delivery forecast within the OMR looks achievable at 92% PPM MAA.

4.2 Identification of Risks

4.2.1 Network Rail's Position

Within the plan NR have assessed the risks to delivering 92%. As a result they have concluded that passenger growth in Scotland will lead to a -0.2%

points PPM MAA impact through increased dwell times at stations and a subsequent growth in sub-threshold delay.

They also raise other performance risks but they do not include any negative impact. In the case of weather this is because increased focus on mitigating its impact and other factors, such as infrastructure and rolling stock investment, have not yet been assessed and therefore are assumed to have no effect post any mitigation.

4.2.2 Summary of Assessors Review Findings

The impact of passenger growth is based on the effect of higher passenger volumes. This is based on the likely growth expected during CP4 and the analysis NR has done on the effect of passenger volumes on dwell times at stations. On the analysis seen this looks to be a reasonable forecast.

However, unlike in England & Wales, NR has not put in any risk impact for engineering work. The assumption appears to be that any schemes within Tier 1, 2 or 3 will be performance neutral. If this is to be achieved the planning for each scheme would need to fully mitigate both the risks of reduced infrastructure availability and of overruns. The one major difference with schemes elsewhere in the UK is that a significant proportion involve construction away from the existing infrastructure such as Glasgow Airport Rail Link (GARL) or the Borders route. The electrification of Edinburgh/Glasgow/Dunblane is discussed but the level of risk has not been quantified as the project is not yet sufficiently developed.

The other noteworthy area of risk for Scotland is weather related incidents. There are currently 2/3 days per annum with severe weather impact involving flooding, landslips or high wind problems. NR is planning to improve drainage management and its contingency arrangements to mitigate this but there is the obvious possibility that these days could increase. NR's current assumption is on balance the correct one, but it must continue to work with the TOCs in Scotland to improve both the prevention of incidents (better drainage, management of lineside trees at risk from high winds etc.) and how they respond when incidents occur.

4.2.3 Conclusion

The fact that there is no risk factor for the engineering programme in Scotland is a little surprising so NR must therefore ensure each scheme has a robust plan.

That said the overall risk factor of -0.2% points PPM appears to cover the other key issues and is appropriate in finalising the forecast for Scotland.

4.3 Benefits from Enhancement Spend

4.3.1 Network Rail's Position

As already stated in 4.1.1 the impact of enhancement schemes is expected to be 0.1% points. This assumes the delivery of Tier 1 schemes within the base forecast and the main enhancement benefit coming from GARL.

The impact of all the other HLOS Tier 2 schemes has been assumed as neutral. This includes Airdrie to Bathgate and the Scottish Borders Railway. All of these schemes are about traffic growth and have the potential to actually reduce PPM without clear specification and planning. The NR assumption is based on this requirement being successfully undertaken.

No effect is modelled for Tier 3 schemes which are at an earlier stage of development and the implementation dates are unclear.

4.3.2 Summary of Assessors Review Findings

The delivery of the HLOS Tier 1 schemes is assumed within the 92% PPM MAA target. This includes the completion of works at Waverley, Stirling-Alloa and Kilmarnock Half Hourly.

Within the NR spreadsheets the 0.1% points PPM improvement is shown to come from the delivery of GARL part of the Tier 2 HLOS schemes. This is based on an expectation that service delivery forecasts are as high as 97.5% PPM which given the number of trains planned would have a measurable impact on Scotland PPM.

Due to the level of development all of the other Tier 2 and Tier 3 schemes are currently treated as having a neutral effect on performance. Whilst this is a reasonable assumption to make at this point, it will be very important to fully understand the impact of each scheme as early as possible. This is closely linked to the comments on risks in section 4.2.2. These projects clearly represent both a major opportunity and a risk to the delivery of 92% PPM

4.3.3 Conclusion

The assumption looks sensible at this moment but NR, the TOCs and TfS must look at the impact of individual schemes within the enhancement programme in Scotland as soon as practical to identify both upside and downside.

4.4 TOC Contributions

4.4.1 Network Rail's Position

The TOC contribution is predicted to be a 10% reduction in delay minutes over the control period. This is the same as the rest of the UK but unlike elsewhere First ScotRail are stated to believe this is a reasonable assumption. This will give a 0.32% points improvement in PPM MAA.

4.4.2 Summary of Assessors Review Findings

The improvement forecast is a mixture of reduced TOC on Self delay and a continuing improvement in TOC on TOC.

First ScotRail has consistently improved its performance and believes the NR target is based on a reasonable set of assumptions. This is supported by the assessors.

The reduction in TOC on TOC is expected to come partly from the improvements in the long distance operators and continuing work with freight operators in Scotland.

Specific initiatives such as area JPIPs and the improvements in timetabling will also help contribute.

4.4.3 Conclusion

The forecast of 0.35% points improvement in TOC led initiatives appears valid based on the levels of current delivery and the plans described.

4.5 Do the Base Plans Deliver the HLOS?

4.5.1 Network Rail's Position

The NR position in Scotland is that they will achieve 92.0% PPM MAA by the end of CP4. This position is broadly supported by First ScotRail and therefore means that NR has not requested any additional funding in Scotland.

4.5.2 Summary of Assessors Review Findings

Based on the submission the assessors would concur with the fact that 92.0% PPM can be delivered in the base with one caveat. As already stated, the impact of Tiers 2 and 3 HLOS schemes is still poorly understood. This is inevitable given the current level of development but it is important to improve this level of understanding as quickly as possible.

4.5.2 Conclusion

Current performance in Scotland is ahead of the NR forecasts. ScotRail achieved 90.6% at the end of 2007/8 and the current JPIP is seeking to achieve in excess of 91% by the end of 2008/9. This suggests that the delivery of 92.0% PPM MAA is readily achievable from the base OMR settlement

4.6 Proposals to Close any Gap

4.6.1 Network Rail's Position

NR are not seeking any additional funding in Scotland.

4.6.2 Summary of Assessors Review Findings

Based on earlier comments the assessors concur there is no requirement for additional spending. It is worth noting however that some of the proposals NR have put forward in England & Wales have potential benefits in Scotland. Autumn management and additional MOMs have been treated as national initiatives and certainly in the case of the former should have an impact in Scotland. NR should review this to assess the impact.

4.6.3 Conclusion

No additional schemes requiring funding are necessary in Scotland to deliver the HLOS targets.

5. FREIGHT

5.1 Network Rail's Position

ORR invited NR to propose a delay minute improvement trajectory for freight traffic for CP4. In response NR has engaged with the industry's freight operators, with a view to:-

- Establishing an appropriate operating framework for freight which would allow both freight operators' performance targets to be met and minimise the performance impact of freight trains on passenger TOCs.
- Agreeing the measures for freight performance which adequately reflect network and infrastructure delay to freight services

The review has considered different methods of measuring the performance of freight and how best to use this to encourage all parties to drive improvement. This looked at the use of velocity as a measure, effectively the relative speed of services across NR but whilst not being dismissed this is not proposed for adoption currently.

Instead NR alongside the freight operators proposes to introduce a Freight Performance Measure (FPM) which would work on similar principles to PPM. There has been a wide ranging industry debate on what the threshold should be with the initial proposal being within15 minutes. However, it was felt that 10 minutes offers a better fit with the rest of the industry.

To ensure the measure focuses on network performance the measure will exclude starting lateness, usually referred to as yard delay. Yard delay dominates freight delay and is often due to awaiting customers to load/ unload wagons. By excluding this factor, the measure will focus on train running. NR and EWS have recognised the importance of continuing to manage yard delays which do have a major impact on performance

Using the new measure NR have predicted that EWS performance would currently be at about 85% FPM MAA. They are currently predicting reducing NR delay minutes on freight by 25%. The prediction currently is that this will improve FPM for EWS to 86.4% (no figure is available currently for other operators). An additional 12.5% improvement in FOS minutes would improve this further to 86.74% (see chart IV in section 6).

NR have also as requested produced a freight delay minute trajectory which is shown in Table J and Chart III in section 6.

5.2 Summary of Assessors Review Findings

The assessors consider this work to be a positive and welcome development. The devised measures appear both appropriate and relevant. The use of a 10 minute threshold in line with the passenger operators is sensible and allows meaningful comparisons. The exclusion of yard delay is sensible but it is important that everyone continues to focus on the importance of right time presentation.

The work now needs to expand to all freight operators to ensure a full sector trajectory is produced.

The delay minute trajectory looks sensible and NR should complete this work alongside the development of the FPM.

5.3 Conclusion

The proposed measure for freight performance represents a significant step forward for the industry. A trajectory based around the new FPM 0-10 measure is fully supported and NR should complete the work to propose a final sector trajectory. NR should also complete the work in producing the required delay minute trajectory.

6. TRAJECTORIES

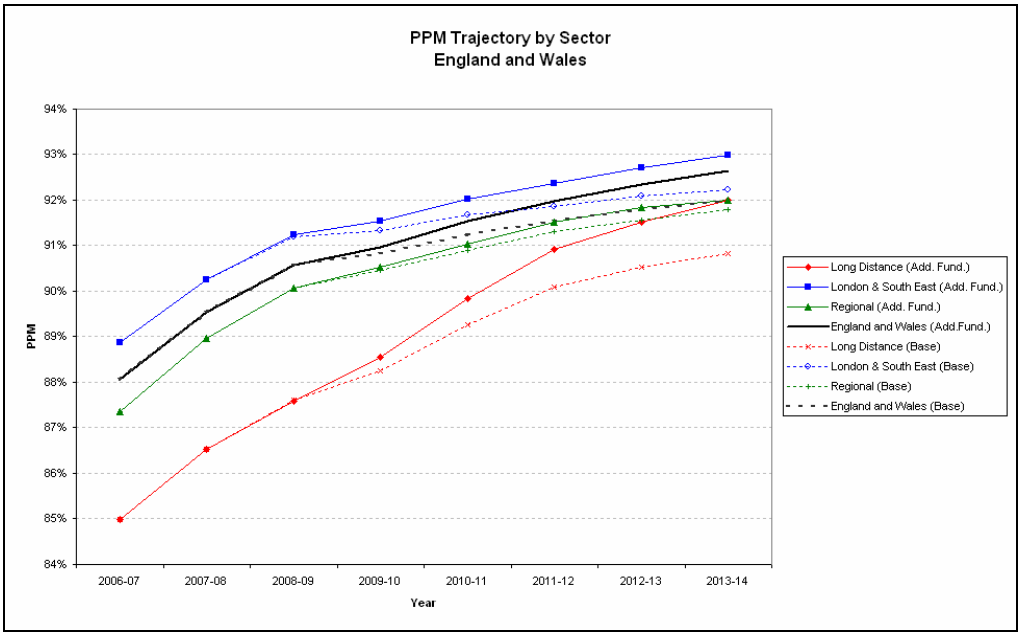
6.1 PPM

Network Rail provided PPM trajectories for CP4 to each TOC. The last two years of CP3 (2006/07 and 2007/08) are shown for comparison. Table H and Chart I show these trajectories at a Sector level, along with the England and Wales trajectory. Trajectories are shown both for the Base Case, and with Additional Funding.

Table H: PPM Trajectory by Sector: England and Wales

	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
Baseline								
Long Distance	85.0%	86.5%	87.6%	88.3%	89.3%	90.1%	90.5%	90.8%
London & South East	88.9%	90.3%	91.2%	91.3%	91.7%	91.9%	92.1%	92.2%
Regional	87.3%	89.0%	90.1%	90.5%	90.9%	91.3%	91.6%	91.8%
England & Wales	**88.1%**	**89.5%**	**90.6%**	**90.8%**	**91.2%**	**91.6%**	**91.8%**	**92.0%**
Additional Funding								
Long Distance	85.0%	86.5%	87.6%	88.6%	89.8%	90.9%	91.5%	92.0%
London & South East	88.9%	90.3%	91.2%	91.5%	92.0%	92.4%	92.7%	93.0%
Regional	87.3%	89.0%	90.1%	90.5%	91.0%	91.5%	91.8%	92.0%
England & Wales	**88.1%**	**89.5%**	**90.6%**	**91.0%**	**91.5%**	**92.0%**	**92.3%**	**92.6%**

Chart I: PPM Trajectory by Sector: England and Wales



Network Rail's view is that the trajectories tend to be front-end loaded due to:

- TOC Improvements: Franchise commitments tend to be front-end loaded and so TOC on Self savings for new franchises are seen early
- Timetable Change: Error free timetables should be delivered within the first two years, while realistic timetables begin in 2010/11 due to planning cycle and need for work before timetable change is committed to

- Local Improvement Schemes: These are front-end loaded since Network Rail want to deliver performance improvement as rapidly as possible

On the other hand, Enhancements are Back-end loaded since enhancement work is still going through GRIP stages.

The LSE sector is impacted in 2009/10 by the Thameslink program. The Long Distance sector improvements in 2010/11 and 2011/12 are driven by a number of schemes coming live, including timetable improvements, full benefits of the West Coast Mainline modernisation, the beginning of improvements from seven day railway, OLE improvements on the East Coast Mainline, the Cotswolds enhancements (the latter two partially explaining the difference in the two Long Distance trajectories after 2010/11.

The assessors conclude that these trajectories are based on reasonable assumptions. In coming to this conclusion the assessors were of the view that the changes suggested in this document to NR's initiatives and targets would not materially affect the trajectories throughout section 6. This is because the assessors have in general supported much of NR's work and the areas of difference are actually small in overall terms and certainly in producing a trajectory.

6.2 Delay Minutes

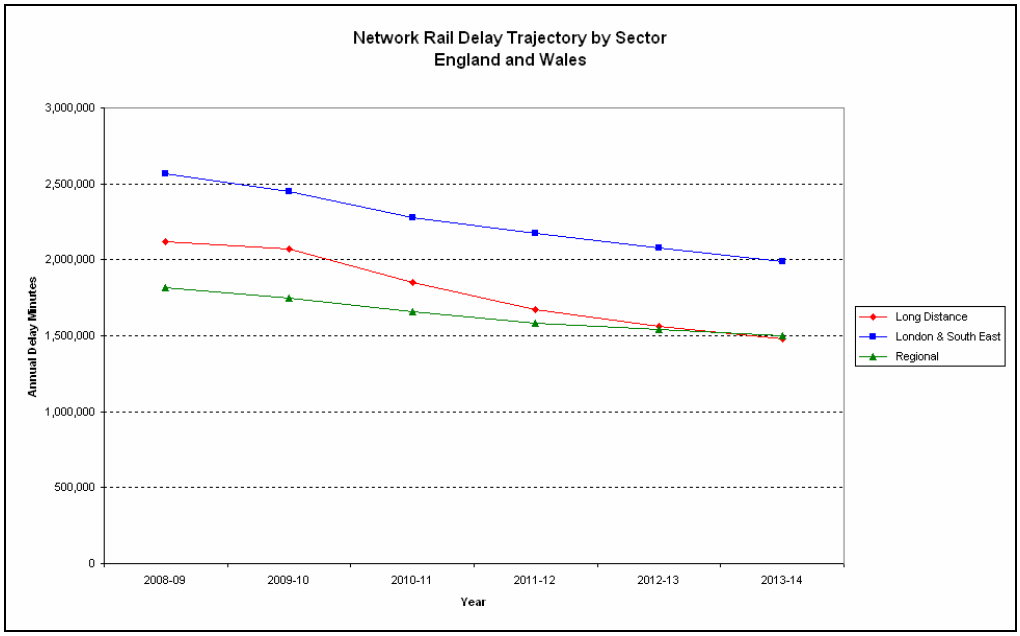
6.2.1 Passenger

Based on the data provided by Network Rail, the Network Rail delay minute trajectories for CP4 for each sector (with additional funding) are shown in Table I and Chart II below.

Table I: Network Rail Delay Trajectory by Sector: England and Wales

	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
Long Distance	2,117,455	2,071,067	1,850,232	1,668,658	1,564,240	1,477,051
London & South East	2,567,118	2,450,036	2,277,759	2,174,345	2,075,463	1,991,426
Regional	1,815,563	1,746,259	1,661,656	1,583,031	1,540,449	1,499,367
England & Wales	**6,500,136**	**6,267,361**	**5,789,647**	**5,426,034**	**5,180,153**	**4,967,844**

Chart II: Network Rail Delay Trajectory by Sector: England and Wales



The rationale behind the delay minute trajectories is the same as outlined in Section 6.1. The relationships between delay minutes and PPM have been derived from runs of the Long Term Performance model.

The assessors therefore conclude that these trajectories are based on reasonable assumptions. It is noted however, that the England & Wales trajectory does not exactly match that published in Appendix 15 of the SBP. The values shown in Table H are based on adding the individual Sector values, with the maximum difference in 2013/14 of just under 10,000 minutes (or 0.2%).

The assessors note that these trajectories are based upon the "preferred basket" of schemes as suggested by Network Rail. Based on the data provided by NR, the assessors calculate that approximately 600k of the total NR delay minutes savings from the above trajectories are a result of this basket of schemes. The NR delay minute savings from this basket makes up around 90% of the total minutes saving over CP4. This indicates that a change in the make-up of the basket to focus on more TOC schemes (i.e. NFRIP) would clearly reduce impact on the NR delay minute savings.

6.2.2 Freight

The trajectory for Network Rail freight delay minutes within CP4 is shown in Table J and Chart III. Table K shows the delay minute per 100 train km trajectory for freight.

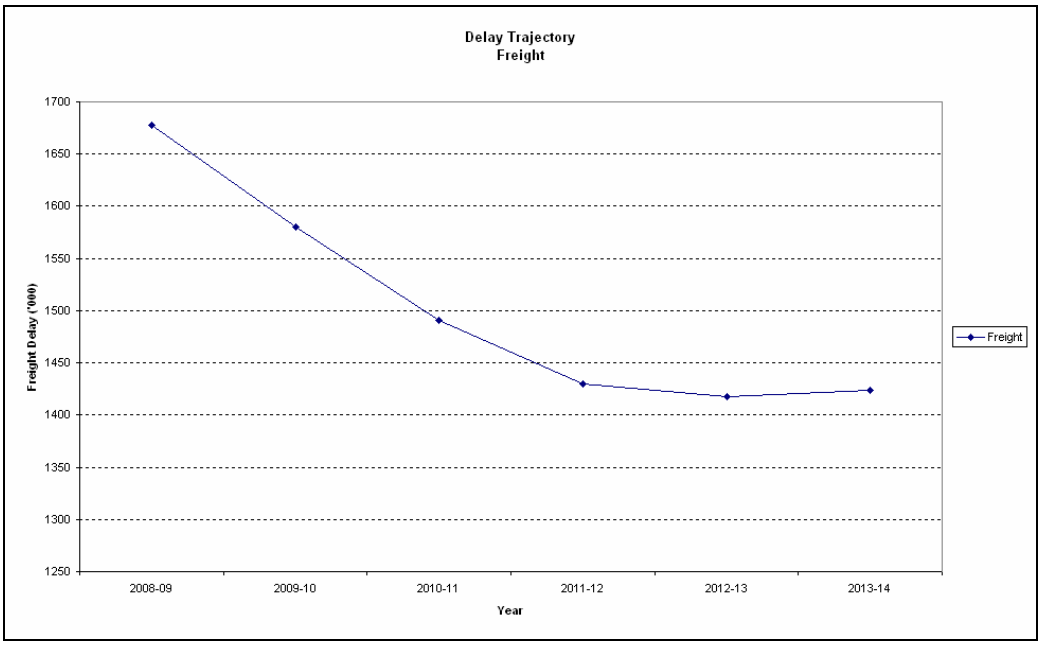
Table J: Freight Delay Trajectory

	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
Freight	1,677,876	1,579,709	1,490,518	1,429,566	1,417,663	1,423,807

Table K: Freight Delay per 100 km Trajectory

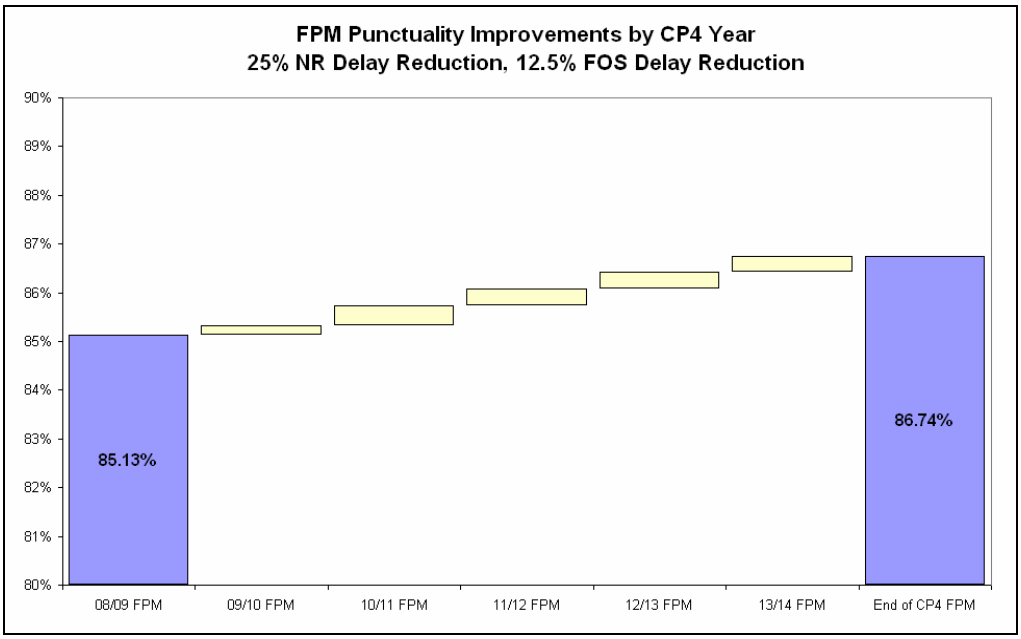
	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
Freight	3.92	3.68	3.41	3.18	3.05	2.94

Chart III: Freight Delay Trajectory



The FPM trajectory for freight within CP4 is shown in Chart IV.

Chart IV: FPM Trajectory: Freight



The FPM measure is based on T-10 punctuality and NR have confirmed that the trajectories above are calculated based on:

- A 25% improvement in NR delay minutes throughout CP4. This improvement is driven by the same schemes that deliver passenger benefits. This has been modelled by NR as:
    - A 2% reduction in freight delay minutes per 100 train km in the first year; and
    - A 6% reduction in freight delay minutes per 100 train km for each year of the remainder of CP4.
- A 12.5% improvement in FOS delay.

The assessors note that overall delay minutes plateau over the final two years of CP4 which is believed to be due to a) the benefits from some front-end loaded initiatives (affecting FOS delay) have been realised, and b) train kms are assumed to increase over CP4 (as shown in Table L).

Table L: Assumed Percent Change in Freight Train KM per Year

	2009-10	2010-11	2011-12	2012-13	2013-14
Percent Change In Freight Train km	0.1%	2.0%	2.8%	3.5%	4.3%

With the exception of the information shown above, NR did not provide any further detailed information surrounding the calculations of these trajectories. Based on this limited information, the assessors believe that these trajectories appear plausible. However, NR need to complete their work with the freight companies to finalise the trajectory.

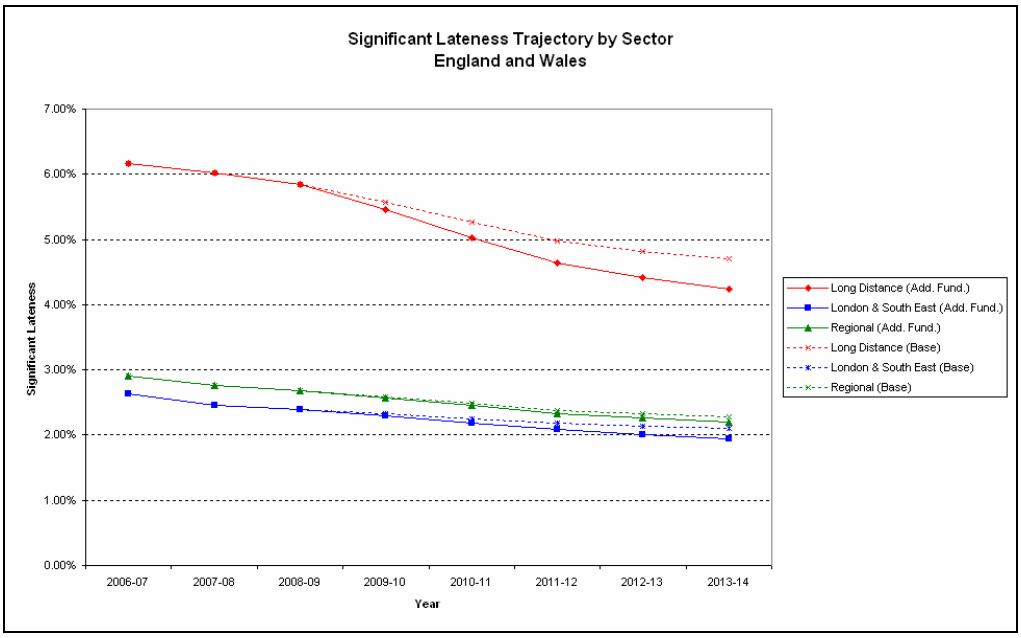
6.3 Significant Lateness and Cancellations

Based on the data provided by Network Rail, the significant lateness and cancellations trajectories for CP4 by sector are shown in Table M and Chart V. Trajectories are shown for Base Case, and with Additional Funding.

Table M: Significant Lateness Trajectory by Sector: England and Wales

	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
Baseline								
Long Distance	6.2%	6.0%	5.8%	5.6%	5.3%	5.0%	4.8%	4.7%
London & South East	2.6%	2.5%	2.4%	2.3%	2.3%	2.2%	2.1%	2.1%
Regional	2.9%	2.8%	2.7%	2.6%	2.5%	2.4%	2.3%	2.3%
England & Wales	3.0%	2.9%	2.8%	2.7%	2.6%	2.5%	2.4%	2.4%
Additional Funding								
Long Distance	6.2%	6.0%	5.8%	5.5%	5.0%	4.6%	4.4%	4.2%
London & South East	2.6%	2.5%	2.4%	2.3%	2.2%	2.1%	2.0%	1.9%
Regional	2.9%	2.8%	2.7%	2.6%	2.5%	2.3%	2.3%	2.2%
England & Wales	3.0%	2.9%	2.8%	2.6%	2.5%	2.4%	2.3%	2.2%

Chart V: Significant Lateness Trajectory by Sector: England and Wales



As with the PPM trajectories, the greater benefits come in the earlier years of CP4 due to a number of key initiatives being front-end loaded. The assessors conclude that these trajectories are based on reasonable assumptions.

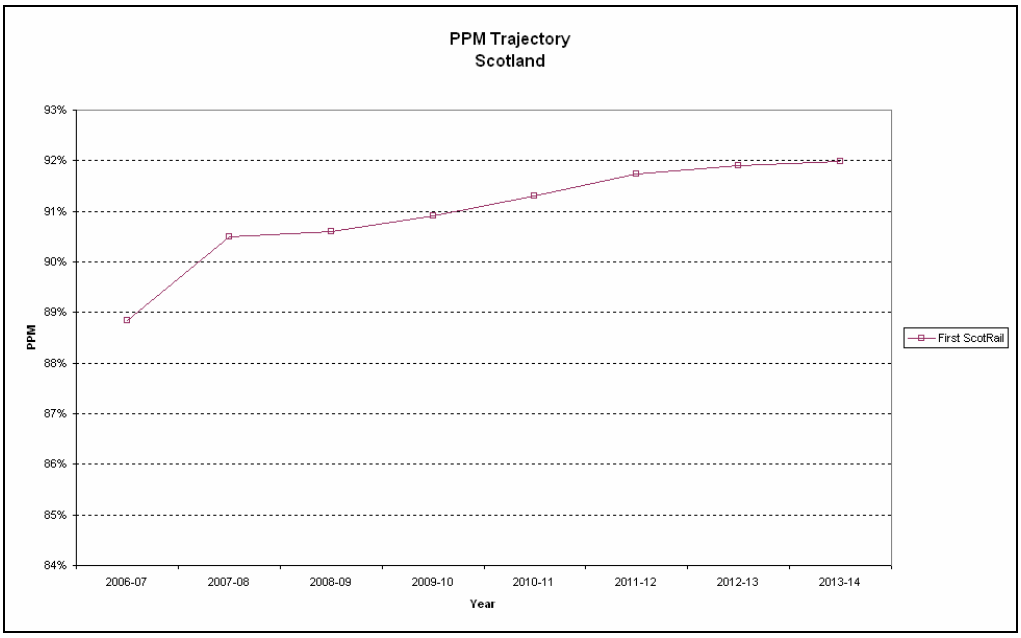
6.4 Scotland

Table N and Chart VI shows the PPM trajectory for Scotland.

Table N: PPM Trajectory: Scotland

	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
Scotland	88.8%	90.5%	90.6%	90.9%	91.3%	91.7%	91.9%	92.0%

Chart VI: PPM Trajectory: Scotland



Network Rail note that there has been a sustained improvement in PPM over the past few years (including the first year on the above chart). Therefore the remaining gap to get to 92% is fairly narrow.

Similarly to the rest of the UK, a number of initiatives are to be introduced early in CP4, which is the reason for the sharper increase in the trajectory in the earlier years. These include:

- Timetable Changes: A rewrite of the timetable in Scotland to provide both performance and service benefits should be delivered early in CP4
- TOC Improvements: TOC-on-Self savings are seen early in Scotland
- Other Stop It schemes such as RCM and Patrolling efficiencies will deliver PPM benefits in the first three years of CP4

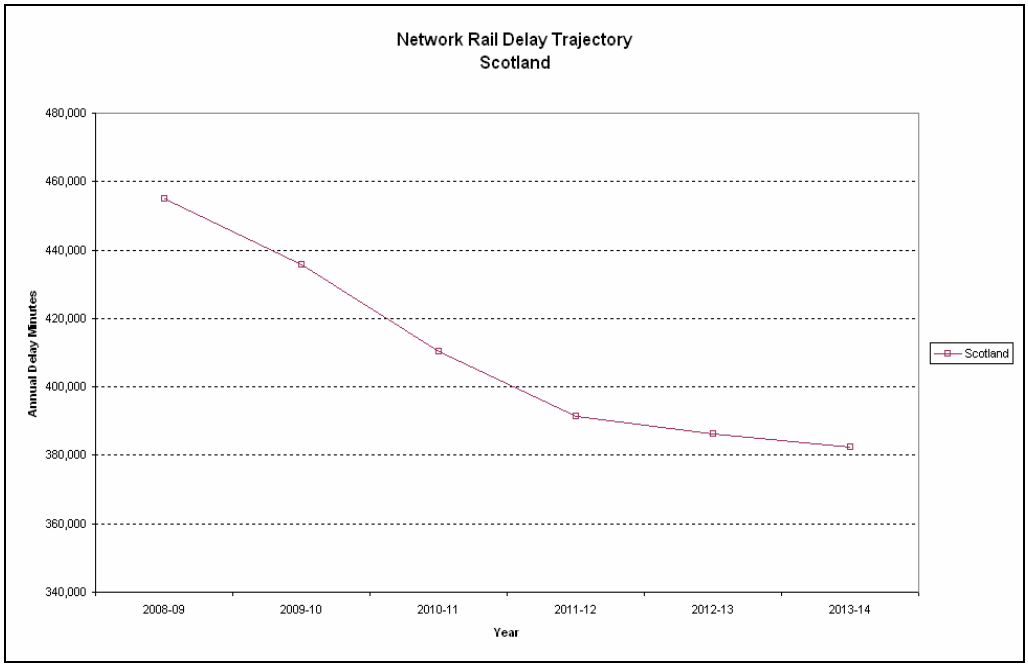
In the assessor's view, this trajectory is based on reasonable assumptions.

Table O and Chart VII shows the Network Rail Delay Minutes trajectory for Scotland.

Table O: Network Rail Delay Minutes Trajectory: Scotland

	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
Scotland	455,000	435,715	410,446	391,368	386,183	382,360

Chart VII: Network Rail Delay Minutes Trajectory: Scotland



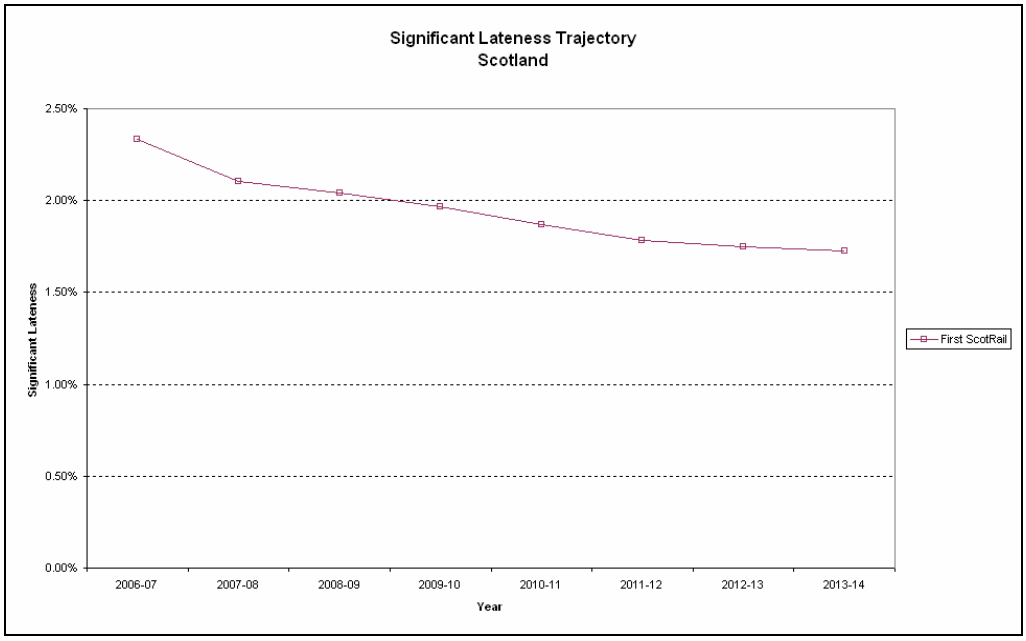
The pattern of the delay minute trajectory is similar to that for PPM and in the assessor's view is therefore based on reasonable assumptions.

Table P and Chart VIII shows the Significant Lateness trajectory for Scotland.

Table P: Significant Lateness Trajectory: Scotland

	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
Scotland	2.3%	2.1%	2.0%	2.0%	1.9%	1.8%	1.8%	1.7%

Chart VII: Significant Lateness Trajectory: Scotland



The initiatives as indicated above with respect to PPM improvements also have a benefit on Significant Lateness and Cancellations in the earlier years of CP4, thus explaining the reason for this trajectory tailing off towards the end of the period. In the view of the assessors, this trajectory is based on reasonable assumptions. The assessors note that these trajectories are based upon the "preferred basket" of schemes as suggested by Network Rail.

Appendix A: Network Rail Models

This appendix provides a brief description of each of the models used by Network Rail for the performance calculations behind the April 08 refresh.

Long Term Performance Model

The Long Term Performance (LTP) Model has been used by Network Rail to evaluate the impact of each initiative.

The LTP Model is designed to produce high-level long-term performance forecasts to assess the impact of:-

- Changes in traffic levels by route and time of day
- Changes in Primary delay (i.e. level of incidents)
- Changes in Secondary delay (resulting from management actions).

Inputs in terms of the changes listed above can be entered at a Strategic Route Section (SRS), area or territory level, which means the individual impact on each TOC of area-specific initiatives can be assessed.

The model was run many times with savings in different categories to assess the PPM impact on each TOC of different types of delay minute change and to test sensitivities. This enabled delay-PPM relationships to be developed to feed into the Individual TOC Forecast Models (see below). The model was also used to evaluate the expected impact of traffic growth, as included as a risk in Network Rail's outputs.

Individual TOC Forecast Models

Network Rail has created an individual spreadsheet performance model for each operator. This allows the user to see the complete impact of a programme of initiatives for each TOC.

The model is set up so that the user can specify the initiative and how much delay that initiative would save. The model will then calculate the impact on delay, PPM and significant lateness.

Each TOC model is set up with all 'baseline' initiatives and a 'method' for filling the gap – this is aligned to Network Rail's preferred basket as outlined in the SBP. The model assumes that all initiatives are independent, and so not reliant on other initiatives to take place.

The model is set up with the 2008/09 delays as predicted by the current J-PIP.

The delay-to-PPM relationships within the model are those that were calculated in the Long Term Performance Model (i.e. a 10% saving in a delay category results in a Y% saving in PPM), as described above.

The delay-to-Significant Lateness & Cancellations relationships within the model come from separate analysis completed by Network Rail. This was based on regression analysis of weighted delay against significant lateness and cancellations, where the weighting of delay was based on IPPR ministerial category (so compares the proportion of trains delayed by a certain type of incident against the proportion of

trains that are tended to be cancelled). This adds weight to delay categories that tend to cause the most cancellations or significantly late trains.

TOC Consolidation Model

Network Rail has then amalgamated the key information from the individual TOC spreadsheets to develop a set of 'consolidation' models. Network Rail has provided two types of 'consolidation model' in the April refresh.

- Summary by initiative, which enables a quick view of the impact of each initiative on each TOC. This shows the CP4 impact for each TOC in terms of PPM and delay, by initiative.
- Consolidation model, which shows a summary of PPM, delay and Significant Lateness & Cancellations by TOC and year. This also shows the sector level calculations.

Separate spreadsheets for each of the above are provided for the "baseline" position and for the 'additional funding' position.

Value for Money Model

Network Rail has developed a new spreadsheet model to assess the costs and benefits of different baskets of initiatives to fill the gap between the HLOS target and the funded position.

The aim of the model was to enable the user to select different sets of initiatives and identify the required funding to meet the HLOS sector targets.

The model only includes the gap targets for National and Long Distance PPM / Significant Lateness. This is because the LSE and Regional gaps are relatively small and the key challenge has been to meet the Long Distance targets. Target gaps for the two 'outlier' TOCs (NXEC and FGW) are also included in response to the requirement to get these up to 90% PPM.

Initiatives Included

The following initiatives are included in the Value for Money model and the benefits are relatively well understood by Network Rail. On the cost side, Network Rail has made assumptions to give indicative values.

- NFRIP
- Deployment of more Mobile Operations Managers
- Deployment of Thunderbirds
- Deployment of Hot Spares
- Renew Track
- Remote Condition Monitoring for Points and Track Circuits

There are a number of further initiatives which are included in the model, but which Network Rail feel more uncertain about the likely associated costs, benefits and deliverability.

- Bridge works to prevent strikes
- Universal Power Supply to prevent power failures
- Security – Scarecrow to prevent trespass and theft/vandalism
- Manned Level Crossings to prevent road accidents
- Fencing to prevent incidents involving animals
- Autumn Management to control leaf fall and vegetation incidents.

Benefits Calculations:

For a given delay category Network Rail know how much delay occurred at each incident site. An initiative to prevent delay in that category at the specified incident site may not prevent all delay, only a percentage of it: even if you build a fence some animals will still get on the line.

In order to build robust estimates of the benefit of initiatives directed at a proportion of incident sites with the worst level delay for a given delay category, Network Rail define the following factors:

- Impact (for delay category) is the percentage of delay that can be saved
- Repeatability (the worst sites now may not be the worst in the future) is the percentage of the historically worst sites that will remain worst in the future
- Effectiveness (= Impact x Repeatability) is the product of impact and repeatability

In addition, for all initiatives Network Rail define a Risk factor related to how sure they are that they will produce the effect expected. This may be adjusted to test the dependency of the plan on the deliverability of a particular scheme (final outputs tend to be based on a 95% Risk Factor, i.e. 95% of the benefit is expected to be realised).

Based on analysis of historical data, Network Rail has then calculated the likely benefit of each initiative which has been fed into this model.

The model is then set up to demonstrate the PPM / Significant Lateness benefit of implementing a scheme on either:

- In a specific area (e.g. Thunderbirds in LNW)
- At the worst x% of sites (e.g. 0-20% of worst sites for fencing).
- By TOC (e.g. NFRIP)
- Nationally (e.g. Autumn Management / MOMs)

Costs Calculation

For each type of initiative, Network Rail has included a cost in the model. Details of the rationale and working assumptions behind these costs were provided in supporting documentation from Network Rail.

For example, for N-FRIP, Network Rail has assumed that 8,000 cabs are potentially to be fitted with the new system, costing £25k per cab. The cost for a given TOC is then based on an estimate of the percentage that cabs for that TOC's fleet represent of all fleet cabs nationally.

Summary

The model then brings together the cost and benefit calculations, and allows the user to select from the basket of schemes. The model will then assess how much of each gap target has been filled, and show the total cost of the basket.