Office of Rail Regulation

Part A Independent Reporter Mandate

Mandate AO/043: Network Rail 2012/13 Regulatory Accounts

Year-end review

Final Report Version 1.0 | 5th September 2013

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Contents

Contents **1**

1 Executive summary **6**

1.1 Introduction 6
1.2 REEM efficiency reporting process 6
1.3 REEM efficiency overview 6
1.4 Maintenance efficiency 8
1.5 Renewals efficiency 10
1.6 MUC Confidence Grading Analysis 15
1.7 RUC Confidence Grading Analysis 17
1.8 Conclusions 17

2 Introduction **18**

2.1 Background and strategic objective 18
2.2 Scope 18
2.3 Key sources of guidance 19
2.4 Report structure 21

3 REEM efficiency reporting process **23**

3.1 Introduction 23
3.2 REEM efficiency handbook 23
3.3 Network Rail's approach to calculating and presenting efficiency results 23
3.4 Governance of efficiency reporting process 23
3.5 Efficiency reporting process: Reporter opinion 24

4 REEM efficiency overview **25**

4.1 Introduction 25
4.2 Headline REEM efficiency figures (2012/13) 25
4.3 Actual REEM efficiency vs. REEM trajectory efficiency 25

5 Operations expenditure efficiency **28**

5.1 Opex: Efficiency calculations 28
5.2 Efficiency evidence: Positive Management Actions 30

6 Maintenance efficiency **34**

6.1 Introduction 34
6.2 Maintenance efficiency breakdown 34
6.3 Maintenance efficiency evidence: Positive Management Actions (PMAs) 35
6.4 Maintenance efficiency evidence: robustness and sustainability 36

7 Renewals efficiency 44

7.1 Introduction 44
7.2 Headline REEM renewals efficiency 44
7.3 Track renewals efficiency 47
7.4 Signalling renewals efficiency 54
7.5 Buildings renewals efficiency 58
7.6 Telecoms renewals efficiency 60
7.7 FTN renewals efficiency 63
7.8 Electrification renewals efficiency 66
7.9 Plant & Machinery renewals efficiency 69

8 MUC (Maintenance Unit Cost) Confidence Grading Analysis 72

8.1 Introduction and background 72
8.2 Approach 72
8.3 MUC confidence grading – results 74

9 RUC (Renewals Unit Cost) Confidence Grading Analysis 80

9.1 Introduction and background 80
9.2 Approach and scope 80
9.3 Results of confidence grading analysis 80
9.4 Reporter opinion 81

10 Regulatory Accounts Statements Data Review 82

10.1 Introduction 82
10.2 Statement 8b parts (1) and (2) - Analysis of maintenance expenditure and headcount by MDU 83
10.3 Statement 9b - Detailed analysis of renewals expenditure 84
10.4 Statement 12 - Analysis of efficiency (Real Economic Efficiency Measure) 87
10.5 Statement 13 - Volume Incentives 89
10.6 Statement 14 – Maintenance Unit Costs 90
10.7 Statement 15 - Renewals unit costs and coverage 91

Appendix A : Regulatory Accounts Mandate AO/43 92

Appendix B : Independent Reporter Regulatory Accounts Opinion Letter (30 July 2013) 96

Appendix C : Review of documentation relating to performance during 2012/13 99

Appendix D : Review of progress in relation to previous recommendations 108

Appendix E : Approach and methodology 114

Appendix F : Meetings held 118

Appendix G : Documents received from Network Rail **119**

Appendix H : Unit cost confidence grading methodology **141**

Glossary

ASI	Asset Stewardship Indicator
B&C	Buildings and Civils
CaSL	Cancellations and Significant Lateness
CEM	Cost Efficiency Measure
ckm	Composite kilometres
CP3	Control Period 3 (2005-2009)
CP4	Control Period 4 (2009-2014)
CP4	Control Period 5 (2014-2019)
DC	Direct Current
E&P	Electrification and Fixed Plant
ERTMS	European Rail Traffic Management System
DPU	Delivery Plan Update
DST	Decision Support Tool
FTN	Fixed Telecom Network
FY	Financial year
GL	General Ledger
GRIP	Governance for Railway Investment Projects' process
GSM-R	Global System for Mobile Communications - Railway
GTG	Good Track Geometry
IM	Information Management
IR	Part A Independent Reporter (Ove Arup)
JPIP	Joint Performance Improvement Plan
KPI	Key Performance Indicator
LD	Long Distance
LDRP	Long Distance Recovery Plan
LDSM	Light Maintenance Depot Stewardship Measure
LSE	London & South East
MAA	Moving Annual Average
MDU	Maintenance Delivery Unit
MNT	Maintenance activity code
MOM	Mobile Operations Manager
MUC	Maintenance Unit Cost
NDS	National Delivery Service
NOS	Network Operations Strategy
NRT	Network Rail’s Telecoms asset management team
O&CS	Operations and Customer Services
O&M	Operations and Maintenance
OLE	Overhead Line Electrification
OM&R	Operations, Maintenance and Renewals
OP	Oracle Projects
ORA	Operations Risk Advisor
ORR	Office of Rail Regulation

OTM	On-track Machinery
P&M	Plant & Machinery
P3e	Primavera Enterprise project planning software
PMA	Positive Management Action
PPM	Public Performance Measure
PR08	ORR Periodic Review 2008
PTG	Poor Track Geometry
RADR	Reliability and Delivery Risk
RAGS	Regulatory Accounting Guidelines
RAMP	Route Asset Management Plan
REEM	Real Economic Efficiency Measure
RSPS	Rail Safety Publications
RUC	Renewals Unit Cost
RWI	Repeatable Work Item
S&C	Switches and Crossings
SBP	Strategic Business Plan
SCADA	Supervisory Control and Data Acquisition
SEU	Signal Equivalent Units
SP&C	Signalling, Power & Communications
Sqm	Square metres
SSI	Signalling Stewardship Indicator
TOC	Train Operating Company
TRUST	Train Running System on Tops (railway computer system providing real time information).
TSI	Telecoms Stewardship Indicator
TSR	Temporary Speed Restriction
YTD	Year to Date

1 Executive summary

1.1 Introduction

This report presents the findings of Arup's review of expenditure data and efficiency calculations prepared by Network Rail for inclusion in its Regulatory Accounts for 2012/13. The strategic objective of this Independent Reporter review is to determine the reliability and accuracy of the information presented in certain sections of Network Rail's regulatory financial statements as set out in this mandate (reproduced in Appendix A). Given the findings of previous reviews, we have also been asked to assess the degree to which Network Rail's reporting has improved. We highlight continuing uncertainties (if any) and specify further improvements that should be made for efficiency reporting.

The guidance we have drawn on in conducting our review and developing our opinions is detailed in Chapter 2, section 2.3.

1.2 REEM efficiency reporting process

Network Rail's reporting of the 2012/13 REEM efficiency has on the whole, followed a similar format to the previous year's reporting process. However, we find a lower priority has been placed on the reporting and governance process for the 2012/13 REEM compared to the previous year. For example, the efficiency evidence collated for each asset area has not been subject to minuted internal review meetings.

Whilst our 2011/12 review found a significant degree of progress had been made in terms of transparency, robustness and provision of supporting evidence, it is evident that Network Rail has not implemented much in the way of further process changes or improvements during 2012/13. It appears that 2012/13 efficiency reporting has been a standalone, retrospective exercise that was less optimal than 2011/12.

Arup has previously recommended changes and improvements to the efficiency reporting process. Substantive progress is not evident in the information provided for this year's review. We comment on this further in our review of progress in relation to individual recommendations in Appendix D.

1.3 REEM efficiency overview

We set out in the Table E1 overleaf, the headline REEM efficiency figures[1] for 2012/13.

[1] Figures are presented in 2012/13 prices unless otherwise stated.

REEM efficiency 2012/13	Baseline (£m)	Actual (£m)	Actual efficiency (£m)	Actual efficiency %
Controllable opex	1,045.5	955.2	90.3	8.6%
Maintenance	1,297.3	996.4	300.9	23.2%
Renewals	2,411.8	2,053.7	358.1	14.8%
Total	**4,754.6**	**4,005.3**	**749.3**	**15.8%**

Table E1: Headline REEM efficiency figures for 2012/13.

We compare in Table E2 actual reported REEM efficiency figures for 2012/13 with the REEM trajectory that Network Rail will deliver to deliver the PR08 assumed efficiency level ('the REEM trajectory').[2]

REEM efficiency 2012/13	Actual efficiency %	REEM trajectory efficiency %	Underperformance (-) / outperformance (+) %	Underperformance (-) / outperformance (+) amount (£m)
Controllable opex	8.6%	7.7%	**+0.9%**	**+9.4**
Maintenance	23.2%	21.5%	**+1.7%**	**+22.0**
Renewals	14.8%	20.8%	**-6.0%**	**-143.6**

Table E2: Actual reported REEM efficiency versus REEM trajectory efficiency for 2012/13

As indicated in the table above, Network Rail's reported efficiency percentages for controllable opex and maintenance are ahead of the REEM trajectory, with the combined outperformance for these two categories representing an additional £32m of efficiencies. However, this is outweighed by underperformance in renewals, with reported efficiency of 14.8%, significantly below the REEM trajectory efficiency of 20.8%. This underperformance represents £144m of efficiencies not achieved.

1.3.1 Operations expenditure efficiency

Operating expenditure in 2012/13 totalled just over £955m. It is split between "Operations & Customer Services" (O&CS) spend of £459m and "Support costs" spend of £495m. Network Rail is reporting total opex efficiency of some £90.3m, or 8.6% relative to baseline, down from 10% in 2011/12.

Network Rail has provided a breakdown of efficiency savings for both O&CS and support costs, with accompanying explanations of how savings were achieved for each sub-category of spend. We note there are a small number of line items feeding into the total efficiency sum for which limited information has been

[2] PR08 assumed efficiencies for CP4 are based on an updated analysis of the ORR's original efficiency projections set out in the PR08, are set out in the ORR's letter to Network Rail, entitled "Success in CP4", dated 1 March 2011.

provided.[3] Notwithstanding this, in overall terms we consider the PMA evidence provided to support the reported efficiency amounts to be reasonable.

In overall terms, Network Rail is reporting an efficiency outperformance in its controllable opex spend. Headcount reductions of staff in various operational and planning functions have contributed nearly all of the efficiency savings in question. As with last year, we note that these savings relate largely to the company's administrative/corporate functions. Unlike for maintenance or asset renewals we consider there is a low risk of controllable opex outperformance impacting on the robustness, sustainability or delivery of regulated outputs. There is no evidence, from a robustness perspective, that cost-saving measures underpinning reported opex efficiencies have been a primary causal factor in the non-delivery of train performance outputs. Similarly, there is no evidence that the long-term sustainability of Network Rail's asset condition or capability is likely to be directly impacted by opex cost saving measures. We therefore consider this to be a reasonable basis to conclude that the efficiency and robustness tests for opex efficiencies have been met.

1.4 Maintenance efficiency

Network Rail reported 23.2% maintenance efficiency on its total maintenance spend of just under £1bn during 2012/13 – around one quarter of Network Rail's total OM&R expenditure.

Network Rail has continued to increase its reported efficiency year-on-year since the start of CP4. The 23.2% efficiency reported this year is higher than the ORR's REEM trajectory that Network Rail will deliver to deliver the PR08 assumed savings for the fourth year of the Control Period of 21.5%, resulting in an outperformance of 1.7% (or £22m).

Network Rail has presented details of Positive Management Actions (PMAs) that account for £160m of the £300m savings reported.

A further £100m of savings reported for the maintenance function relate to route-driven initiatives. Network Rail has indicated that these savings are too numerous to list or consolidate in a single table. However, Network Rail has provided examples of initiatives from specific routes (Western and Wessex), with spreadsheets from each listing and quantifying specific efficiency initiatives.

The remaining £40m of reported maintenance efficiencies relates to savings not directly associated with the maintenance function. The majority of this amount (£32m) is associated with provision made by Network Rail in its CP4 baseline annual expenditure (in consultation with the ORR) for changes to staff terms &

[3] This concerns the following:
- A negative value of -£29.7m reported for actual spend under the Support cost sub-category "Investment Projects".
- A negative baseline spend value of -£7.0m for the Support cost sub-category "Group".
- An O&CS efficiency amount of £13.1 attributed to "additional operating income".

We understand these are adjustment positions within the numbers, but we have not been provided with any further details.

conditions[4], with the remaining £8m the result of reallocation of spend originally captured within the maintenance area that is now distributed to other departments.

Network Rail has not been able to give a breakdown of 2012/13 maintenance spend versus baseline (2008/09) by volume and unit cost, due to changes to the MUC framework. As a result, there is an absence of any visible connection between PMA measures described and the quantified activities and cost reductions resulting in cost savings. Therefore the PMA evidence for this year's efficiency is incomplete in terms of detail, and limited in terms of its explanation relative to cost savings. We would need to receive further information to conclude what impact (if any) these factors should have on our assessment of the value of the efficiencies being reported in this area.

Network Rail did not meet its required train performance outputs during 2012/13. As detailed in Chapter 6 (section 6.4.2), delay-minute data indicate that both adverse weather conditions and asset-related failures in a number of areas were the main contributors to the excess delay minutes. In light of the delay-causing asset failures contributing to Network Rail's overall regulated (performance) output shortfall, we consider there to be material uncertainty around the robustness of volume-driven efficiencies relating to certain assets.

We consider certain areas of track-related expenditure for which significant volume efficiencies are reported are examples of areas in which reduced activity levels cannot be decoupled from asset-related failures experienced during the year. We have identified volume changes in a number of areas that have contributed, in net terms, £35m of savings.

We consider that there is also likely to be uncertainty with respect to the impact on robustness of any maintenance efficiencies associated with volume / scope reductions in maintenance of:

- the electrification infrastructure (3rd rail and OLE); and
- telecoms.

This is in light of the high numbers of delay minutes associated with these asset categories.[5]

Overall, with respect to robustness and impact on regulated outputs, we consider there to be material uncertainty around the robustness of track, electrification and telecoms-related volume efficiency savings.

As with last year, we consider further evidence and analysis would be required in order for us to assess adequately what proportion, if any, of this expenditure relates to non-performance and hence should not be claimed as efficiency.

[4] Referenced in the letter from Charles Robarts (Network Rail) to ORR (Paul McMahon), dated 19 November 2010. (Letter to Paul McMahon re TCS 121110.pdf)

[5] Whilst electrification and telecoms maintenance activities are captured under the "new" MUC framework, there is no baseline 2008/09 volume/ unit cost against which to compare them. It is not possible for us to assess the overall amount of efficiency saving (if any) feeding into the REEM calculation that is associated with these areas.

With respect to sustainability, the ASI and other measures that can be associated with long term asset performance do not indicate trends that would suggest there is a material risk of a decline into the next control period.

1.5 Renewals efficiency

Network Rail reported 14.8% renewals efficiency, on its spend of just over £2bn during 2012/13 – around one half of Network Rail's total OM&R expenditure. This equates to an underperformance of 6.0%, which is in expenditure terms £144m of cost savings.

Table E3 overleaf provides a breakdown of renewals efficiency in this year's REEM by asset category.

Renewals efficiency by asset category	REEM baseline (£m)	2012/13 Actual (£m)	2012/13 Efficiency (£m)	% Efficiency
Track	910.8	783.3	127.5	14.0%
Signalling	679.7	551.2	128.5	18.9%
Civils	*Not included in the 2012/13 REEM calculation*			
Buildings (Operational property)	303.8	203.4	100.4	33.0%
Electrification	107.9	100.6	7.4	6.8%
Telecoms	56.8	45.2	11.6	20.4%
Fixed Telecom Network	119.6	142.1	-22.4	-18.8%
Plant & Machinery	106.3	81.7	24.6	23.2%
IT & Corporate Offices	108.9	95.9	13.0	11.9%
Other	18.0	50.5	-32.5	-180.1%
Total	**2,411.8**	**2,053.7**	**358.1**	**14.8%**

Table E3: Breakdown of REEM renewals efficiency for 2012/13

The table shows that the bulk of £358m of renewals efficiencies relate to track and signalling, the two most significant asset categories in terms of spend, contributing just over £127m and £128m respectively. An efficiency saving of £100m is calculated for operational property – which represents in percentage terms a saving of 33%, the highest of any asset category.

1.5.1 Track

For track renewals, Network Rail is reporting in net terms a slight unit cost inefficiency; unit cost savings are more than offset by cost-escalating factors. Network Rail principally attributes this to a loss in planned volumes of activity, particularly for Plain Line. Other factors also adversely influencing unit rates include increased Plain Line materials costs, increased design costs incurred for S&C, and work mix inefficiency for Plain Line.

The bulk of evidence in Network Rail's efficiency report relates to unit cost savings for Plain Line and S&C. Network Rail has noted a number of factors positively influencing Plain Line and S&C unit costs. These include improved

site costs through renegotiated contracts; reduced indirect costs; improved S&C production process; and reorganisation of maintenance management to create a more flexible, cost efficient delivery team.

We consider that the level of clarity and detail contained with Network Rail's explanations of the PMAs and cost savings to be a reasonable evidence base to support Network Rail's efficiency calculations. Notwithstanding this, we have concerns around sustainability, which we detail below.

In relation to robustness for track assets, we consider the principal area of concern to be around maintenance (as highlighted earlier in this summary). We do not consider the volume shortfall to be a material driver of concerns with respect to robustness / non-delivery of regulated performance outputs over the short term.

In the case of Plain Line we consider that delivering an increased volume (+18% on 2012/13) in the final year of CP4 will prove a considerable challenge to the business. Some 40% of volume not delivered in Plain Line during 2012/13 is in 1A critical routes. Very significant increases in delivery volumes for 2013/14 (29% higher than volumes achieved in 2012/13) are planned for this category.

The shortfall experienced in 2012/13 to be indicative of an increasing "bow wave" of undelivered track activity. This was noted in last year's review. Network Rail has stated that there is a "likely deferral" of 280 ckm of Plain Line renewal into CP5. This brings into question the risk of a "reversal"[6] of recorded efficiencies to date at the end of the control period and gives rise to uncertainty that Network Rail can deliver an efficient volume of work that meets the sustainability "test" for this asset group.

We consider the value of work in question is material and noteworthy. Further analysis would be required in order for us to adequately assess what proportion (if any) of expenditure associated with an "inefficient" deferred volume of work could affect reported efficiencies in CP4.

1.5.2 Signalling

Some 77% of signalling renewals expenditure in 2012/13 is broken down by volume and unit cost categories.

Non-volume expenditure represents 23% of the total expenditure in 2012/13. This includes level crossings, modular signalling and modular level crossings and European rail traffic management system (ERTMS) infrastructure. An inefficiency of -£5.8m has been reported for non-volume signalling expenditure.

We consider the breakdown of signalling expenditure and efficiency on a volume and unit cost basis provides a satisfactory overview of the nature of efficiencies delivered.

To substantiate the PMAs driving efficiencies, Network Rail provided detailed breakdowns of savings made on a project-specific basis for GRIP 5-8 expenditure, as well as details of savings across the different non-volume expenditure categories. However, for GRIP 1-4 expenditure limited details were provided; as recommended last year, we consider it would be beneficial for us to have sight of

[6] i.e. a resulting reduction of efficiency levels in later years.

these to provide us with a greater level of confidence around the efficiencies being reported. Notwithstanding this, we consider the PMA evidence for signalling renewals to be reasonable.

Network Rail's signalling renewals programme is, for the most part, being delivered in line with planned timescales. Network Rail has stated that it remains on course to deliver planned signalling renewals up to the end of CP4. For resignalling projects, which represent the bulk of signalling renewals spend, Network Rail has provided evidence that its planning and change control processes are working. The signalling renewals programme shows a greater degree of stability in planning and delivery than in other areas.

We note that for renewals of level crossings, which accounted for approximately £77m in FY 12/13 (13% of total signalling renewals spend), volumes delivered during FY 12/13 were significantly below the levels targeted within Network Rail's 2012 Delivery Plan update. The ORR has flagged this as a sustainability concern within its annual review.

With respect to robustness, we have highlighted Network Rail's view that signal related failures are arguably primarily due the non-performance of other asset groups in coping with (extraordinary) weather.[7] On this basis, it could be possible to conclude that signalling renewals and associated efficiencies are consistent with the robustness test being met.

From the perspective of sustainability, the Signalling Stewardship Indicator (SSI) results indicate a long term in improvement in asset condition and performance, indicating the signalling programme is sustainable in the long term. On this basis, we consider the evidence presented to demonstrate the sustainability tests with respect to resignalling projects, which form the bulk of Network Rail's signalling renewals programme, to be satisfactory.

1.5.3 Buildings

Buildings renewals is the largest expenditure category for which expenditure and efficiency is not broken down on a volume and unit cost basis.

In order to demonstrate compliance with asset policy from a robustness and sustainability perspective, Network Rail has provided an 'investment policy verifier' spreadsheet and an Operational Property Policy 'ready reckoner' that are used to ensure that projects meet the requirements of asset policy. Network Rail has also presented Station Stewardship Measure (SSM) and Light Maintenance Depot Stewardship Measure (LDSM) data. The results reported for 2012/13 and earlier in CP4 indicate improvements in Network Rail's scores against both measures.

From the perspective of robustness and sustainability, we consider the evidence provided in relation to policy compliance and asset condition measures is reasonable, insofar as it demonstrates buildings renewals activities to date have

[7] Network Rail explained during meetings that signal failures have been mainly the result of weather conditions causing issues both with flooding of equipment leading to failure, and with defects / failures in track circuits and switches that have led to failures of associated signalling equipment. We consider this reasonable, given the information and analysis presented on the nature of causal factors driving the robustness issues identified.

not resulted in any asset deterioration that we believe could represent a material risk in future.

However, it is not clear how the efficiency amounts associated with the PMAs cited by Network Rail have been calculated. We have been unable to link the claimed efficiency savings with any cost information at sub-asset or project level.

We do not consider that Network Rail has provided sufficient detailed evidence demonstrating how the £100m efficiencies reported through REEM have been achieved.

Network Rail provided spreadsheets containing information from the buildings business plan to help explain changes to the buildings programme by asset type and at a project level. However, we have been unable to reconcile the numbers contained within these spreadsheets with those presented in the REEM calculation. Therefore we conclude that without further information, it is not possible to verify the value of the buildings efficiency number being reported by Network Rail.

1.5.4 Telecoms

Network Rail has provided information relating to PMAs driving telecoms efficiencies on a project-by-project basis. The twelve largest project efficiencies account for 70% of the total efficiency amount. Network Rail has provided a qualitative description of efficiencies, together with quantitative figures drawn from detailed spreadsheets.

We consider the PMA evidence provided to substantiate the reported telecoms efficiency savings to be reasonable. Information was comprehensive and sufficiently granular to justify the efficiencies claimed on a project-by-project basis.

In relation to robustness for telecoms assets, we consider the principal area of concern to be around maintenance as noted earlier. To demonstrate robustness and sustainability Network Rail has provided results reported under the metric 'Telecoms Condition'. This takes into account asset condition, maintainability, operability and reliability and is informed with information in Network Rail's Decision Support Tool (DST). The score achieved under DST in 2012/13 is 0.966, an improvement on the previous year's rating of 0.940. However, we note that the metric is still scoring less than 1.0. If this was not to improve, we understand this could lead to a reduction in asset remaining life which may have implications for asset sustainability.

If improvements in the score under this measure continue (so that 1.0 is achieved) this would suggest that the renewals programme is contributing to delivering an increasingly sustainable outcome for the asset base. On this basis, efficiencies could be considered to have met the relevant tests for sustainability.

1.5.5 FTN

Network Rail identified -£22.6m inefficiency in FTN[8] renewals spend in 2012/13. As the FTN renewals result achieved was not efficient, Network Rail has not provided information on PMAs that have helped drive efficiency. Instead, an efficiency schedule was provided that outlines the additional scope of works undertaken in CP4 compared to baseline predictions and justifies the additional costs resulting in the reported inefficiencies. The reasons given for additional spend are based around requirements for additional scope for planning and delivery activities and trespassing and vandalism mitigation. We consider Network Rail's explanation of factors driving the additional spend to be reasonable.

With regard to robustness and sustainability, Network Rail has indicated that FTN assets, although reported as a standalone renewals expenditure category under the REEM, are also will be captured within Network Rail's telecoms asset management policy - although we note that the policy makes limited reference specifically to FTN asset management. We have also taken into account documentation covering functional and business specifications that form the basis for planning and delivery of the FTN infrastructure. This was provided to us for last year's review, and we have assumed that (in the absence of any evidence to the contrary) this documentation remains valid. We consider that this provides a reasonable indication of the robustness and sustainability of the FTN infrastructure renewals programme.

1.5.6 Electrification

For this asset class, Network Rail has indicated that significant efficiencies in earlier years of CP4 were driven by the company's change from age based to condition based driving significant scope related cost savings. Over the past year efficiencies have reduced due to more complex projects now being delivered.

Network Rail has indicated that it is now projecting a deferral into CP5 of £103m. This has been attributed to a review regarding the scope of the SCADA project (£42m), and the deferral of DC switchgear and LV cable renewals (£61m).

From the perspective of sustainability, this raises questions about the impact that this non-delivery will have on the electrification asset base. Although performance and condition metrics have shown an improving trend during CP4, we consider that the deferral of £103m of renewals activities during CP4 may adversely affect the sustainability of its electrification asset base in the future. As with track, this could lead to a "reversal"[9] of efficiencies being recorded in CP4.

Further analysis would be required in order for us to adequately assess what proportion (if any) of expenditure associated with "inefficient" deferral could impact on reported efficiencies in this control period.

In relation to robustness for electrification assets, we consider the principal area of concern to be around maintenance (as highlighted previously).

[8] We note that in the context of this report, FTN renewals relate to all FTN and GSM-R related infrastructure.
[9] i.e. a resulting reduction of efficiency levels in later years.

We consider that Network Rail's PMA evidence explaining the £2.9m of efficiencies associated with project scope reductions (around 40% of the total reported efficiency saving) to be reasonable. For the remaining portion of efficiencies associated with activity-based cost savings (£4.9m), it is not clear how the efficiency amount has been calculated. We do not consider that Network Rail has provided sufficient evidence to support this portion of reported efficiency. Further detail would be required for us to amend our opinion in relation to this element of efficiency being reported.

1.5.7 Plant & Machinery

Network Rail divides Plant & Machinery (P&M) expenditure by three activity areas:

- Signalling, power and communications P&M renewals (SP&C);
- Civils P&M renewals; and
- National Delivery Service (NDS) P&M renewals, relating mainly to mobile plant, vehicles etc.

Network Rail is reporting significant P&M efficiencies of 37% and 84% for SP&C and Civils respectively, in contrast to the inefficiency of 8.5% related to NDS P&M expenditure.

Whilst Network Rail has provided evidence underpinning the expenditure and associated inefficiency associated with the NDS portion of P&M expenditure, no evidence has been provided to support the efficiency amounts reported for the other areas of P&M spend, which account for the entirety of efficiency savings being reported. On this basis, we are not able to form any opinion with regard to the validity of efficiency savings reported by Network Rail for P&M renewals expenditure.

It is not possible for us to opine on the robustness and sustainability of Network Rail's P&M renewals programme, because we have not received any documentation over the course of this review that relates to P&M robustness and or sustainability.

1.6 MUC Confidence Grading Analysis

Network Rail's MUC framework has evolved during CP4, with an increase in the overall number of MNT codes reported under the framework from 47 at the start of the control period to 108 in the current year.

Issues encountered in the provision of MUC source data have impacted our reliability and our accuracy gradings. Network Rail was unable to provide the week 3 reports for reporting periods 2-9 within the requested timescales for our review. We understand this was due to an update to the Business Objects system,

which caused the Unit Cost 4 report used to produce the week 3 data extract to become corrupted.[10]

With regard to reliability, we recognise that Network Rail has continued to implement measures to improve the MUC reporting process over the past year. Had Network Rail been able to provide the source data within the requested timescales, together with fully documented evidence of the mitigation measures described during Periods 2-9, then we consider that it would have been likely to attain an overall confidence grading of B2. We consider that it should be within Network Rail's capability to achieve an accuracy grade of "1" across all MNT codes.

However, the inability of Network Rail to supply the week 3 data within the original review timescales has reduced confidence in the systems in place. Although Network Rail has informed us of alternative data validation arrangements implemented during Periods 2-9, we have not seen written evidence documenting how the alternative arrangements were put into place during that time (i.e. from Period 2 onwards, when the systems error first occurred).[11] We consider these factors to represent a major shortcoming in the process, for which a reliability grading of D is assigned.

With regard to accuracy, our nominal analysis by individual MNT code suggests Network Rail is likely to have achieved an accuracy grading of "2" had it been able to provide the requested source data.[12] However, because these data were not provided within the requested timescales, we have been unable to deliver our assessment fully in line with our agreed approach. As a result, we are unable to give a definitive accuracy grading due to lack of evidence required to support our findings. On this basis, our overall accuracy grading for the 2012/13 MUCs is X2.

In summary, our assessed confidence grading for the MUCs presented in Network Rail's 2012/13 regulatory accounts is DX2.

[10] Network Rail was not able to provide replicated versions of the Week 3 reports for Periods 2 – 9 until 3rd July 2013 - more than two months later than requested by Arup. These replicated week 3 reports have not been taken into account in our review.

[11] We note that Network Rail provided records of correspondence from January 2013, documenting the implementation of a fix to the error in the system to ensure correct Week 3 data reports going forward. This documentation does not refer to any alternative validation process put into place prior to this (i.e. during April – December 2012 when the systems error was occurring).

[12] As documented earlier in this chapter, we have undertaken a nominal analysis of accuracy by individual MNT code, based on the assumption that the mitigations described by Network Rail were implemented (even though this has not been substantively proven with any documentation). The purpose of this analysis has been to assess what the level of data accuracy would have been, had Network Rail been able to evidence the Periods 2-9 mitigations it described. The results of that assessment indicate that Network Rail would have achieved an improvement in terms of overall levels of accuracy; a greater proportion of MNT codes would have achieved a "1" grading compared to last year, and none of the MNT codes would have reported a "4" (the first time this would have happened in any of our reviews).

1.7 RUC Confidence Grading Analysis

We have undertaken an assessment of the RUC calculation process in accordance with the confidence grading definitions. Network Rail has stated that it considers the scope of this confidence grading assessment should be limited to a review of the high level arithmetic calculation presented in Statement 15, on the basis of which the RUC figures are formulated. Our approach to this confidence grading is therefore focused on the basic RUC calculation, which comprises expenditure divided by volume for each renewals activity.

The RUC calculation process is described in Network Rail's RUC handbook. Both the total cost and the volume figures for each line item are shown in Statement 15, alongside the resulting RUC figure. The clear and simplistic basis of the calculations presented results in a reliability grading of A.

In terms of accuracy, Network Rail's calculation of RUC values on the basis of cost divided by volume in Statement 15 has been found to be, in all cases, without error. This results in an accuracy grading of 1.

We do not consider this simple analysis of the RUCs to have yielded any significant findings or insights for Network Rail or the ORR. We would recommend the reports / outputs of the relevant audits undertaken by PwC on the cost accounting side and Arup on the volume reporting side be reviewed in order to gain more meaningful insights into the source data feeding into the RUC calculation.

1.8 Conclusions

Based on our review and audit of information provided in respect of statements covered by this report, there are a number of areas where we have either been unable to form an opinion or where the information provided over the course of this review has led us to conclude there are areas of material uncertainty.

- Maintenance efficiencies – details underpinning the quantification of a number of PMAs, robustness test/impact of outperformance efficiencies on non-delivery of regulated outputs.
- Track renewals – risk of "inefficient" deferral into CP5.
- Building renewals – details underpinning the quantification and reconciliation of efficiency numbers being reported.
- Electrification – risk of "inefficient" deferral into CP5.
- Plant & Machinery – not possible to form opinions with respect to validity of efficiencies reported (due to a lack of information), robustness or sustainability tests.
- MUC confidence grading – issues with the provision of source data required for completion of review; overall confidence grading of DX2.
- RUC confidence grading – "A1" assigned based on simple analysis of top-line figures used to derive the figures. Arup recommends reviewing the relevant audits undertaken by PwC in order to gain meaningful insights into the source data feeding into the RUC calculation.

2 Introduction

2.1 Background and strategic objective

This report presents the findings of Arup's review of expenditure data and efficiency calculations prepared by Network Rail for inclusion in its Regulatory Accounts for 2012/13.

This assignment builds on Arup's previous findings and conclusions as Independent Reporter ("the Reporter"), including reviews of Network Rail's regulatory accounts for the two previous financial years (2010/11 and 2011/12).

The work has been delivered under the Independent Reporter mandate AO/043: Regulatory Accounts Data Assurance. A copy of the mandate is included as Appendix A.

The strategic objective of this review is to determine the reliability and accuracy of the information presented in certain sections of Network Rail's regulatory financial statements set out within this mandate. Given the findings of previous reviews, we have also been asked to assess the degree to which Network Rail's reporting has improved. We highlight continuing uncertainties (if any) and specify further improvements that should be made for efficiency reporting.

2.2 Scope

The mandate encompasses a review of the following sections of the regulatory accounts, in order to determine the reliability and accuracy of the information presented by Network Rail:

- Directors' review and management commentary (yet to be provided)
- Statement 8b (parts 1 and 2) – Analysis of maintenance expenditure by MDU
- Statement 9b – Detailed analysis of renewals expenditure
- Statement 12 – Analysis of efficiency (Real Economic Efficiency Measure)
- Statement 13 – Volume Incentives
- Statement 14 – Maintenance unit costs (review completed commentary to follow)
- Statement 15 – Renewals unit costs and coverage (review completed commentary to follow)

The Real Economic Efficiency Measure (REEM), set out in Statement 12, is a principal area of focus for this review. The objectives of our review of efficiency reporting work have been:

- To assess the transparency and robustness of efficiency results reflected in Statement 12 or the Regulatory Accounts, based on year-end results.

- To review the provision of underlying evidence for these reported efficiencies.
- To assess the degree to which Network Rail's programme of improvements for efficiency reporting addresses the themes raised in our earlier reports, including the 2010/11 and 2011/12 Regulatory Accounts reviews.[13]

For all statements we have reviewed the numerical consistency between expenditure figures presented in the respective statements. The includes both the linkage between cost figures and efficiency calculations and the consistency between total (GB) figures and the breakdowns between England & Wales and Scotland.

For the unit costs presented in Statements 14 and 15, we have undertaken a review of data quality using the agreed confidence grading approach. Details are provided in Chapters 8 and 9. (The completed commentary for these two statements is to follow.)

We set out our approach and methodology in delivering this assignment in Appendix E to this report.

We would like to acknowledge the time and effort that Network Rail has put into providing us with information and clarifications for this review.

2.3 Key sources of guidance

We set out in Table 1 below the key documents that have informed our approach and methodology for this review.

Source document	Description	Why relevant to our review
ORR PR08 Determination (October 2008)	The document specifies the regulatory outputs Network Rail is required to deliver for the current control period (CP4) and the associated level of funding. This includes efficiencies savings in operations, maintenance and renewals expenditure required from Network Rail, set out in terms of the year-on-cost savings over the course of CP4.	PR08 is the original source analysis from which Network Rail's efficiency trajectory for CP4 is derived. Comparing actual expenditure and efficiency against the REEM trajectory that Network Rail will deliver to deliver the PR08 assumed savings is an important part of our review.
ORR Regulatory Accounting Guidelines	The Regulatory Accounting Guidelines (RAGS) detail the requirements for Network Rail's	Our review of Network Rail's reliability and compliance of efficiency reporting includes

[13] As detailed in Arup's reports: Mandate AO/005 Audit of the Robustness of the Network Rail Unit Cost Framework; Mandate AO/003: Network Rail's Annual Return MUC and CAF audit 2009/10; Mandate AO/011: 2011/12 Regulatory Accounts Data Assurance; Mandate AO/023: 2012/13 Regulatory Accounts Data Assurance.

Source document	Description	Why relevant to our review
(March 2013)	annual regulatory accounts reporting. This includes principles underpinning the reporting of efficiency savings in operations, maintenance and renewals expenditure, including in relation to the delivery of required outputs.	reviewing the consistency of REEM calculations and supporting evidence against the requirements set out in the RAGS.
ORR letter to Network Rail, "Success in Control Period 4", (1 March 2011)	Building upon the PR08 determination, the letter sets out in detail Network Rail's output indicators for CP4. In some instances, this includes year-on-year values for specific measures / KPIs including train performance measures and asset condition metrics.	This letter encompasses assumed efficiency trajectory numbers updated from the original PR08 analysis to take into account variations in Network Rail's efficiency position at the start of CP4. The letter also elaborates on PR08 output requirements by identifying a number of specific KPIs against which output delivery can be monitored during CP4.
ORR letter to Network Rail, "Asset policies", (1 June 2010)	This letter defines two tests, "robustness" and "sustainability", that are utilised by ORR to review Network Rail's asset policies "Robustness: Is it reasonable to believe that the policy can deliver the required CP4 outputs, for England & Wales and for Scotland?..." "Sustainability: If demand on the network were to remain steady, would application of the same policy continue to deliver the outputs specified for the final year of CP4 indefinitely?..."	We have reviewed Network Rail's justification of reported efficiency savings feeding into the REEM calculation for each asset area in the context of these two tests, to assess whether the savings have been made on a robust and sustainable basis. This ensures our review also takes into account forward-looking issues (i.e. ensuring that savings made historically will not result in future issues / risks, e.g. in terms of output delivery / asset performance / cost incursion).
"Monitoring and Treatment of Network Rail's Underspend and Efficiency Policy Statement", ORR, (January 2006)	This document provides guidance specifically in relation to "underspend" by Network Rail, i.e. expenditure on asset maintenance or renewal that is below the level provided for in the ORR's determination for the	The relationship between underspend and the delivery of outputs is an important area of focus in our assessment of the sustainability of efficiency savings. Buildings upon the guidance provided in the RAGS, this document has helped guide and how such underspend is to be treated

Source document	Description	Why relevant to our review
	given control period.	from an efficiency reporting perspective.
"Reporting to Regulators of Regulated Entities", Institute of Chartered Accountants in England & Wales, (October 2003).	This document provides guidance with regard to "reporting to Regulators of Regulated Entities." Included within this document is guidance relating to materiality, and how this may apply to the assessment and reporting of regulatory accounts.	This has helped guide our assessment how and when issues identified in Network Rail's efficiency reporting / presented results are flagged as being of material relevance.

Table 1: Sources underpinning the approach and methodology adopted for this review.

Our review has also taken into account, where appropriate, documentation provided by Network Rail to support its 2013 Strategic Business Plan. This has been subject to review by Arup under Independent Reporter mandates AO/030, AO/034 and AO/035. In particular, we have reviewed Network Rail's proposed levels of asset renewal expenditure for CP5 when considering the impact (or otherwise) of efficiencies savings being reported in CP4.

2.4 Report structure

The remainder of this report is structured as follows:

- Chapters 3-7 relate to Network Rail's reporting of the 2012-13 efficiencies presented in Statement 12 of the regulatory accounts. This includes:
    - Chapter 3: Efficiency reporting process assurance – a review of the processes and governance underpinning Network Rail's efficiency reporting.
    - Chapter 4: REEM efficiency overview – we provide an overview of the elements of the REEM calculation.
    - Chapter 5: Operations efficiency – this chapter reviews the efficiency calculations and evidence base for Network Rail's operations expenditure.
    - Chapter 6: Maintenance efficiency – this chapter reviews the efficiency calculations and evidence base for Network Rail's maintenance expenditure.
    - Chapter 7: Renewals efficiency – this chapter reviews the efficiency calculations and evidence base for Network Rail's renewals expenditure, subdivided into a section reviewing efficiencies for each renewals expenditure category by asset type.
- Chapter 8 contains our data quality review and confidence grading analysis of maintenance unit costs (MUCs).
- Chapter 9 contains our data quality review and confidence grading analysis of renewals unit costs (RUCs).

- Chapter 10 contains our data assurance review of the regulatory accounts statements (Statements 8b, 9b, 13 and 14).
- Appendices containing supporting data and analysis.

3 REEM efficiency reporting process

3.1 Introduction

We summarise in this section our review of Network Rail's reporting process for the 2012/13 REEM efficiency calculation. This underpins efficiencies presented in Statement 12 of the regulatory accounts.

3.2 REEM efficiency handbook

Network Rail's reporting of efficiency under the REEM measure is supported by the Efficiency Handbook. The handbook sets out the calculation process, principles and assumptions that form the basis for the CEM and REEM efficiency calculations.

The handbook remains largely unchanged from the version presented in our review of last year's (2011/12) regulatory accounts.[14] Notwithstanding our assessment of shortcomings in the governance process which we set out below, we consider that the handbook clearly defines and explains the processes and principles by which efficiency is reported under REEM.

3.3 Network Rail's approach to calculating and presenting efficiency results

Network Rail has presented the underlying calculations for its 2012/13 REEM efficiencies in its REEM efficiency model. The structure and formulae of the model remain unchanged from the version provided for last year's (2011/12) regulatory accounts review.

The structure of the model enables the calculations of baseline versus actual expenditure and associated efficiencies to be presented in a clear and logical manner. We consider the breakdown and level of detail within the model to be appropriate for the purposes of efficiency reporting under REEM, including (where relevant) the breakdown of volume and unit costs. Notwithstanding this, there is a lack of detailed breakdown of maintenance efficiencies within the input data identified within this year's model.

Although in our previous reviews Network Rail intended to link the REEM model directly to its main Hyperion accounting system, we understand no further progress has been made in this regard.

3.4 Governance of efficiency reporting process

The reporting of efficiencies under the REEM is a process overseen by Network Rail's central finance team, which is responsible for preparing the regulatory accounts. We understand that asset management teams providing the underlying efficiency evidence for each area, with financial controllers from each asset management group provide inputs in terms of asset-specific expenditure /

[14] For further details see our 2011/12 regulatory accounts review report, Section 4.1.

efficiency figures. The asset level efficiency numbers and supporting evidence is then reviewed by the central finance team, alongside efficiency calculations and consolidated into the REEM model and presented in the regulatory accounts.

Network Rail has indicated that it has faced internal challenges in preparing its efficiency analysis and evidence for this year's REEM. For example, devolution has led to the planning, budgeting and delivery of maintenance to be largely route-led (as opposed to being led by centralised asset teams). This has meant that the process of consolidating efficiency numbers and evidence into the central REEM submission has been made more difficult. Network Rail has also indicated that the focus of the business in recent months with its SBP submission for CP5. This has meant less time and fewer resources being allocated to efficiency reporting.

For its 2012/13 efficiencies, Network Rail did not undertake internal review and challenge meetings that were completed for the 2011/12 review. We have found that for the analyses relating to positive management actions there are very few examples of any new measures or initiatives. The commentary in many areas matched that for FY 2011/12.

3.5 Efficiency reporting process: Reporter opinion

Network Rail's reporting of the 2012/13 REEM efficiency has on the whole, followed a similar format to last year's (2011/12) reporting process. With respect to the REEM model, we consider the breakdown and level of detail to be appropriate for the purposes of efficiency reporting. However, there is a lack of detailed breakdown of maintenance efficiencies within the input data.

The efficiency evidence collated for each asset area has not been subject to minuted internal review meetings.

It appears that the 2012/13 efficiency reporting has been a standalone, retrospective exercise. Arup has previously recommended changes and improvements to the efficiency reporting process to become part of a continuous, proactively managed internal process or framework to monitor and drive efficiency improvement.

Whilst our 2011/12 review found a significant degree of progress had been made in terms of transparency, robustness and provision of supporting evidence, it is evident that Network Rail has not implemented much in the way of further process changes or improvements during 2012/13. We comment on these further in our review of progress in relation to individual recommendations in 0D.

4 REEM efficiency overview

4.1 Introduction

This chapter provides an overview of the REEM efficiency calculation presented in Statement 12 of the regulatory accounts. We compare actual reported year-end expenditure to the baseline, and compare Network Rail's overall efficiency position with the ORR's REEM trajectory efficiency level. [15]

4.2 Headline REEM efficiency figures (2012/13)

We set out in Table 2 below, the headline REEM efficiency figures[16] for 2012/13.

REEM efficiency 2012/13	Baseline (£m)	Actual (£m)	Actual efficiency (£m)	Actual efficiency %
Controllable opex	1,045.5	955.2	90.3	8.6%
Maintenance	1,297.3	996.4	300.9	23.2%
Renewals	2,411.8	2,053.7	358.1	14.8%
Total	**4,754.6**	**4,005.3**	**749.3**	**15.8%**

Table 2: Headline REEM efficiency figures for 2012/13.

As shown above, reported efficiency differs by expenditure type, with maintenance efficiency of 23.2% significantly above the controllable opex efficiency of 8.6%. For renewals, the largest area of spend, efficiency is reported at 14.8%.

A more detailed breakdown for operations, maintenance and each of the seven renewals expenditure categories is provided in the chapters that follow.

4.3 Actual REEM efficiency vs. REEM trajectory efficiency

We compare in Table 3 below actual reported REEM efficiency figures for 2012/13 with the REEM trajectory efficiency level.[17]

REEM efficiency 2012/13	Actual efficiency %	REEM trajectory efficiency %	Underperformance (-) / outperformance (+) %	Underperformance (-) / outperformance (+) amount (£m)
Controllable opex	8.6%	7.7%	+0.9%	+9.8
Maintenance	23.2%	21.5%	+1.7%	+22.0
Renewals	14.8%	20.8%	-6.0%	-143.6
Total	**15.8%**	**18.6%**	**-2.8%**	**-135.0**

[15] Note that efficiency is not a regulated output/target under Network Rail's licence.
[16] Figures are presented in 2012/13 prices unless otherwise stated.
[17] PR08 assumed efficiencies for CP4, based on an updated analysis of ORR's original efficiency projections set out in the PR08, are set out in the ORR's letter to Network Rail, entitled "Success in CP4", dated 1 March 2011.

Table 3: Reported REEM values compared with REEM trajectory efficiency for 2012/13.

As indicated in the previous table, total operations, maintenance and renewals (OM&R) efficiency for 2012/13 was 15.8%. This was below the REEM trajectory efficiency of 18.6% - in monetary terms a shortfall of around £135m. The efficiency position differs between expenditure areas. Reported maintenance efficiency of 23.2% is ahead of the ORR's 21.5% REEM trajectory efficiency level, with controllable opex efficiency also ahead of the assumed level. According to the RAGS, efficiency ahead of the REEM trajectory efficiency represents an outperformance in efficiency terms. This is in contrast to underperformance in renewals spend, with reported efficiency of 14.8%, which is below the REEM trajectory efficiency of 20.8%.

We compare in the chart below Network Rail's aggregate 2012/13 efficiency position for OM&R compared to previous years in CP4, as well as its projection for the final year of the control period in Figure 1 below.

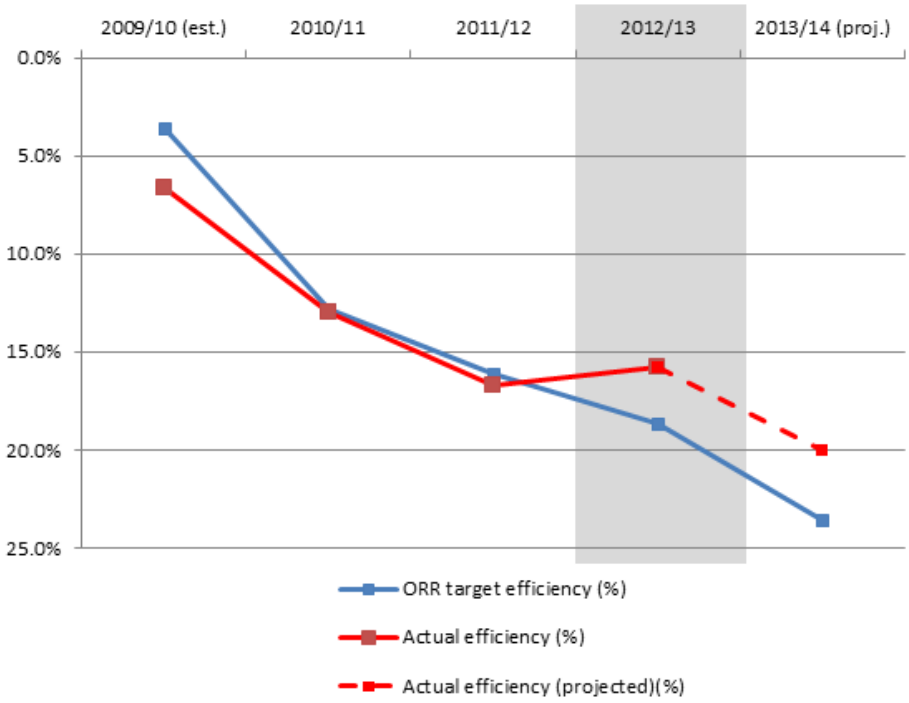

Figure 1: Network Rail aggregate efficiency over CP4.[18]

As can be seen for years 1-3 of CP4, Network Rail has outperformed relative to the ORR's REEM trajectory that Network Rail will deliver to deliver the PR08 assumed savings. For 2012/13, it has underperformed. With its projected

[18] Source: "Success in CP4" letter (ORR) / Arup analysis

efficiency for FY 13/14 of 20%[19], Network Rail expects to remain around 3.5% below the ORR's REEM trajectory efficiency of 23.5% for the "exit year" of CP4.

[19] Source: SBP supporting document, "Efficiency Summary" (provided for Arup review of SBP efficiency evidence under mandate AO/035; document ref. "SBPT220 Efficiency Summary.pdf", provided 7th January 2012, p.5).

5 Operations expenditure efficiency

5.1 Opex: Efficiency calculations

Operating expenditure (opex) in 2012/13 totalled just over £955m. It is split between "Operations & Customer Services" (O&CS) spend of £459m and "Support costs" spend of £495m. As shown in Table 4 Network Rail is reporting total opex efficiency of some £90.3m, or 8.6% relative to baseline.

Operations expenditure efficiency 2012/13	REEM baseline (£m)	2012/13 Actual (£m)	2012/13 Efficiency (£m)	% Efficiency
O&CS	488.8	459.9	28.8	5.9%
Support	556.7	495.2	61.5	11.0%
Total	**1,045.5**	**955.2**	**90.3**	**8.6%**

Table 4: Operations expenditure and efficiency overview

Although 2012/13 efficiency of 8.6% is lower than the 9.8% reported in 2011/12, it remains ahead of the ORR's assumed efficiency level for the fourth year of the Control Period of 7.7%. This represents an outperformance of ca. 0.9 percentage points (or £9m).

5.1.1 O&CS efficiency

We summarise reported efficiencies for O&CS in Table 5 below.

O&CS efficiency 2012/13	REEM baseline (£m)	2012/13 Actual (£m)	2012/13 Efficiency (£m)	% Efficiency
Hours	384.6	378.4	6.1	1.6%
Other direct costs	21.6	20.3	1.3	6.0%
Indirect opex	82.6	61.2	21.4	25.9%
Total	**488.8**	**459.9**	**28.8**	**5.9%**

Table 5: O&CS opex efficiency

- Network Rail is declaring 5.9% efficiency on operating expenditure in 2012/13, down from 7.1% in 2011/12.
- Volume-related (hours) savings account for £6.1m of efficiency; a 1.6% decrease to baseline, down from 5.2% in 2011/12. Other direct costs show a 6% efficiency of £1.3m (down from 11.8%).
- Indirect opex reports more significant savings of £21.4m, 25.9% relative to baseline, an increase from 14.3% in the previous year.

5.1.2 Support opex efficiency

We summarise reported efficiencies for opex associated with support functions within Network Rail in Table 6 overleaf.

Support cost efficiency 2012/13	REEM baseline (£m)	2012/13 Actual (£m)	2012/13 Efficiency (£m)	% Efficiency
Asset Management	98.6	128.1	-29.5	-29.9%
Property	96.8	86.0	10.8	11.2%
Human Resources	79.9	64.3	15.7	19.6%
Group	-7.0	60.6	-67.6	na[20]
Information Management	74.3	60.5	13.8	18.6%
Finance	30.9	30.3	0.6	2.0%
Government & Corporate Affairs	27.9	21.5	6.4	23.0%
Business Services	14.2	13.6	0.6	4.2%
Safety & Compliance	2.6	10.7	-8.1	-315.5%
Network Operations - Asset Management	15.3	10.6	4.7	30.5%
Contracts & Procurement	51.4	9.8	41.6	80.9%
Planning	6.3	7.3	-0.9	-14.8%
Network Strategy	7.0	6.7	0.3	3.9%
National Delivery Service	18.7	6.6	12.1	64.6%
Legal Services	3.0	4.8	-1.8	-61.4%
Other Corporate Services	17.3	3.7	13.6	78.6%
Investment Projects	19.5	-29.7	49.3	na[21]
Total	**556.7**	**495.2**	**61.5**	**11.0%**

Table 6: Support cost opex efficiency 2012/13

- As can be seen, areas of significant expenditure include Asset Management, Property, Human Resources, Group, and Information Management. Network Rail is declaring total support opex efficiency of £61.5m (11% relative to baseline, down from 12.1% in 2011/12).
- Asset management, the most important expenditure item by value. A 30% inefficiency at -£29.5m is being reported.
- Property, Human Resources, Information Management, in contrast, all reported significant efficiencies (11.2%, 19.6% and 18.6% respectively), totalling £40.3m.

[20] This appears to have been inserted as an adjustment item.
[21] This also appears to have been inserted as an adjustment item.

5.2 Efficiency evidence: Positive Management Actions

5.2.1 O&CS PMAs

As evidence of PMAs supporting its O&CS efficiency, Network Rail has provided a table breaking down the total savings into sub-categories, and briefly summarising the PMA evidence associated with each sub-category.[22] We reproduce the figures and summarise the commentary provided in Table 7 below.

PMA	Description	Efficiency (£m)
Unit cost efficiencies		
Unit cost efficiencies	Impact of reduction in hourly rate as a result of reduction in higher grade staff	-12.7
Sub-total: unit cost efficiencies		**-12.7**
Volume efficiencies		
Project Flower - MOMs	Activity analysis and benchmarking resulting in rationalisation of MOMs, reduction of 88 posts	4.0
Project Flower - SSMs	Activity analysis and benchmarking resulting in rationalisation of SSMs	0.5
Anglia Integrated Control	Rationalisation of Operational Control in Anglia, removal of 19 posts	1.0
Rostering effectiveness	Development of reporting tool to identify and target non core activities; reduction in enhanced hours worked	1.6
Controls	Activity analysis and benchmarking resulting in rationalisation of Operations Controls	0.4
Resignalling schemes	Signal box closures resulting from Signalbox schemes	8.6
Wessex	Reorganisation - removal of 5 posts and reduction in premium hours	0.2
Other	Timesheet control, overtime control, sickness management, capital works, severe weather impact	1.9
Sub-total: volume efficiencies		**18.3**
Non-volume efficiencies		
Customer/Contract services	Review of workload and activities within the Customer Services team resulting in the removal of 15 posts	0.8
Ops planning centralisation	Centralisation of the Ops Planning Team in Milton Keynes resulting in the removal of 45 posts	0.7
Performance management	Review of workload and activities within the HQ Performance team resulting in the removal of 17 posts	0.5
Station & Ops development	Review of workload and activities within the Stations and Ops Development team resulting in the removal of 17 posts	0.8

[22] OCS & RAM PMA Summary FY13.pdf

PMA	Description	Efficiency (£m)
Operations - NODM	Review of workload and activities within the NODM team resulting in the removal of 14 posts	0.4
Operations	Review of workload and activities within the HQ NODM team resulting in the removal of 20 posts	0.9
Operations - RSPS/SMIS	Creation of a centralised Ops Safety team with overall reduction of 19 posts	0.4
Performance management - routes	Review of activities within Route performance team and removal of 31 posts	0.8
Route & Area ORA teams	Review and rationalisation of ORA teams with removal of 19 posts	0.6
Operations Management - AOMs	Removal of Area Ops Managers, reduction in 13 posts	0.9
Scotland Single Area	Creation of single area for Scotland route with savings in management team; removal of 5 posts	0.3
Stations efficiencies	Primarily delivered through activity analysis and renegotiation of contracts	1.1
Sussex indirect staff utilisation	Better tracking of missing timesheets	0.2
Local initative	MPV Autumn Treatment (Contract negotiations to absorb inflationary increases and keep cost constant for same volume of circuit)	0.3
Scotland Local Initiative	Isolations recoveries (Policy change to drive more recoveries)	1.0
Scotland Local Initiative	OM & LOM Signallers - Training recoveries (Policy change to drive more recoveries)	0.3
Other	Additional operating income	13.1
Sub-total: non-volume efficiencies		**23.3**
Total		
Total efficiencies		**28.8**

Table 7: List of Positive Management Actions and associated efficiencies, as provided by Network Rail[23]

As indicated in the table above, Network Rail's total reported efficiency of £28.8m comprises:

- Unit cost inefficiency of -£12.7m;
- Volume efficiencies of £18.3m; and
- Non-volume efficiencies of £23.3m.

For its unit cost efficiency calculation, although Network Rail cites lower hourly staff rates in its commentary, an inefficiency is reported (i.e. reflecting higher unit rates). It is not clear how this number has been arrived at.

[23] 'OCS & RAM PMA Summary FY13.pdf', received 18 April 2013.

Under "non-volume efficiencies", Network Rail lists an item entitled "additional operating income", with an efficiency value of £13.1m. We assume this represents an adjustment to the calculation although no detail has yet been provided. Net of this £13.1m "income" figure, evidence relating to PMAs accounts for a smaller efficiency of £15.7m (rather than the full £28.8m).

5.2.2 Support cost PMAs

Support cost evidence appears only to be based on a breakdown comparing baseline and actual spend, (reproduced in Table 6). We note two "negative" values being included within the table:

- "Group" – baseline value of -£7m, resulting in a calculated inefficiency of -£67m;
- "Investment projects" – actual value of -£30m, resulting in a calculated efficiency of £49m;

We understand these figures relate to adjustments. Network Rail has not provided further detail or explanation as to what these figures represent.

5.2.3 Operations expenditure efficiency: Reporter opinion

Robustness and sustainability

In overall terms, Network Rail is reporting an efficiency outperformance for O&CS and Support Costs. Headcount reductions of staff in various operational and planning functions have contributed nearly all of the efficiency savings in question. As with last year, we note that these savings relate largely to the company's administrative/corporate functions. Unlike for maintenance or asset renewals we consider there is a low risk of O&CS outperformance impacting on the robustness, sustainability or delivery of regulated outputs.

From a robustness perspective, opex-related efficiencies may have impacted capabilities within the business such as response time to incidents arising or general asset management capability; however, there is no evidence that such cost-saving measures are primary causal factors in the non-delivery of train performance outputs.

From a sustainability perspective, we consider the long-term condition and capability of the rail network to be primarily a function of the maintenance and renewals activity programme rather than the operational activities underpinning the opex efficiency calculation. There is no evidence that the long-term sustainability of Network Rail's asset condition or capability is likely to be directly impacted by opex cost saving measures.

We therefore consider this to be a reasonable basis to conclude that the efficiency and robustness tests for opex efficiencies have been met.

PMAs

We consider the *pro formas* listing out the savings and the accompanying explanations of savings achieved against the various O&CS and Support cost

subcategories to represent a reasonable level of detail to support reported efficiency amounts. We note there are a small number of line items feeding into the total efficiency sum for which limited information has been provided. Notwithstanding this, in overall terms we consider the PMA evidence provided to support the reported efficiency amounts to be reasonable.

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6 Maintenance efficiency

6.1 Introduction

Table 8 shows a summary of Network Rail's maintenance expenditure compared to the pre-efficient baseline for 2012/13 (as well 2011/12 for comparison). The baseline figure is representative of expenditure during 2008/09 (the CP3 "exit position").

Maintenance expenditure, (2012/13 prices)	*2011/12*	2012/13
REEM pre-efficient baseline (£m)	*1,295*	1,297
Actual expenditure (£m)	*1,032*	996
Efficiency (£m)	***263***	**301**
Efficiency (%)	***20.3%***	**23.2%**

Table 8: Maintenance expenditure and efficiency overview

Network Rail reported 23.2% maintenance efficiency, on its total maintenance spend of just under £1bn during 2012/13 – around one quarter of Network Rail's total OM&R expenditure.

Network Rail has continued to increase its reported efficiency year-on-year since the start of the control period. The 23.2% efficiency reported this year is higher than the ORR's REEM trajectory efficiency for the fourth year of the Control Period of 21.5%, an outperformance of 1.7% (or £22m). This represents a continuing trend of outperformance.

6.2 Maintenance efficiency breakdown

Network Rail has attributed efficiency to categories labelled in the REEM model as volume / unit cost / non-volume efficiencies, which we present in the Table 9 below.

Maintenance efficiency 2012/13	REEM baseline (£m)	2012/13 Actual (£m)	2012/13 Efficiency (£m)	% Efficiency
MUC (volume-related) total	692.0	669.2	22.8	3.3%
- of which, volume efficiency			- 3.7	-0.5%
- of which, unit cost efficiency			26.5	3.8%
Other direct maintenance	315.8	177.3	138.5	43.9%
Indirect maintenance	289.5	149.8	139.6	48.2%
Total	**1,297.3**	**996.4**	**300.9**	**23.2%**

Table 9: Maintenance efficiency breakdown by volume, unit cost & non-volume

Although Network Rail has attributed efficiency amounts to volume / unit cost / non-volume categories, these are inputted as total figures in the REEM model. As can be seen from the table, a breakdown of volume and unit cost has not been provided.

In last year's review Network Rail provided a reconciliation of outturn 2011/12 spend on the basis of the "old" MUC framework enabling a comparison with the 2008/09 baseline. Network Rail has not been able to present a reconciliation of MUCs against baseline for this year's REEM calculation. Since the middle of 2011/12 Network Rail has been reporting MUCs internally under a new framework, with new MUC definitions largely replacing the original unit cost codes captured earlier in CP4.

The efficiency totals attributed to volume and unit cost savings are based on the comparison of unit costs reported under the "new" MUC framework between 2011/12 and 2012/13. It is not clear where the remaining cost saving attributable to unit cost and volume savings between 2008/09 and 2011/12 has been incorporated into this year's REEM calculations.

Network Rail has provided a breakdown of efficiency, on the basis of resource type (labour (including three labour sub-categories), plant & vehicles, materials and other). Drawing upon financial data sourced from Network Rail's core accounting system (the Oracle General Ledger), this is a comparatively straightforward comparison of the expenditure between the baseline year (2008/09) and 2012/13. We reproduce this breakdown in the Table 9 below.

Maintenance costs & efficiency (2012/13 prices)	Baseline (2008/-09) (£m)	2012/13 Actual (£m)	2012/13 Efficiency (£m)	2012/13 Efficiency (%)
Labour	812.9	612.8	200.1	24.6%
Plant & Vehicles	170.2	139.2	31.0	18.2%
Materials	90.3	63.6	26.7	29.6%
Other	33.4	30.3	3.1	9.2%
Total	**1,106.7**	**845.9**	**260.8**	**23.6%**

Table 10: Maintenance efficiency breakdown by expenditure type

It should be noted that the proportion of spend broken down on this basis relates only to the maintenance function of the business, whereas the REEM model is activity-based, which also encompasses "indirect maintenance" spend incurred by other (non-maintenance) functions. Although the actual expenditure figure (£846m) appears to match the total direct cost in the REEM model, the baseline figure of £1,107m differs from the REEM model figure for direct maintenance cost of £1,007m. Arup has requested a reconciliation between the above figures and the REEM figures.

6.3 Maintenance efficiency evidence: Positive Management Actions (PMAs)

To support the resource-based breakdown of efficiency savings described above, Network Rail has presented details of the following specific, quantified initiatives achieved through the maintenance function, which account for £160m (53%) of savings reported:

- New rail management equipment (est. £10.5m efficiency)

- Manpower planning tools (est. £1.8m efficiency)
- Vehicle trackers (est. £2.5m efficiency)
- Reliability centred maintenance (est. £10.1m efficiency)
- Phase 2bc (est. £57.1m efficiency)
- Maintenance campaigns (est. £1.0m efficiency)
- Contractor Management RPI (est. £8.9m efficiency)
- Overtime Control (est. £33.2m efficiency)
- Freight Haulage (est. £2.6m efficiency)
- Non-NDS materials/Stock management (est. £13.7m efficiency)
- Road Vehicles (est. £5.5m efficiency)
- Other local / national management initiatives cited (est. £13.6m efficiency)

Network Rail has provided supporting tables setting out the workings and assumptions underpinning the estimated efficiency amounts listed above.

A further £100m of savings are reported for the maintenance function that relate to route-driven initiatives. Network Rail has indicated that these savings are too numerous to list or consolidate in a single table. Network Rail has provided examples of initiatives from specific routes (Western and Wessex), with spreadsheets from each listing specific efficiency initiatives and their cost saving impact.

The remaining £40m of reported maintenance efficiencies relate to savings not directly associated with the maintenance function. Network Rail has stated that this relates to expenditure captured within the company's "Group" accounting, code (BU91). The maintenance baseline encompasses an annual provision of £32m made by Network Rail for changes to staff terms & conditions in consultation with the ORR[24] (£28m of additional annual spend in 09/10 prices); Network Rail indicated these costs were not incurred during FY 12/13, resulting in the £32m showing as a saving versus the baseline. Network Rail has indicated that the remaining £8m of reported savings are the result of various movements, with spend originally encompassed within the Group accounting code within the baseline now allocated elsewhere, resulting in the £8m difference.

6.4 Maintenance efficiency evidence: robustness and sustainability

Our review of the robustness and sustainability of maintenance efficiencies involves the assessment of evidence of asset policy compliance provided in Network Rail's main efficiency report, as well as a review of factors causing the shortfall in its required levels of (regulated) performance outputs compared to target.

[24] Referenced in the letter from Charles Robarts (Network Rail) to ORR (Paul McMahon), dated 19 November 2010. (Letter to Paul McMahon re TCS 121110.pdf)

As noted earlier in the report, the ORR has provided guidance, through a range of sources, about how Network Rail should demonstrate that the efficiencies it reports are both robust and sustainable.[25]

In the case of outperformance, part of the robustness test is to gain comfort that efficiency savings are not a contributing factor to any shortfall in delivery of required outputs.

6.4.1 Policy compliance and asset indicators

Network Rail's maintenance efficiency report explains the basis by which maintenance activities are planned and delivered in line with asset policy. To demonstrate the delivery of asset-related outputs, Network Rail has presented metrics used to demonstrate the delivery of asset performance and maintenance of asset condition.

Results reported for 2012/13 under Network Rail's Asset Stewardship Indicator (ASI) indicate overall asset condition in 2012/13 has reached 0.096, up from 0.084 the previous year. Network Rail has also provided updated asset reliability performance indicators used by the business to monitor asset reliability. When viewed over the course of CP4, the measures also illustrate, for the most part, a continually improving trend.

When comparing 2012/13 performance against target for ten measures (relating principally to track)[26] which Network Rail indicated are directly impacted by maintenance activities, half of the ten measures shown are not being met (see Table 11 below). Overall, Network Rail attributes the shortfall in its asset measures to extreme weather conditions.

Asset measure	Actual 2012/13	"Success in CP4" target	Achieved?
Good Track Geometry (GTG)	138.1%	137.5%	Y
Poor Track Geometry (PTG)	2.38%	2.36%	N
Geometry Faults /100km	40.34	37.00	N
Broken Rails & Serious Rail Defects / 100km	4.09	5.70	Y
Signalling Failures >10 mins	15,023	14,608	N
Points Failures	5,069	3,388	N
Track Circuit Failures	3,906	4,180	Y

[25] We derive our understanding of sustainability and robustness from definitions set out in the June 2010 letter from ORR to Network Rail. Robustness tests relate to Network Rail's ability to deliver outputs within CP4, whereas sustainability tests relate to the company's ability to deliver outputs in the longer term.

[26] The seven measures set out in the ORR letter but not included in the table above are:

- Civils assets subject to additional inspections
- Signalling condition
- AC traction feeder station track sectioning point condition
- DC traction substation condition
- AC traction contact system condition
- DC traction contact system condition
- Telecoms condition

Asset measure	Actual 2012/13	"Success in CP4" target	Achieved?
Track Faults	5,322	6,353	Y
Power Incidents >300 mins	57	78	Y
Telecoms failures >10 mins	697	656	N

Table 11: Asset measures: actual vs. target (source: Network Rail).

Although still within its annual target, Network Rail has reported a 42% increase in the number of rail breaks reported 2012/13 compared to the previous year which it also attributes to cold weather. In relation to poorer track geometry, alongside the impact of adverse weather, Network Rail has continued to cite reduction of volume in OTM activity as causal factor.

6.4.2 Linkage between maintenance programme and shortfall in delivery of outputs

In 2012/13 Network Rail did not meet all of its regulated train performance targets. Train performance remains below required levels for three out of four passenger service categories. The sum of total delay minutes for England & Wales passenger and freight services are below target.

In addition to gaining comfort that efficiencies are not undermining the robustness or sustainability of the railway, regulatory guidelines recommends that in the case of outperformance, Network Rail should demonstrate that efficiencies have not led to non-delivery of (regulated) outputs. For maintenance, we interpret this as assessing the extent to which Network Rail's non-delivery of required train performance outputs during 2012/13 are not attributable to asset-related failures.

When reviewing the results of train performance outputs, under the PPM, CaSL and delay minutes measures compared to the ORR's original target (as well as the targets set out in Network Rail's JPIP performance recovery plan), a deteriorating picture is apparent.

We discuss below the evidence presented by Network Rail (and the ORR) to explain the performance shortfall, and the extent to which it can be demonstrated that the levels of maintenance spend and associated activity / cost reductions can be considered to have met the tests noted.

Long Distance and London & South East Recovery Plans

The shortfall in delivery of required train performance during 2012/13 came at the same time as Network Rail being required by the ORR to produce plans to improve performance in the Long Distance and London & South East passenger sectors during 2012. The implementation of recovery plans was the result of

enforcement action by the ORR, following a period of below-target delivery of required levels of train performance during 2011/12 and previous years of CP4.[27]

These recovery plans contain a number of targeted initiatives in various areas of asset management and performance improvement, together with estimations in terms of reduced total delay minutes that the proposed measures will deliver. Delay reductions were based on analysis of historical delay minutes that would no longer occur as a result of planned improvement measures.

The JPIPs set out targets for improvements in the key performance measures under the key output performance measures PPM, CaSL and total delay minutes, with revised performance trajectories up to the end of CP4.

Performance causal analysis

Network Rail's results in terms of performance measures at the end of 2012/13 indicate that it has fallen short of both the original ORR target performance levels and the revised (lower) JPIP targets, by some margin. Analysis has been provided to us to explain the shortfall. We summarise this below.

Overall, Network Rail attributes the performance shortfalls during 2012/13 to adverse weather conditions experienced during the year. In its supporting documentation for the 2008 Strategic Business Plan, Network Rail identified that there was a likelihood of increasing instances of severe weather; a risk which it said it would become better at managing.

Network Rail has indicated that delays and performance problems resulting from weather have been of such severity that they have outweighed the benefits accrued from the programme of improvements implemented through the recovery plan / JPIP process.

A breakdown table provided comparing total 2012/13 delay minutes by causal category vs. JPIP targets showed that just under half of the total numbers of delay minutes in excess of target were attributed to adverse weather conditions. Delay minutes associated with asset failures contributing over 60% of total excess delay minutes) have been negatively influenced – to a greater or lesser extent – by adverse weather. We have not had sight of an estimation of the magnitude of weather impact on other delay categories. The business has indicated that quantifying the impact of weather would be challenging, given the complexity of causal factors driving delay.

Network Rail has also provided LD and LSE recovery plan quarterly progress reports (Q3/Q4 2012/13). The progress reports highlight adverse weather conditions as the predominant cause of below-target performance. Other factors not directly relating to weather conditions are also documented. Network Rail identifies weather related disruption as having had indirect impact on asset performance / "other" activities (e.g. possessions), etc. But there is no quantified analysis to ascertain the extent to which severe/extreme weather was the root cause of performance shortfalls in these areas.

[27] With the exception of Long Distance performance during 2009/10, which during that year was ahead of target for PPM.

The ORR has also completed its own analysis of underlying train performance (delay minutes and PPM) in 2012-13. The results suggest the correlation between delay minutes and days in which severe precipitation were experienced may be less strong than may be expected from Network Rail's narrative. The ORR's approach has involved adjusting between 12% and 15% of the total days of the year when the most severe weather was experienced.[28] Delays incurred on those days were adjusted to a four-year average, in order to "discount" the impact poor weather conditions on those days had on performance, and to compare assess performance for the remainder of the year when conditions were not severe. In spite of this level of adjustment to total annual delay metrics, the results suggest adjusted performance metrics remained significantly below target.

Linkage with volume efficiency savings

We have reviewed volume efficiencies across the different areas of maintenance activities, to assess areas in

which a potential linkage may (or may not) exist between levels of maintenance activity and the delay-causing asset failures contributing to Network Rail's overall performance output shortfalls discussed earlier in this chapter.

Maintaining the rail infrastructure encompasses a wide range of activities. Only part of Network Rail's maintenance spend is broken down in volume and unit cost terms. We acknowledge it is not practicable for details of every type of activity to be broken down and unitised.

Significant cost savings feeding into the total maintenance saving can be identified from reductions in a number of key track-related maintenance activities.[29] Overall, the impact of volume savings in these areas is, in net terms, £35m. [30]

[28] The involved the ORR identifying specific days where a relationship can be made between higher precipitation levels and performance being below a certain threshold. For the days in which this relationship is identified, the ORR has adjusted the given delay minute / PPM level for that day, by replacing it with the overall period average, based on its percentage variance during CP4 from the end of year MAA. The ORR has applied the methodology described above to adjust the National PPM figure for 44 days between FY 09/10 and FY 12/13 to produce a revised PPM moving annual average (MAA) profile. Using the same approach for PPM in the long-distance sector, ORR has adjusted a total of 55 days; whilst in the London & South East (LSE) sector, the ORR has adjusted 54 days.

[29] As indicated at the start of this chapter, Network Rail has not provided a full breakdown of volume and unit costs savings under the MUC framework for this year's REEM. However, we have been able to combine savings reported under the "new" MUC codes between 2011/12 and 2012/13, with cost savings between 2008/09 and 2011/12 reported in last year's REEM, to make an aggregated estimation of overall savings in particular activity areas.

[30] Our estimation of the £35m net savings is based on a combination of:

- £67m of track-related volume savings associated with the following eleven activity categories:
    - S&C Unit Renewal £13.4m volume efficiency
    - S&C Tamping £10.9m volume efficiency
    - Plain Line Tamping £8.7m volume efficiency
    - Installation of pre-fabricated IBJs £7.4m volume efficiency
    - Manual Spot Re-sleepering £7.2 m volume efficiency
    - Replacement of Pads & Insulators £5.0 m volume efficiency

Delay-minute data indicate that asset-related failures associated with both electrification and telecoms infrastructure have also contributed to excess delay minutes during 2012/13. We are not able to quantify maintenance volume savings feeding into the overall efficiency amount from these asset areas, because although maintenance of these asset areas is captured under the "new" MUC framework, there is no baseline 2008/09 volume/ unit cost against which to compare them.

As indicated in our opinion below, we consider there to be material uncertainty around the robustness of track, electrification and telecoms-related volume efficiency savings. Further evidence and analysis would be required in order for us to adequately assess what proportion, if any, of this expenditure relates to non-performance and hence should not be claimed as efficiency.

6.4.3 Sustainability

To demonstrate the long-term sustainability of its maintenance efficiencies, Network Rail has provided an overview of long-term trends in the various asset condition and performance related measures since before the start of CP4.

The majority of the indicators show improving trends over a number of years (typically, since before the start of CP3). Only two measures – poor track geometry and intervention / immediate action track geometry incidents – show increases during CP4, and both measures have in fact shown a decline during 2012/13 (although they remain below target as discussed in earlier sections). Signal failures, track faults points failures and traction power faults show a "levelling off" in performance improvements during the latter part of the control period, whilst telecoms faults have shown a rise during the past year.

In overall terms, none of the measures appears to indicate patterns of sustained long-term decline in asset condition or performance (a risk to sustainability) for the duration of CP4 that would suggest there is a significant risk of a decline into the next control period.

  - Track Circuits / Train Detection Services £3.5 m volume efficiency
  - Stoneblowing £3.3 m volume efficiency
  - Replacement of S&C bearers £3.3 m volume efficiency
  - Mechanical Wet Bed removal £2.5 m volume efficiency
  - S&C weld repairs £2.1 m volume efficiency
- Combined volume increases driving £32m additional spend in eight other track-related maintenance categories, which comprises:
  - Manual correction of PL track geometry: +£17.5m additional spend
  - Maintenance of rail lubricators: +£8.7m additional spend
  - Inspections (fencing, vegetation, drainage): +£2.9m additional spend
  - Point end routine maintenance: +£0.7m additional spend
  - Fences & boundary walls: +£1.1m additional spend
  - Drainage: +£0.6m additional spend
  - Manual wet bed removal: +£0.5m additional spend

In net terms this results in a saving of £35m.

6.4.4 Reporter opinion

PMA Evidence

For those savings associated directly with the maintenance function (accounting for 85% of the total spend reported through REEM), Network Rail has provided a breakdown of savings by expenditure category, extracted directly from Network Rail's accounting system. This gives reasonable visibility of the areas in which savings have been delivered – most notably, via labour cost reductions. But the detail of measures and initiatives beyond this level is limited. Network Rail has given some quantification and rationale for £160m through details of supporting workings. However, for a further £100m of efficiency savings delivered through local initiatives, only a small sample of measures have been presented. For the 15% (£40m) of maintenance spend not directly associated with the maintenance function, no further detail has been given.

Network Rail has not been able to give a breakdown of 2012/13 maintenance spend vs. baseline (2008/09) by volume and unit cost, due to changes to the MUC framework. As a result, there appears to be an absence of any visible connection between PMA measures described and the quantified activities and cost reductions resulting in cost savings.

Overall we consider the PMA evidence for this year's efficiency is incomplete in terms of detail and limited in terms of its explanatory power relative to cost savings. We would prefer to receive further information to conclude what impact (if any) these factors should have on our assessment of the value of the efficiencies being reported in this area.

Robustness

In light of the delay-causing asset failures contributing to Network Rail's overall performance output shortfalls discussed earlier in this chapter, we consider there to be material uncertainty around the reasonableness of volume-driven efficiencies relating to certain assets.

Network Rail did not meet its required train performance outputs during 2012/13. Delay-minute data indicate that both adverse weather conditions and asset-related failures in a number of areas were the main contributors to the excess delay minutes. The incidence of delays relating to track assets in particular sits alongside a worsening of performance against target in relation to asset measures such as rail breaks, points failures and signal failures as well as ongoing shortfalls relating to track geometry.

Network Rail has attributed higher levels of asset-related failures principally to adverse weather conditions, highlighting that rainfall was beyond what could have normally been expected and at record levels in some areas. It is evident that prolonged heavy rainfall during the year and colder than average conditions during Q4 were contributing factors to delay-causing asset failures. However, we do not consider that unexpected weather is predominantly to blame. It is not clear to what extent actual weather conditions experienced during 2012/13 went "above and beyond" what it (and the ORR) anticipated at the start of CP4.

Network Rail has provided limited analysis and data with respect to how many of the delay minutes attributed to asset failures were weather related, as opposed to other factors cited in the quarterly reports. Other (non-weather) delay drivers cited include possession overruns, de-wirements, planning failures and track faults.

We consider certain areas of track-related expenditure for which significant volume efficiencies are reported may be considered areas in which reduced activity levels cannot be decoupled from asset-related failures experienced during the year.

We also consider that there is also likely to be uncertainty with respect to the impact on robustness of maintenance efficiencies associated with volume / scope reductions in maintenance of the electrification infrastructure (3rd rail and OLE) and telecoms, in light of the high numbers of delay minutes associated with these asset categories.[31]

As was the case last year, we consider further evidence and analysis would be required in order for us to adequately assess what proportion, if any, of this expenditure relates to non-performance and hence should not be claimed as efficiency

Sustainability

With respect to sustainability, the ASI and other measures that can be associated with long term asset performance do not indicate trends that would suggest there is a material risk of a decline into the next control period and beyond.

[31] Whilst maintenance of these asset areas is captured under the "new" MUC framework, there is no baseline 2008/09 volume/ unit cost against which to compare them.

7 Renewals efficiency

7.1 Introduction

This chapter presents our review of renewals efficiencies calculated through the REEM measure and reported in Statement 12. We review the efficiency reported for each asset area, including the breakdown by volume and unit cost. We also take into account levels of activity and spend in Network Rail's Delivery Plans and compare budget to actuals.

We review and analyse the evidence presented for each renewals asset area to demonstrate positive management actions driving the efficiency savings reported. Taking into account the efficiencies in relation to volume and unit cost, as well as variability in activity at year-end compared to budget and plans, we review the evidence of robustness and sustainability of efficiencies in relation to delivery of outputs and efficiency levels.

7.2 Headline REEM renewals efficiency

We review in this section the headline renewals efficiency reported in Statement 12, and its constituent elements from each asset renewals area.

7.2.1 Headline efficiency calculation

Table 12 presents the REEM renewals efficiency calculation for 2012/13. The baseline figure is representative of expenditure during 2008/09 (the CP3 "exit position"), as well as the efficiency from last year (2011/12) for comparison.

Renewals expenditure, (2012/13 prices)	*2011/12*	2012/13
REEM pre-efficient baseline (£m)	*2,430*	2,412
Actual expenditure (£m)	*1,998*	2,054
Efficiency (£m)	***432***	**358**
Efficiency (%)	***17.8%***	**14.8%**

Table 12: Renewals expenditure and efficiency overview

Network Rail reported 14.8% renewals efficiency, on its spend of just over £2bn during 2012/13 – around one half of Network Rail's total OM&R expenditure

We compare Network Rail's reported efficiency to the REEM trajectory efficiency overleaf.

Renewals efficiency, (2012/13 prices)	2012/13
Actual efficiency	14.8%
REEM trajectory efficiency %[32]	20.8%
Underperformance (-) / outperformance (+) %	**-6.0%**
Underperformance (-) / outperformance (+) amount (£m)	**-143.6**

Table 13: Renewals REEM trajectory vs. actual efficiency

Network Rail's renewals efficiency level has fallen back from 17.8% last year (2011/12), with this year's reported efficiency of 14.8%, below ORR's REEM trajectory efficiency level of 20.8%[33]. This equates to an underperformance of 6.0%, which represents £144m of cost savings. This is a less favourable efficiency position in comparison to earlier years of CP4, when Network Rail's renewals efficiency level was closer to the REEM trajectory efficiency, as illustrated in Figure 2 below.

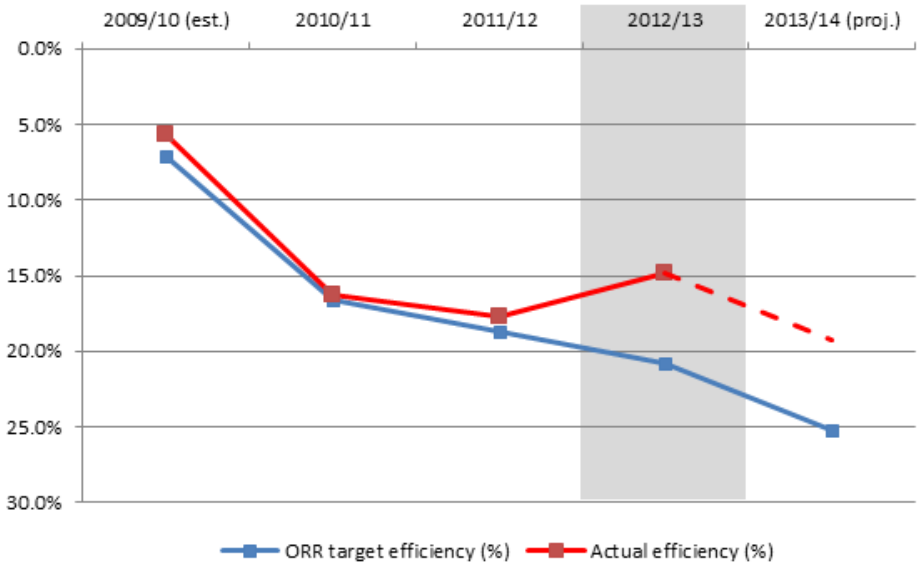


Figure 2: Renewals actual efficiency target for CP4

7.2.2 Efficiency breakdown by renewal asset category

Table 14 below provides a breakdown of renewals efficiency in this year's REEM by asset category.

[32] Set out in the letter from ORR (Bill Emery) to David Higgins (Network Rail), "Success in control period 4", 1st March 2011, p.4.
[33] Note the renewals efficiency calculation has been re-baselined to account for the removal of civils renewals expenditure from the efficiency calculation.

Renewals efficiency by asset category	REEM baseline (£m)	2012/13 Actual (£m)	2012/13 Efficiency (£m)	% Efficiency
Track	910.8	783.3	127.5	14.0%
Signalling	679.7	551.2	128.5	18.9%
Civils	*Not included in the 2012/13 REEM calculation*			
Buildings	303.8	203.4	100.4	33.0%
Electrification	107.9	100.6	7.4	6.8%
Telecoms	56.8	45.2	11.6	20.4%
Fixed Telecom Network	119.6	142.1	-22.4	-18.8%
Plant & Machinery	106.3	81.7	24.6	23.2%
IT & Corporate Offices	108.9	95.9	13.0	11.9%
Other	18.0	50.5	-32.5	-180.1%
Total	**2,411.8**	**2,053.7**	**358.1**	**14.8%**

Table 14: 2012/13 REEM renewals efficiency breakdown by asset category

As indicated above, the bulk of the £358m renewals efficiencies is related to the two most significant asset categories in terms of spend – track and signalling contributing just over £127m and £128m respectively. An efficiency saving of £100m is calculated for operational property – which represents in percentage terms a saving of 33%, the highest of any asset category.

The remaining asset categories, apart from FTN and Other, show efficiency levels of between 7% and 23%. Associated efficiency amounts totalling about £55m, are however almost entirely offset by inefficiencies of -£22m for FTN and -£32m for Other.

REEM figures include a breakdown of expenditure by volume and renewals unit costs (RUC) for a proportion of the expenditure associated with the two largest expenditure categories – track and signalling. This comprises:

- 90% of track renewals expenditure (£704m), captured under two unit cost categories – Plain Line and S&C.
- 77% of signalling renewals expenditure (£426m), captured under two unit cost categories – SEU and Grip 1-4.
- In combination, the RUC costs for these two categories together account for just over £1.1bn of renewals spend – 55% of the total.

Network Rail's reported renewals efficiency is supported by evidence for efficiency savings calculated for each asset area, which underpins the headline efficiency calculation reported in Statement 12. We review the efficiency calculations and supporting each of the renewals categories in the sections that follow.

7.3 Track renewals efficiency

7.3.1 Track efficiency calculation

Track renewals spend for 2012/13 accounted for £783m – the largest asset renewals expenditure area, accounting for 38% of total renewals spend.

Track expenditure, (2012/13 prices)	*2011/12*	2012/13
REEM pre-efficient baseline (£m)	*952*	911
Actual expenditure (£m)	*723*	783
Efficiency (£m)	***230***	**128**
Efficiency (%)	***24.1%***	**14.0%**

Table 15: Track renewals expenditure and efficiency overview.

Network Rail has reported an efficiency of 14.0%, some seven percentage points lower than the ORR's REEM trajectory efficiency for 2012/13 of 20.8%. This is also significantly lower than the 24.1% efficiency reported by Network Rail for last year's REEM. Although total spend in 2012/13 is higher than the previous year, the baseline value is slightly lower – reflective of lower delivery volumes, which we discuss further below.

7.3.2 Track expenditure vs. plan

As can be seen in Table 15, 2012/13 outturn expenditure is largely in line with the budget (DPU 2012) and SBP figures and slightly higher than the 2009 CP4 Delivery Plan. Network Rail has stated that it estimates some 280km of Plain Line volume is likely to be deferred into CP5. We estimate that this equates to around £85m[34] of originally proposed CP4 expenditure.

Total Track Renewals Expenditure, £m (2012/13 prices)	2012/13	**CP4 Total**	**Planned deferral of total CP4 spend into CP5**
2009 CP4 Delivery Plan	**766**	3,885	0
Delivery Plan update 2012	**789**	3,748	0
Strategic Business Plan 2013 forecast	***776***	*3,762*	*0*
Actual Outturn	**783**	*3,751*	*85*

Table 16: CP4 track renewals expenditure: planned vs. actual[35].

[34] The £85m figure is our estimation of the value of deferral, based on multiplying the 280km Plain Line by the 2012/13 unit rate (£302k). This represents the most up-to-date unit rate for Plain Line renewal, based on Network Rail's delivery of PL renewals during FY 12/13. In terms of work mix between criticality quadrants, we understand the Plain Line renewals programme up to the end of CP4 and in early CP5 is likely to be more similar to FY12/13 than to earlier years of CP4.
[35] It is worth noting the SBP was formulated before the 2012/13 results and therefore does not fully account for the delivery shortfall in this period, discussed later in this chapter.

When viewing the profile of spend over the full control period, a degree of variability is evident, as illustrated in the chart overleaf. In contrast to the original 2009 Delivery Plan projection showing continually falling expenditure, the latest projection from the SBP (see Figure 3 overleaf) shows expenditure increasing with a significantly higher level of spend up to the end of CP4, following lower spend during the first three years of the control period.

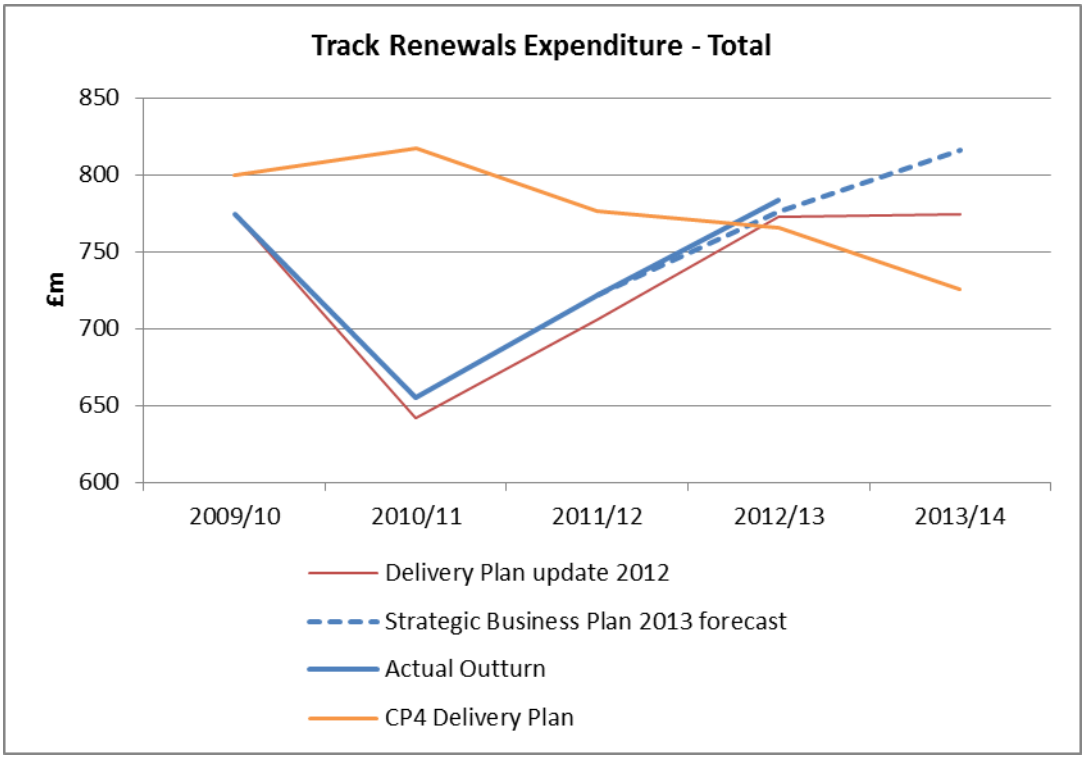


Figure 3: Track renewals expenditure by plan, outturn and forecast for CP4.

7.3.3 Efficiency breakdown by volume and unit cost

We set out in the table overleaf the track efficiency breakdown contained within Network Rail's REEM calculation. Savings reported under the 2012/13 REEM are entirely attributable to the volume efficiency component of the efficiency calculation. Network Rail is in fact reporting a volume efficiency amount of £132m, which is excess of the overall track efficiency saving of just under £128m – the difference relating to some £4m of inefficiencies reported for unit costs and non-volume expenditure.

Track renewals 2012/13	Volume efficiency	Unit cost efficiency	Non-volume efficiency	Total efficiency
Plain Line				
Efficiency (£m)	£79.6	-£20.0	n/a	£59.6
Efficiency (%)	**13.7%**	**-3.4%**	n/a	**10.5%**
S&C				
Efficiency (£m)	£52.4	£17.6	n/a	£70.0
Efficiency (%)	**20.8%**	**7.0%**	n/a	**27.8%**
Non volume				
Efficiency (£m)	n/a	n/a	-£2.0	-£2.0
Efficiency (%)	n/a	n/a	**-2.7%**	**-2.7%**
Total efficiency				
Efficiency (£m)	£132.0	-£2.4	-£2.0	£127.5
Efficiency (%)				**14.0%**

Table 17: Track efficiency breakdown by volume, unit cost & non-volume

Volume efficiency

Network Rail derives its volume efficiency for Plain Line and S&C renewals from a pre-determined efficiency calculation, based on a comparison of the ORR's assessed volume compared with reduced volumes from a revised CP4 asset policy, as set out in Table 18 below.

Track renewals volume efficiency	CP 4 baseline (5Y): PR08	CP4 volume projection (5Y): NR 2010 Delivery Plan	% Delivery Plan reduction vs. PR08
Plain Line volume (ckm)	10,956	9,456	**-13.7%**
S&C volume (units)	2,249	1,781	**-20.8%**

Table 18: Track renewals baseline volume calculations.

This is the same approach as was followed for the last two years. Rebaselining of the volume efficiency calculations means that the percentages of 13.7% / 20.8% are in line with the predetermined level. Network Rail delivered significantly lower volumes in 2012/13 compared to budgeted volume. This has driven up unit costs. It also creates uncertainty about around the robustness of the renewals programme to the end of CP4. This is discussed further below.

Unit cost efficiency

In aggregated terms, Network Rail is reporting a unit cost inefficiency of over -£2m; whilst S&C renewals are showing just under £18m savings from unit cost reductions, this is more than offset by inefficiencies of -£20m reported for Plain Line renewals, the larger cost category.

7.3.4 Track renewals efficiency: PMA evidence

Network Rail "Efficiency Report – Track Renewals FY 2012/13" details the workings and assumptions supporting its 2012/13 track renewals efficiency calculation.

Volume efficiency

Volume-based efficiencies are based on the assumption that Network Rail is continuing to deliver the pre-determined volume saving over the course of CP4 (see above). We review the planned and actual volumes in the context of robustness and sustainability below.

Unit cost efficiency

The bulk of PMA evidence in Network Rail's efficiency report relates to unit cost savings for Plain Line and S&C. A detailed breakdown and commentary has been provided. Actions and initiatives driving efficiencies are the same as for last year.

Network Rail has noted a number of factors positively influencing Plain Line and S&C unit costs, including improved site costs through renegotiated contracts; reduced indirect costs (headcount reductions, reductions in NDS charges and central charges); improved S&C production process; and reorganisation of maintenance management to create a more flexible, cost efficient delivery team.

However, cost savings have been more than offset by cost-escalating factors, resulting in net unit cost inefficiency across the two categories. Network Rail principally attributes this to a loss in planned volumes of activity, particularly for Plain Line. Delivery shortfalls have resulted in indirect costs and site costs being spread over insufficient volume.

Other factors also adversely influencing unit rates include increased Plain Line materials costs; increased design costs incurred for S&C associated with planning for CP5 renewals programme, resulting in higher indirect costs; and adverse work mix efficiency for Plain Line due to a lower proportion of renewals delivered by (lower cost) maintenance teams.

7.3.5 Track renewals efficiency: robustness and sustainability

Key evidence presented

Network Rail has presented the robustness and sustainability evidence on the same basis as for 2011/12. This includes information that demonstrates the following:

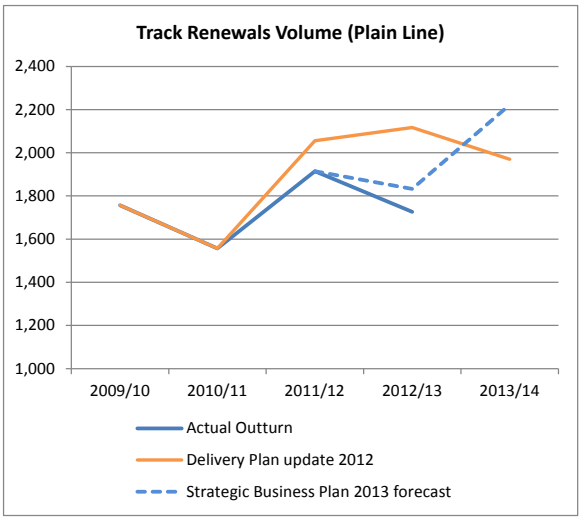
- acceptance by the ORR of Network Rail's track renewals asset policy at the start of CP4. This includes revision to planned CP4 volumes compared to the ORR's original assessed volumes set out in PR08, which forms the basis of Network Rail's volume efficiency calculation (see above);
- compliance of Network Rail's workbank planning and delivery with asset policy. This includes planning of activities in relation to route criticality;
- measurement of track asset condition and performance KPIs relating to track geometry during CP4 (with some of the same information provided in support of maintenance efficiencies: see previous chapter); and

- evidence of long-term analysis and modelling of asset performance and condition that informs current work planning and delivery. These measures indicate trends of stable or improving performance against these measures in the long term (up to 2047).

We note that the ORR has raised concerns with regard to the sustainability of Network Rail's track drainage asset policy. Track drainage is a "non-volume" renewals activity, representing approximately 27% of non-volume track renewals expenditure.[36] Network Rail is not reporting any efficiency vs. baseline for drainage renewals during CP4. Network Rail's track efficiency report does not contain any details of drainage renewals activity levels and spend. Due to the comparatively small scale of drainage expenditure compared to the main volume-based components of the track efficiency calculation, we have not scrutinised track drainage expenditure in the context of REEM efficiency reporting for this review.

Overview of volume delivery shortfall

In terms of year-on-year delivery, outturn volumes have not always kept pace with the levels set out in successive Delivery Plan updates. Below we compare the volume profiles set out in successive delivery plans for Plain Line and S&C renewals with actual delivered volumes.



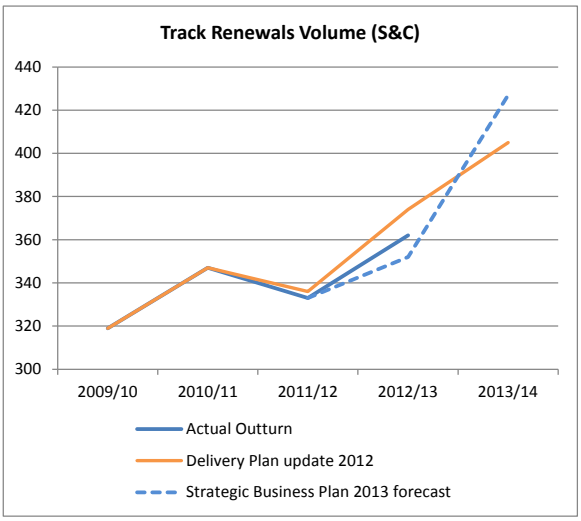


Figure 4 and Figure 5: Track renewals Plain Line and S&C.

Figure 4 and Figure 5: Track renewals Plain Line and S&C. above illustrate:

- A shortfall in volumes delivered during 2012/13 compared to volume in the DPU 2012 budget figures, comprising:
    - a significant shortfall of 390 ckm (18.4%) in Plain Line volume vs. plan; and

[36] Network Rail has provided a breakdown of non-volume spend on the basis of total expenditure during CP4 (without a breakdown of cost within FY 12/13). Figures presented indicated that, of £391m non-volume track renewals spend during CP4, drainage represents £107m, 27% of total non-volume spend. The "actual" CP4 figure for drainage (£107m) is the same as the baseline total, therefore no efficiency is reported for this activity area.

- a smaller shortfall of 12 x S&C units (3%) in volume vs. plan.

- Significant increases in planned delivery volumes for FY 13/14 compared to 2012/13:
  - 29% increase in Plain Line volumes (an additional 496 ckm)
  - 18% increase in S&C volumes (65 x additional units)
- Likely deferral of 280ckm of Plain Line renewal into CP5.

Network Rail has highlighted a number of factors and incidents resulting in the volume shortfall including bad weather, difficulties obtaining access to deliver works, changes to planned works implemented by route managers to save cost or deliver synergies in future work programmes, industrial action and poor contractor performance. Network Rail has however been unable to provide a more detailed breakdown of the 390 ckm shortfall itself.

Implications of volume delivery shortfall

Network Rail has provided us with the chart (Figure 6) below showing the distribution of planned and actual delivered Plain Line renewals for 2012/13.

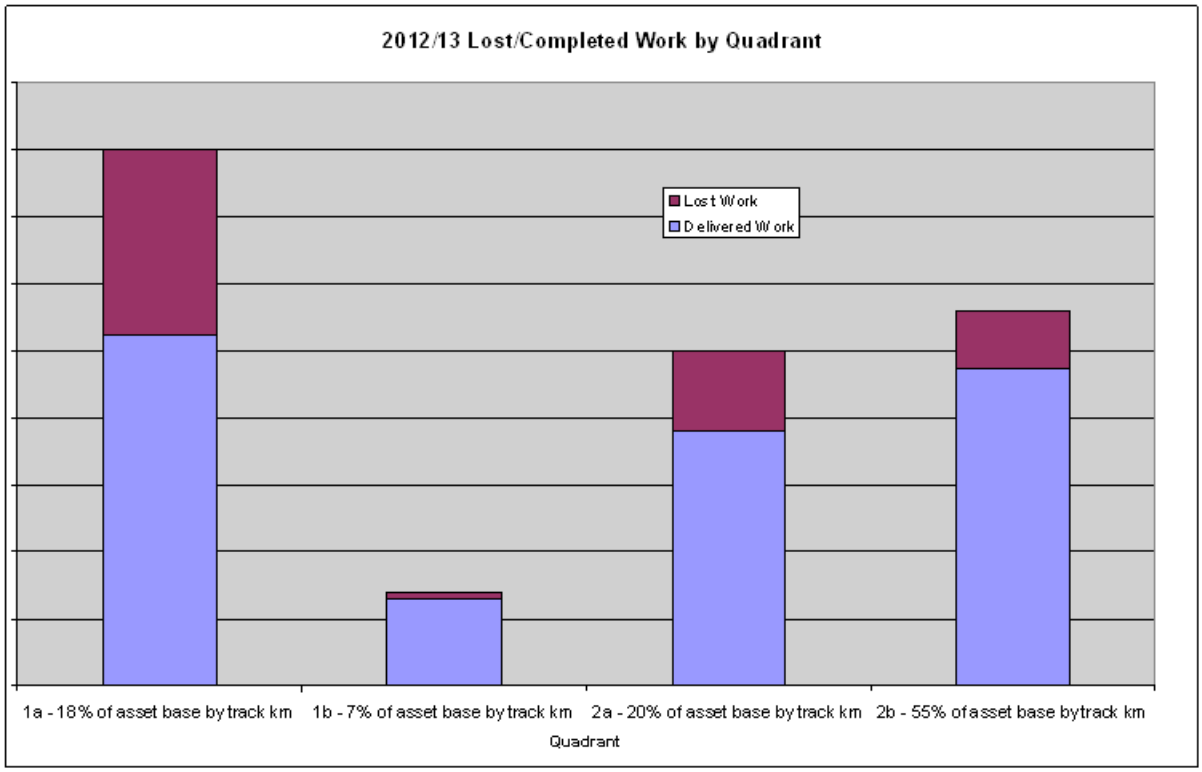


Figure 6: Distribution of track volume delivery by track quadrant.

- Network Rail's analysis shows that approximately 40% of work planned falls into quadrant 1a, which represents "high cost, high frequency" work. The majority of the remaining Plain Line km relate to categories 2a (low cost, high frequency) and 2b (low cost, low frequency) while category 1b (high cost, low frequency) represents both the lowest proportion of asset base (7%) and of lost work.

- However, 1a is also the category with the largest amount of lost work – over a third of the planned work according to the above graph. Network Rail emphasises that this is due to fluidity and flexibility in the work bank in the face of planning issues, which it recognises can lead to inefficiencies from late change and is trying to improve on.
- Network Rail also provided a number of KPIs used to monitor track asset condition and performance, in support of the evidence given on track renewals efficiency. These are the same as those used for maintenance efficiencies.

7.3.6 Track renewals efficiency: reporter opinion

PMA evidence

We consider that the level of clarity and detail contained with Network Rail's explanations of the PMAs and cost savings in its "Efficiency Report (REEM): Track Renewals (FY2012/13)" to be a reasonable evidence base to support Network Rail's efficiency calculations. Notwithstanding this, we have concerns around sustainability which we detail below.

Robustness

In relation to robustness for track assets, we have identified concerns principally around track maintenance activities (as highlighted earlier in the report). We consider that changes to the track renewal programme – including the volume shortfall discussed in this chapter – are likely to have had some impact on the condition and performance of asset during the control period. However, based on the information provided over the course of this review it is not possible for us to conclude whether or not any direct linkage exists between shortfalls in the track renewals programme and non-delivery of regulated performance outputs during CP4.

Sustainability

In the case of Plain Line we consider that delivering an increased volume (+18% on 2012/13) in the final year of CP4 will prove a considerable challenge to the business. Some 40% of volume not delivered in Plain Line during 2012/13 is in 1A critical routes. Very significant increases in delivery volumes for 2013/14 (29% higher than volumes achieved in 2012/13) are planned for this category.

The shortfall experienced in 2012/13 to be indicative of an increasing "bow wave" of undelivered track activity. This was noted in last year's review. Network Rail has stated that there is a "likely deferral" of 280 ckm of Plain Line renewal into CP5. This brings into question the risk of a "reversal"[37] of recorded efficiencies to date at the end of the control period and gives rise to uncertainty that Network Rail can deliver an efficient volume of work that meets the sustainability "test" for this asset group.

We consider the value of work in question is material and noteworthy. However, further analysis would be required in order for us to adequately assess what

[37] i.e. a resulting reduction of efficiency levels in later years.

proportion (if any) of expenditure associated with an "inefficient" deferred volume of work could impact on reported efficiencies in CP4.

7.4 Signalling renewals efficiency

7.4.1 Signalling efficiency calculation

Signalling is the second largest renewals expenditure category, with outturn expenditure for 2012/13 of £551m –over one quarter of the total renewals spend reported under REEM. We set out in Table 19 below the signalling efficiency calculation.

Signalling efficiency, £m (2012/13 prices)	*2011/12*	2012/13
REEM pre-efficient baseline (£m)	*595*	680
Actual expenditure (£m)	*437*	551
Efficiency (£m)	*158*	129
Efficiency (%)	*26.6%*	18.9%

Table 19: Signalling renewals expenditure and efficiency overview

For 2012/13, Network Rail is reporting a Signalling efficiency of £128m (18.9%). This is lower than the 26.6% efficiency reported during 2011/12. It is also slightly below the REEM trajectory renewals efficiency of 20.8%.

7.4.2 Signalling expenditure vs. plan

Total Signalling Renewals Expenditure, £m (2012/13 prices)	2012/13	CP4 Total
2009 CP4 Delivery Plan	482	2,457
Delivery Plan update 2012	571	2,306
Strategic Business Plan 2013 forecast	568	2,421
Actual Outturn	551	2,347

Table 20: Total signalling renewals expenditure

At the end of FY2012/13, the actual outturn spend (£551m) is 2% below the budgeted figure. Network Rail identified slippage from 2012/13 to the final period of CP4, which it attributed to three specific projects – Hertford North, Crewe-Shrewsbury and Gatwick. Network Rail is confident that none of the planned 2013/14 volumes will be deferred into CP5.

7.4.3 Efficiency breakdown by volume and unit cost

We set out in the Table 21overleaf, the signalling efficiency breakdown contained within Network Rail's REEM calculation, setting out savings relating to volume, unit cost and other (non-volume) categories.

Signalling renewals 2012/13	Volume efficiency	Unit cost efficiency	Non-volume efficiency	Total efficiency
Resignalling - SEUs GRIP 1-4				
Efficiency (£m)	£0.0	£50.5	n/a	£50.5
Efficiency (%)	**0.0%**	**16.0%**	n/a	**16.0%**
Resignalling - Modelled SEU GRIP 5-8				
Efficiency (£m)	£29.0	£54.8	n/a	£83.8
Efficiency (%)	**11.8%**	**22.3%**	n/a	**34.1%**
Non volume				
Efficiency (£m)	n/a	n/a	-£5.8	-£5.8
Efficiency (%)	n/a	n/a	**-4.9%**	**-4.9%**
Total efficiency				
Efficiency (£m)	£29.0	£105.3	-£5.8	£128.5
Efficiency (%)				**18.9%**

Table 21: Signalling renewals efficiency breakdown by volume, unit cost & non-volume

Some 77% of signalling renewals expenditure in 2012/13 is broken down by volume and unit cost under the following two categories:

- Resignalling, modelled SEUs (GRIP 1-4), relating to costs incurred in the GRIP 1-4 planning stages of renewals projects.
- Resignalling SEUs (GRIP 5-8) which is based on breakdown of volume and unit cost savings by project in the delivery stages of renewals projects.

Volumes are measured in Signalling Equivalent Units (SEUs) for these two categories. Overall, volume efficiencies account for £29.0m whilst unit cost efficiencies account for £105.3m.

Non-volume expenditure represents 23% of the total expenditure in 2012/13. It includes level crossings, modular signalling and modular level crossings and European rail traffic management system (ERTMS) infrastructure.

An inefficiency of -£5.8m has been reported for non-volume signalling expenditure. Network Rail has indicated this is mainly the result of an additional £25.6m of spend identified within its outturn costs. Network Rail has indicated that the precise origin of this spend is uncertain, but that to take a prudent approach it has not discounted the £25.6m from actual spend, nor added it to the baseline. This means that non-volume spend shows an inefficiency.

7.4.4 Signalling renewals efficiency PMA evidence

For GRIP 1-4 expenditure efficiency is calculated on the basis of evidence of inherent “efficiency assumption” within planned works. Network Rail has provided a limited level of detail other than incurred cost divided by (fixed) volume to ascertain savings on a unit rate basis.

For GRIP 5-8 signalling spend, associated with infrastructure delivery and commissioning, volume and unit cost savings are calculated for each individual resignalling project currently "live" within Network Rail's renewal programme. Network Rail has provided an updated table with 21 live GRIP 5-8 projects feeding into the FY 12/13 efficiency calculation. For each project the original (PR08) baseline volume assumed is set out and the (expected) outturn volume, on the basis of which the volume saving is calculated. Given the long-term nature of most resignalling projects, Network Rail takes an "earned value" approach, calculating the full scope of volume and unit cost savings that the given project is set to achieve over its duration and then apportioning the relevant share of expenditure and efficiency to the year, based on the proportion of that project's spend that falls in the given year.[38] Commentary on the positive management actions or scope changes that have led to these efficiencies has been provided for almost all projects where volume and unit cost efficiency was claimed on this basis. The following positive management actions are listed:

- Remodelling and rationalisation
- Use of solid state interlocking and other technologies
- Security measures
- Alignment with other assets
- Contractor milestones, and
- Policy
- Other

Non-volume efficiencies are principally associated with expenditure for level crossings and modular signalling. We note that although Network Rail has presented a breakdown of expenditure in volume and unit cost terms for ERTMS and level crossings within the spreadsheet explaining the basis of its signalling efficiency calculations efficiency explanations, it does not include these within the main REEM calculation. We understand this is due to Network Rail being unable to provide an appropriate baseline measure of volume and unit cost from the 2008/09 baseline year against which to measure efficiency. Non-volume efficiency measures cited include a reduction in the level of optioneering through to the packaging of sites to reduce design costs and risks.

7.4.5 Signalling renewals efficiency robustness and sustainability

We discussed the impact of signalling related failures on Network Rail's performance in Chapter 6. We highlighted that signal failures of more than ten

[38] It is worth noting that in terms of the total SEU count in the PR08 and Delivery Plans, these are calculated on a different basis to the "earned value" approach used for REEM. Delivery Plan totals use the total SEU counts upon completion of a given project as the volume measure. On this basis, the delivery plan reporting of volume is effectively separate from calculation of volume in REEM, with a different approach followed.

minutes exceed target, as was the case for the points failure measure[39]. (Note that the track circuit failure target was met.) Network Rail informed us that the reason for the two asset targets in question not being achieved was more to do with other factors. Network Rail explained during meetings that signal failures have been mainly the result of weather conditions causing issues both with flooding of equipment leading to failure, and with defects / failures in track circuits and switches that have led to failures of associated signalling equipment. We consider this reasonable, given the information and analysis presented on the nature of causal factors driving the robustness issues identified. Alongside extreme weather, civils assets (such as earthworks and drainage) may therefore have more to do with the failure of signalling than the signalling asset renewal programme itself.[40]

With respect to sustainability, Network Rail has provided evidence of planning and change control processes for its re-signalling programme (which represents the bulk of its signalling renewals spend reported under REEM). This appears to demonstrate that the planning of its re-signalling programme going forward is in good shape. As noted earlier and last year, the risk of volume deferral for re-signalling projects into CP5 appears minimal. In addition, data with respect to the Signalling Stewardship Indicator (SSI) indicated a general trend of improving asset condition during CP4. However, for level crossings renewals, which account for approximately £77m of FY 12/13 spend (13% of total signalling renewals spend reported under REEM), volumes delivered were significantly below planned levels. Network Rail has reported in its 2013 Annual Return that during FY 12/13 it delivered 51 level crossing renewals, against a target of 79. This contrasts with Network Rail's 2012 Delivery Plan update, which projected a volume for FY 12/13 of 90 level crossing renewals. The ORR has flagged this as a sustainability concern within its annual review.

7.4.6 Signalling renewals efficiency reporter opinion

We consider the breakdown of signalling expenditure and efficiency on a volume and unit cost basis provides a satisfactory overview of the nature of efficiencies delivered.

To substantiate the positive management actions driving the efficiencies, Network Rail provided detailed breakdowns of savings made on a project-specific basis for GRIP 5-8 expenditure, as well as details of savings across the different non-volume expenditure categories. However, for GRIP 1-4 expenditure limited details were provided.

Although efficiencies in this area are based on cost savings assumed to be inherent within the planning process, no details of how Network correlates volume and unit cost values to GRIP 1-4 expenditure have been provided. As recommended last year, we consider it would be beneficial for us to have sight of these to provide us with a greater level of confidence around the efficiencies being reported. Notwithstanding this, we consider the PMA evidence for signalling renewals to be reasonable.

[39] The cause of points failures can typically be attributed to the signalling asset base or the track asset.
[40] As noted elsewhere, civils assets are not included in the REEM measure of efficiency.

Network Rail's renewals programme is, for the most part, being delivered in line with planned timescales. It has stated that it remains on course to deliver planned renewals up to the end of CP4. For resignalling projects, which represent the bulk of signalling renewals spend, Network Rail has provided evidence that its planning and change control processes are working. The signalling renewals programme shows a greater degree of stability in planning and delivery than in other areas.

We note that for renewals of level crossings, which account for approximately £77m of FY 12/13 spend (13% of total signalling renewals spend), volumes delivered during FY 12/13 were significantly below the levels targeted within Network Rail's 2012 Delivery Plan update. As noted above, the ORR has flagged this as a sustainability concern within its annual review.

With respect to robustness, we have highlighted Network Rail's view that that signal related failures are arguably primarily due the non-performance of other asset groups in coping with (extraordinary) weather. On this basis, it could be possible to conclude that signalling renewals and associated efficiencies are consistent with the robustness test being met.

From the perspective of sustainability, the SSI results indicate a long term in improvement in asset condition and performance, indicating the signalling programme is sustainable in the long term. On this basis, we consider the evidence to demonstrate the sustainability tests with respect to renewals of signalling assets to be satisfactory.

7.5 Buildings renewals efficiency

Buildings renewals[41] expenditure in 2012/13 totalled £203m, which represents 9.9% of total Network Rail renewals expenditure for the year.

Buildings expenditure, (2012/13 prices)	***2011/12***	**2012/13**
REEM pre-efficient baseline (£m)	*347*	304
Actual expenditure (£m)	*275*	203
Efficiency (£m)	***73***	**100**
Efficiency (%)	***20.9%***	**33.0%**

Table 22: Buildings renewals expenditure and efficiency overview

Network Rail has calculated the efficiency figure for the year to be 33.0%, which is higher than previous years in both absolute and percentage terms, and the highest percentage of any other asset renewals category. It is significantly above the REEM trajectory efficiency of 20.8%.

Buildings renewals expenditure is the largest expenditure category for which expenditure and efficiency is not broken down on a volume and unit cost basis. No other efficiency breakdown (e.g. by asset sub-category) has been provided for the buildings renewals efficiency calculation.

[41] The term "operational property" is also used to describe this asset category.

7.5.1 Buildings expenditure vs. plan

The actual expenditure in 2012/13 was £203m, which was 23% lower than the figure projected in the latest budget (Delivery Plan update 2012).

Total Buildings Renewals Expenditure, £m (2012/13 prices)	2012/13	CP4 Total
2009 CP4 Delivery Plan	262	1,369
Delivery Plan update 2012	265	1,321
Strategic Business Plan 2013 forecast	242	1,284
Actual Outturn	203	*1,236**

** predicted based on Network Rail's 2013/14 forecasts*

Table 23: Total Buildings renewals expenditure

As indicated above, 2012/13 outturn expenditure was around £62m (23%) lower than budgeted in the DPU 2012. Network Rail is projecting a slightly increased level of expenditure for the final year of CP4 (6% more than in 2012/13). Network Rail is now forecasting that for the final year of CP4 it will be able to make efficiency savings of £140m (39% vs. baseline).

7.5.2 Buildings renewals efficiency PMA evidence

Network Rail has broken down total buildings efficiency amount into five sub-categories that relate to the following five PMAs:

- Work bank planning (£53.7m)
- Cost & Modelling (£2.8m)
- Design to Cost (£10.8m)
- Efficient Project Governance (£4.8m)
- Efficient Contract Management (£27.8m)

Network Rail has indicated that the key drivers for cost savings have remained unchanged from last year. It is not clear from the information provided how Network Rail has calculated the efficiency amounts associated with each category.[42]

[42] The first four PMA categories (Work bank planning, Cost & Modelling, Design to Cost and Efficient Project Governance) totalling £71m are derived from total efficiency sums "hard coded" into a spreadsheet entitled "IP model - benefit profile (Source: AL / B&C CP4 Efficiency Report 23/6/11)", which makes reference to buildings and civils efficiency savings. The remaining £28m, allocated to efficient contract management, appears to be derived from a calculation (in the same spreadsheet) that subtracts the total efficiency amount (£99m) by the four other categories. No details of the assumptions underpinning these efficiency amounts have been provided.

7.5.3 Robustness and sustainability

In order to demonstrate compliance with asset policy from a robustness and sustainability perspective, Network Rail has provided an 'investment policy verifier' spreadsheet and an Operational Property Policy 'ready reckoner' that are used to ensure that projects meet the requirements of asset policy. Network Rail has also presented Station Stewardship Measure (SSM) and Light Maintenance Depot Stewardship Measure (LDSM) data. The results reported for 2012/13 and earlier in CP4 indicate improvements in Network Rail's scores against both measures.

7.5.4 Buildings renewals efficiency reporter opinion

From the perspective of robustness and sustainability, we consider the evidence provided in relation to policy compliance and asset condition measures is reasonable, insofar as it demonstrates buildings renewals activities to date have not resulted in any asset deterioration that we believe could represent a material risk in the future.

However, it is not clear how the efficiency amounts associated with the PMAs cited by Network Rail have been calculated. We have been unable to link the claimed efficiency savings with any cost information at sub-asset or project level.

Network Rail provided spreadsheets containing information from the buildings business plan to help explain changes to the buildings programme by asset type and at a project level. However, we have been unable to reconcile the numbers contained within these spreadsheets with those presented in the REEM calculation.

More detailed evidence demonstrating how £100m of efficiencies reported through REEM have been achieved would be required for us gain an appropriate level of comfort with this value.

We conclude that without further information, there is a material degree of uncertainty associated with the value of the buildings efficiency being reported by Network Rail.

7.6 Telecoms renewals efficiency

This chapter sets out the findings of our review of the telecoms efficiencies (excluding FTN[43] assets) reported through the REEM efficiency measure. Although FTN assets also form part of the asset base managed by Network Rail's Telecoms asset management team (NRT), these are reported as a separate renewals asset category under REEM and we review FTN efficiencies in a separate section in this report.

Non-FTN telecoms expenditure in 2012/13 totalled £45.2m, which represents 2.2% of total renewals expenditure for the year.

[43] We note that in the context of this report, FTN renewals relate to all FTN and GSM-R related infrastructure.

As illustrated in Table 24, Network Rail has reported telecoms efficiency £11.6m (20.4%). This is close to the REEM trajectory efficiency for renewals of 20.8%, but less than the efficiency claimed last financial year (in both absolute and percentage terms).

Telecoms expenditure, (2012/13 prices)	*2011/12*	2012/13
REEM pre-efficient baseline (£m)	*55*	57
Actual expenditure (£m)	*41*	45
Efficiency (£m)	*14.1*	12
Efficiency (%)	*25.4%*	20.4%

Table 24: Telecoms renewals expenditure and efficiency overview

7.6.1 Telecoms expenditure vs. plan

Telecoms renewals expenditure results for the 2012/13 financial year and projections for CP4 totals are presented in Table 25below.

Telecoms Renewals Expenditure, £m (2012/13 prices)	2012/13	CP4 Total
2009 CP4 Delivery Plan	49	288
Delivery Plan update 2012	70	266
Strategic Business Plan 2013 forecast	53	279
Actual Outturn	45	279*

** SBP data.*

Table 25: Telecoms renewals expenditure

As indicated above, actual outturn spend is £25m (36%) lower than the amount budgeted in the DPU 2012. As a result, final year expenditure would need to double in order for CP4 renewals budgeted within DPU 2012 to be delivered.

7.6.2 Telecoms renewals efficiency PMA evidence

Network Rail has provided information relating to PMAs driving telecoms efficiencies on a project-by-project basis, which we summarise overleaf.[44]

[44] We note the telecoms efficiency total of £12.2m calculated in PMA efficiencies table differs slightly from the REEM efficiency amount of £11. We understand that the figures are based on different inflation assumptions and we do not consider the difference to be material.

PMA (Project number and name)	Non-volume efficiency (£m)
106695 - Telecoms SISS Renewals FGW	0.8
123087 - LNE Concentrator Renewals 12/13 (PA Unit Cost Reduced)	1.1
123087 - LNE Concentrator Renewals 12/13 (Reduction in Concentrator Volumes)	0.3
123488 - Mersey Sub Surface PA and LED Renewals	0.3
131634 - East Croydon Redevelopment SISS	0.3
123088 - LNE Cable and Route Life Extension and Renewal.	0.3
112217 - Dunfermline LLPA	1.7
119458 - SEA Victoria PA\VA Renewal	0.3
121909 - Ashford Concentrator Renewals	1.2
123756 - Signalling Power Distribution Renewals	0.9
123084 - LNE Retail Telecoms 12/13.	0.5
112228 - York Concentrator	0.5
118807 - Cable and Route Renewals	0.4
Other	3.7
Total	**12.2**

Table 26: Telecoms PMA efficiency breakdown.

The twelve largest project efficiencies presented above account for 70% of the total efficiency amount. Network Rail has provided a qualitative description of efficiencies, together with quantitative figures drawn from detailed spread sheets which capture data from '*SP&C project efficiency scorecards'* and 'Programme Manager's period reports'. These also document any efficiency that has been achieved above and beyond the anticipated savings through the original AFCs.

7.6.3 Telecoms renewals efficiency robustness and sustainability

To demonstrate robustness and sustainability Network Rail has provided results reported under the metric 'Telecoms Condition'. This takes into account asset condition, maintainability, operability and reliability and is fed by the information in Network Rail's Decision Support Tool (DST). The score achieved under DST in 2012/13 is 0.966, an improvement on the previous year's rating of 0.940. However, we note that the metric is still scoring less than 1.0. If this was not to improve, we understand this could lead to a reduction in asset remaining life which may have implications for asset sustainability.

7.6.4 Telecoms renewals efficiency reporter opinion

We consider the PMA evidence provided to substantiate the reported telecoms efficiency savings to be reasonable. Information was comprehensive and sufficiently granular to justify the efficiencies claimed on a project-by-project basis.

In relation to robustness for telecoms assets, we consider the principal areas of concern to be around maintenance (see Chapter 6) rather than the renewals programme. With respect to sustainability, we note there has been a general improvement in reported asset condition. However, the telecoms condition metric indicates a shortfall albeit small in the remaining life of the asset over time. This may raise a question around the sustainability of the asset base.

If improvements in the score under this measure continue (so that 1 is achieved) this would suggest that the renewals programme is contributing to delivering an increasingly sustainable outcome for the asset base. On this basis, efficiencies could be considered to have met the relevant tests for sustainability.

7.7 FTN renewals efficiency

7.7.1 FTN efficiency calculation

This chapter sets out the findings of our review of the FTN efficiencies reported through the REEM efficiency measure. We note that in the context of this report, FTN renewals relate to all FTN and GSM-R related infrastructure.

FTN expenditure in 2012/13 totalled £142.0m, which represented 6.9% of total renewals expenditure for the year.

We set out in Table 27 the FTN renewals efficiency calculation for 2012/13 (as well as 2011/12 for comparison). The data show Network Rail reported an inefficiency of 18.8%, higher than the 3.2% inefficiency reported for 2011/12. This compares with the positive REEM trajectory efficiency for renewals of 20.8%. It is important to note here also, that this year's result is just under half of the total anticipated inefficiency predicted for FTN renewals across the entire CP4 (£58m).

FTN efficiency, (2012/13 prices)	*2011/12*	2012/13
REEM pre-efficient baseline (£m)	*167*	120
Actual expenditure (£m)	*173*	142
Efficiency (£m)	*-5*	-22
Efficiency (%)	*-3.2%*	-18.8%

Table 27: FTN expenditure and efficiency overview

Network Rail has identified that the inefficiencies reported in FTN renewals are due to additional scope items across a variety of projects. These items have been identified as:

- additional asset testing (involving radio signal verification, additional commissioning and network functional testing);
- increase in activities related to cell planning such as increase mast sites and tunnel solutions, as well as additional fill sites for signal testing);
- trespass and vandalism measures; and
- snagging works for early built sites in readiness for asset handover to maintenance.

Cost escalation has in part been offset by efficiencies found in relation to cab mobile fit-out work.

7.7.2 FTN expenditure vs. plan

FY 2012/13 FTN renewals expenditure is presented in Table 28. Actual outturn spend of £142m is the lowest during CP4. Inefficiency of 18.8% is the highest reported to date.

FTN Renewals Expenditure, £m (2012/13 prices)	2012/13	CP4 Total	Planned deferral of total CP4 spend into CP5
2009 CP4 Delivery Plan	49.9	804	
Delivery Plan update 2012	118.0	824	
Strategic Business Plan 2013 forecast	142.0	873	
Actual Outturn	142.1	*870**	*13*

**based on Network Rail's 2013/14 forecasts*

Table 28: FTN renewals expenditure vs. plan

As indicated above, Network Rail's outturn spend was significantly above budget, with Network Rail also now projecting higher total CP4 spend. This is attributed to an increase in the scope of FTN renewals, which is also the reason given for this year's high level of reported inefficiency (see below).

The current forecasts presented by Network Rail suggest a slippage of £13m from CP4 into CP5 for FTN renewals. It has identified that this slippage can be attributed to cab mobile fitment and legacy system removal costs[45].

7.7.3 FTN renewals efficiency PMA evidence

Network Rail has provided a high level description of factors causing cost increases that underpin the reported inefficiency for 2012/13. The reasons given for additional spend are based around requirements for additional scope for planning and delivery activities to deliver the planned FTN capability. Additional

[45] Network Rail has indicated that it has discussed this slippage with the ORR and hopes to accelerate the work plan to include all the scope and costs of these activities within CP4 (avoiding deferral into CP5). However this is not reflected in Network Rail's FTN expenditure projections, which show the £13m slippage into CP5 described above.

spend has also been incurred for the purposes of trespassing and vandalism mitigation.

7.7.4 FTN renewals efficiency robustness and sustainability

FTN assets, although reported as a standalone renewals expenditure category under the REEM, are also captured within Network Rail's telecoms asset management policy (although, the policy makes limited reference to FTN asset management). Network Rail has reported that the "FTN programme itself does not have an asset policy but is a programme of work more akin to enhancements."

During our review of the 2011/12 regulatory accounts, Network Rail provided us with FTN authority papers, which demonstrated compliance with programme controls. Network Rail also provided the following documents:

- Functional Requirements Specification; and
- Business Requirements Specification.

We have assumed that these documents remain valid for this year's review.

It is our understanding that Network Rail will monitor and report on FTN asset performance and condition in order to demonstrate robustness and sustainability during CP5.

7.7.5 FTN renewals efficiency reporter opinion

With regard to robustness and sustainability, Network Rail has indicated that FTN assets will be captured within Network Rail's telecoms asset management policy - although we note that the policy makes limited reference specifically to FTN asset management. We have also taken into account documentation covering functional and business specifications that form the basis for planning and delivery of the FTN infrastructure. This was provided to us for last year's review. Assuming that (in the absence of any evidence to the contrary) this documentation remains valid, we consider that this provides a reasonable indication of the robustness and sustainability of the FTN infrastructure renewals programme.

Network Rail identified -£22.6m of inefficiency in FTN renewals spend in 2012/13. We consider Network Rail's explanation of factors driving the additional spend to be reasonable. As the FTN renewals result achieved was not efficient, Network Rail has not provided information on PMAs that have helped drive efficiency. Instead, a schedule was provided that outlines the additional scope of works undertaken in CP4 compared to baseline predictions and justifies the additional costs resulting in the reported inefficiencies.

7.8 Electrification renewals efficiency

7.8.1 Electrification efficiency calculation

This section of our report relates to the efficiencies that Network Rail has reported for electrification expenditure, which accounts for approximately 5% (£101m) of Network Rail's total renewals expenditure during the year.

We set out the electrification efficiency calculation in Table 29 below.

Electrification efficiency, (2012/13 prices)	*2011/12*	2012/13
REEM pre-efficient baseline (£m)	*123*	108
Actual expenditure (£m)	*106*	101
Efficiency (£m)	*17*	7
Efficiency (%)	*14.1%*	6.8%

Table 29: Electrification expenditure and efficiency overview

As indicated above, Network Rail's reported efficiency of 6.8% is lower than the 14.1% efficiency reported for 2011/12.

Network Rail has indicated that significant efficiencies in earlier years of CP4 were driven by a change from age-based to condition-based renewals. This has driving significant scope related cost savings.

7.8.2 Electrification expenditure vs. plan

Network Rail has reported total Electrification expenditure of £100.6m for 2012/13, representing approximately five per cent of total renewals expenditure during the year. Table 30 below details the electrification expenditure and forecasts over CP4.

Total Electrification Renewals Expenditure, £m (2012/13 prices)	2012/13	CP4 Total	Planned deferral of total CP4 spend into CP5
2009 CP4 Delivery Plan	124	696	
Delivery Plan update 2012	190	702	
Strategic Business Plan 2013 forecast	122	634	
Actual Outturn	101	608*	*103*

** predicted based on Network Rail's 2013/14 forecasts*

Table 30: Electrification renewals expenditure

As indicated above, Network Rail's outturn spend was around £89m (47%) lower than budget. Network Rail has cited four specific projects that account for around

£50m of the £89m total variance,[46] and has indicated that change control logs are in the process of being completed to account for all variances in the plan.

Network Rail has indicated that is now projecting a deferral into CP5 of £103m. This has been attributed to a review regarding the scope of the SCADA[47] project (£42m), and the deferral of DC switchgear and LV cables renewals (£61m). We discuss this further below.

7.8.3 Electrification renewals efficiency PMA evidence

Network Rail reports all Electrification expenditure within a single non-volume category under REEM. The *Efficiency Report Electrification & Plant Renewals Report - April 2013*, details and tracks forecast volume savings across electrification activities, as well as non-volume efficiencies (which contribute almost double the value that volume based efficiency provide).

Network Rail's efficiency evidence is sub-divided into scope related efficiencies and activity based efficiencies.

Network Rail has provided an overview of the scope changes against baseline for eleven key asset sub-types, with an explanation of the main factors driving the relevant scope savings. Such savings account for £2.9m (40%) of the total electrification efficiencies. These efficiencies have been documented in detail and provide justification for different asset sub-categories across a number of projects. The detail provided to justify these efficiencies appears robust and presents results against baseline forecasts.

Activity based efficiencies represent roughly £4.6m – 60% of the total electrification renewals efficiencies being claimed. The following has been provided describing the savings being made:

- Use of internal labour to complete onsite works
- Design completed in house rather than with expensive contractors
- Tenders received being lower than expected but contractors having to deliver over longer time frames
- Packaging of works into geographical areas to reduce mobilisation costs
- Extended possession negotiated enabling longer slots with more work time and efficient delivery
- Utilising the same contractor and teams to reduce learning curve associated with new teams
- Projects delivered by maintenance teams Efficiency PMAs - Electrification & Points.

[46] 101567 – GE Project - £37.3m
103120 – DC Switchgear Renewal - £6.1m
BBD020 – National Scada Project - £5m
106410 – HV Cables – £2.1m
[47] SCADA (Supervisory Control and Data Acquisition) is a computerised management system for the monitoring and control of the E&P infrastructure.

The document appears to make reference to a separate PMA Efficiencies spreadsheet "A4". We assume this contains further details of the workings underpinning the reported savings of £4.6m apportioned to activity-based efficiencies. This has not yet been provided by Network Rail for review.

7.8.4 Electrification renewals efficiency robustness and sustainability

The principal focus of Network Rail's evidence to demonstrate robustness and sustainability relates to compliance with asset policy and delivery of outputs. Network Rail has changed from an age-based to a condition-based policy. In its electrification efficiency report, Network Rail indicates that implementation of the change in approach began in 2009/10, with the policy formally endorsed in 2011. The resulting change in approach has resulted in reduction in planned volumes over the course of CP4, as reflected in the successive Delivery Plan updates from 2010 – 2012. These reductions are a result of the change from age-based to condition-based policy.

Evidence of compliance with this policy can be gained from monitoring the condition of Electrification assets. To this end, Network Rail has provided commentary derived from its draft Annual Return on improvements in electrification metrics have occurred over the course of CP4. These include:

- Alternating Current traction power incidents: fifty-two incidents were reported for 2012/13, which was described as an increase from the previous year, but below the 5-year average. Network Rail identified the trend for this asset sub category as 'an improvement'.
- Direct Current traction power incidents causing train delays: eight incidents were recorded during 2012/13. This was noted by Network Rail as being the 'lowest figure in the last five years and below the long term trend of 14'.
- Electrification condition – AC track feed stations and track sectioning points showed an improvement in score in 2012/13, from 2.57 to 2.29.
- Electrification condition – DC traction substations has also showed an improvement in score in 2012/13 from the previous year (2.38 compared to the previous year's result of 2.45).
- Electrification condition – AC traction contact systems has improved from 1.62 to 1.4 in 2012/13.
- Electrification condition – DC traction contact systems has improved from 1.62 to 1.4 in 2012/13.

The majority of these metrics indicate stable or improving performance / asset condition.

7.8.5 Electrification renewals efficiency reporter opinion

In relation to robustness for electrification assets, we consider the principal area of concern to be around maintenance (as highlighted in Chapter 6 previously).

From the perspective of sustainability, we consider that Network Rail's deferral of £103m of its renewals programme into CP5 raises questions about the impact that this non-delivery will have on the electrification asset base. Although performance and condition metrics have shown an improving trend during CP4, Deferral of £103m of renewals activities during CP4 may adversely affect the sustainability of its electrification asset base in the future.[48] As with track, this could lead to a "reversal"[49] of efficiencies being recorded in CP4.ORR guidance states that deferral of renewals spend beyond the control period is considered inefficient, unless Network Rail can demonstrate that the deferral is the result of more efficient practices, i.e. genuine scope efficiency. [50]

Further analysis would be required in order for us to adequately assess what proportion (if any) of expenditure associated with "inefficient" deferral could impact on reported efficiencies in this control period.

We consider that Network Rail's PMA evidence explaining the £2.9m of efficiencies associated with project scope reductions (around 40% of the total reported efficiency saving) to be reasonable. For the remaining portion of efficiencies associated with activity-based cost savings (£4.9m), it is not clear how the efficiency amount has been calculated. We do not consider that Network Rail has provided sufficient evidence to support this portion of reported efficiency. Further detail would be required for us to amend our opinion in relation to this element of efficiency being reported.

7.9 Plant & Machinery renewals efficiency

7.9.1 P&M renewals efficiency calculations

We summarise reported efficiency for Plant & Machinery (P&M) in the Table 31 below.

Plant & machinery expenditure, £m (2012/13 prices)	*2011/12*	2012/13
REEM pre-efficient baseline (£m)	*65*	106
Actual expenditure (£m)	*120*	82
Efficiency (£m)	*-55*	25
Efficiency (%)	*-85.4%*	23.2%

Table 31: Plant & Machinery renewals efficiency overview

Network Rail is reporting P&M efficiency of £24.6m, or 23.2% vs. baseline. This marks significant improvement on last year's 85% inefficiency. The pre-efficient baseline is substantially higher than that for last year. Network Rail justifies this as the result of slippage of projects from previous years (NDS), as well as an adjustment for "Modular S&C" which was transferred over from track.

[48] Network Rail has stated that the SCADA programme is not currently assessed and reported in a formal manner, and that it considers deferral of spend under this programme does not have a sustainability impact.
[49] i.e. a resulting reduction of efficiency levels in later years.
[50] "Monitoring and Treatment of Network Rail's Underspend and Efficiency Policy Statement", ORR, (January 2006)

Network Rail divides P&M expenditure by three activity areas:

- Signalling, power and communications renewals (SP&C);
- Civils renewals; and
- National Delivery Scheme (NDS), or mobile plant, representing vehicles etc.

Network Rail is reporting significant efficiency, of 37% and 84% related to SP&C and Civils expenditure respectively, in contrast to 8.5% inefficiency related to NDS expenditure, as indicated in Table 32below.

Plant & machinery renewals 2012/13	Baseline (£m)	Actual (£m)	Efficiency amount (£m)	Efficiency %
SP&C P&M	53.3	33.4	19.8	37.3%
NDS P&M	43.1	46.7	-3.7	-8.5%
Civils P&M	9.6	1.5	8.0	83.9%
Plant & Machinery total	**105.9***	**81.7**	**24.2***	**22.9%***

Table 32: Plant and machinery renewals efficiency by expenditure area (Source: Network Rail Plant & Machinery report[51]).

* - We note that the total baseline and efficiency amounts in the table above are based on the figures presented in Network Rail's breakdown of P&M spend and efficiency in the document "Consolidated template for Arup using P13 excl maint pages.pdf". These figures differ from those presented in Network Rail's final REEM model.

7.9.2 Plant & Machinery expenditure vs. plan

We compare in the table below P&M renewals expenditure figures / projections for 2012/13 and CP4 between the 2009 CP4 Delivery Plan, the 2012/13 budget (DPU 2012), SBP and actuals.

P&M Renewals Expenditure, £m (2012/13 prices)	2012/13	CP4 Total
2009 CP4 Delivery Plan	64	446
Delivery Plan update 2012	101	454
Strategic Business Plan 2013 forecast	110	540
Actual Outturn	82	540*

** SBP data.*

Table 33: P&M renewals expenditure, £m.

As indicated above, whilst Network Rail's original 2009 CP4 Delivery Plan projected total spend during CP4 of £446m, the latest projections within the SBP 2013 forecasts a substantial increase to £540m.

For 2012/13, outturn was £82m; 26% lower than forecast the £110m in the SBP. A doubling of P&M renewals expenditure up to £164m will be required in the

[51] The total baseline figures provided in Network Rail's final REEM model (£106.3) presents small discrepancies with the breakdown provided in the Plant & Machinery report.

final year of CP4 in order to deliver the full scope of renewals expenditure projected in the SBP 2013 forecast. No documentation has been provided with regard to the nature of increased expenditure, or whether any deferral of expenditure into CP5 is currently foreseen.

7.9.3 P&M renewals efficiency: PMA evidence

Network Rail has only provided evidence to support the portion of expenditure associated with NDS (some 57% of the total). An inefficiency is reported for this area. Network Rail has informed us that the NDS inefficiency relates mainly to the one-off purchase of fleet vehicles (which Network Rail has stated will yield long-term savings due to reduced vehicle rental costs), as well as additional maintenance costs on its plant.

No evidence supporting the efficiencies reported for SP&C and civils has been provided.

7.9.4 P&M renewals efficiency: Robustness and sustainability

Network Rail has not provided any evidence demonstrating the robustness and sustainability of its Plant & Machinery renewals expenditure or efficiency savings.

7.9.5 Plant & Machinery renewals expenditure: reporter opinion

PMA evidence

Whilst Network Rail has provided evidence underpinning the expenditure and associated inefficiency associated with the NDS portion of P&M expenditure, no evidence has been provided to support the efficiency amounts reported for the other areas of P&M spend, which account for the entirety of efficiency savings being reported. On this basis, we are not able to form any opinion with regard to the validity of efficiency savings reported by Network Rail for P&M renewals expenditure.

Robustness & sustainability

It is not possible for us to opine on the robustness and sustainability of Network Rail's P&M renewals programme, because we have not received any documentation over the course of this review that relates to P&M robustness and or sustainability.

8 MUC (Maintenance Unit Cost) Confidence Grading Analysis

8.1 Introduction and background

We set out in this chapter our Confidence Grading Analysis of Maintenance Unit Costs (MUCs) included in the 2012/13 Regulatory Accounts.

Network Rail's MUC codes have changed during previous reporting years, increasing from an original 47 MNT codes to 108 in the current year. The company reported 30 of these codes in the 2012/13 Regulatory Accounts.

Arup completed three previous data quality and confidence grading analyses of MUC unit costs, the results of which were as follows:

- September 2010 - confidence grading of C4.
- September 2011 - confidence grading of C2.
- September 2012 - confidence grading of B2.

The above improvements in the assessed confidence gradings are indicative of the effort channelled into improving MUCs in recent years, resulting in a system that is a significant improvement over the initial MUC framework. However, whilst this year's review has taken into account ongoing developments in the MUC process, Network Rail was unable to provide source data within the timescales required for us to undertake our review. This has had a major impact on our assessment. We discuss this in further detail in the sections that follow.

8.2 Approach

Reliability

Our approach to the reliability grading assessment has combined our existing knowledge and analysis of the MUC process gained through previous reviews with the review of further process developments / improvements, most notably in relation to the MUC handbook and evidence of its utilisation.

However, our reliability assessment has been impacted by issues encountered in the provision of MUC source data (as referred to above). Arup requested week 1 and week 3 data presented in the "Unit Cost 4" reports at the start of our review in mid-April (in line the approach taken in previous years). Network Rail was unable during this period to provide the week 3 reports for reporting periods 2-9.[52] We understand this was due to an update to the Business Objects system, causing the Unit Cost 4 report used to produce the week 3 data extract to become corrupted. We discuss the impacts of this below.

Network Rail has informed us that it put mitigations in place (involving the use of alternative system reports to validate initially inputted Week 1 data). Network

[52] Network Rail was not able to provide replicated versions of the Week 3 reports until 3rd July 2013 - more than two months later than requested by Arup. These replicated week 3 reports have not been taken into account in our review.

Rail provided records of correspondence from January 2013, documenting the implementation of a fix to the error in the system to ensure correct Week 3 data reports going forward. However, this documentation does not refer to any alternative validation process put into place prior to this (i.e. during April – December 2012 when the systems error was occurring).

This issue has also influenced our approach to the accuracy grading assessment.

Accuracy

Our accuracy grading approach is based on analysis of Business Objects files containing week 1 and week 3 data for each period. We combine the following calculations to derive an estimation of the overall accuracy level of the MUC data for each respective MNT code:

- **YTD variance** – analysis of variance between Year To Date (YTD) and baseline unit cost values.
- **Period variance** – variance between period and baseline unit cost values for each route for each period.
- **Costs With No Units** – review of proportion of Week 3 figures that have a cost associated with them but no volume of work recorded.
- **Units With No Costs** – review of proportion of Week 3 figures that have a work volume recorded but no cost.
- **5% Error non-correction** – measure reflecting the total impact in accuracy terms of uncorrected errors, assuming that 1 out of every 20 errors (i.e. 5%) goes uncorrected.

For each of the above calculations, the resulting figure for the given MNT code is correlated to an accuracy score, the logic of which corresponds to the accuracy scoring component of the Confidence Grading. The above indicators are then averaged out, via a rounding formula. Full details of our MUC Confidence Grading methodology are set out in Appendix H.

As indicated in the previous section, Network Rail was not able to provide week 3 data for periods 2-9 of the year FY 12-13, which contain corrected MUC data from each period feeding into the final reported numbers, within the requested timescales for this review. As a result, we have undertaken a nominal assessment of accuracy for each MNT code based on the assumption that errors were corrected during periods 2-9, in line with the other reporting periods (for which we were provided with all requested files). However, our overall accuracy grading reflects the fact that Network Rail did not provide all the source data that we requested within the requested timescales in order to deliver our review in line with our usual defined approach.

8.3 MUC confidence grading – results

8.3.1 Reliability

We set out in Table 32 below the results of our Reliability Grading. Because the formulation process is exactly the same for all MUCs, the reliability grading applies to all MNT codes.

Reliability Band	Description	Comments
A	Sound textual records, procedures, investigations or analysis properly documented and recognised as the best method of assessment. Appropriate levels of internal verification and adequate numbers of fully trained individuals.	Although we consider the MUC process is documented to a satisfactory level, we consider there to be too many errors / inconsistencies in the documentation to give confidence that the handbook has been adequately reviewed or used.
B	As A, but with minor shortcomings. Examples include old assessment, some missing documentation, insufficient internal verification, undocumented reliance on third-party data.	Notwithstanding the major shortcomings associated with lack of source data (as documented above), we consider that the significant shortcomings previously identified through our reviews have been addressed, along with many of the minor shortcomings. We consider previous concerns surrounding the lack of design documentation and the appropriateness of the MUC handbook have also been addressed. However, we consider that a lack of evidence of internal verification for this documentation is still evident.
C	Some significant shortcomings in the process which need urgent attention.	
D	**Major shortcomings in all aspects of KPI: process unfit for purpose**	**Although the inability to produce the "Unit Cost 4" report for 9 periods within requested timescales is likely to have a small impact on the MUC figures assuming the appropriate mitigation was in place, we have seen no definitive evidence to support this.** **The inability of Network Rail to supply the data that were requested and that have been available during previous audits, especially following assurances that this would be possible within requested timescales, has**

Reliability Band	Description	Comments
		reduced our confidence in the systems in place. Combined with the lack of evidence proving the effective communication and implementation of the described mitigation measures, this is a major shortcoming. **We consider this to be the level at which Network Rail is operating.**

Table 34: MUC Reliability Grading results.

8.3.2 Accuracy

The first part of this section of the report sets out our accuracy grading by individual MNT code. This is followed by our overall accuracy grading for the full MUC dataset. Our accuracy grading has, like our reliability grading, been impacted by the non-provision of some of the requested source data.

We set out overleaf in Table 33 the results of our accuracy grading analysis by individual MNT code. This has been undertaken on a notional basis with the assumptions that mitigations described by Network Rail were put in place (as explained in Section 8.2).

(Please note that we set our full Accuracy Grading results for all MUC unit costs, including those not included within Statement 14 of the Regulatory Accounts, in Appendix H).

MUC code	Activity Description	Reliability Score	Accuracy Score
MNT004	Plain Line Tamping	D	2
MNT006	Manual Wet Bed Removal	D	2
MNT010	Replacement of S&C Bearers	D	2
MNT011	S&C Arc Weld Repair	D	1
MNT013	Level 1 Patrolling Track Inspection	D	1
MNT015	Weld Repair of Defective Rail	D	2
MNT016	Installation of Pre-Fabricated IRJs	D	2
MNT020	Manual Reprofiling of Ballast	D	1
MNT026	Replenishment of Ballast Train	D	2
MNT027	Maintenance of Rail Lubricators	D	1
MNT029	Replacement of Pads & Insulators	D	1
MNT030	Maintenance of Longitudinal Timber	D	2
MNT032	CWR - Stressing	D	2
MNT039	Manual Spot Re-sleepering (Concrete)	D	2
MNT041	Manual Ultrasonic Inspection - (PL)	D	2
MNT042	Manual Ultrasonic Inspection - (S&C)	D	2
MNT045	Rail Changing - CWR - Renew (Defects)	D	1
MNT047	Rail Changing - Jointed Rail - Renew (Defects)	D	2
MNT120	S&C - Renew crossing	D	2
MNT123	S&C Renew Half Set of Switches	D	2
MNT125	Track Inspection (Other)	D	2
MNT128	Lift & Replace Level Crossing for PWAY	D	2
MNT150	Signalling Cables	D	2
MNT155	Point End Routine Maintenance non powered	D	1
MNT156	Point End Routine Maintenance Powered	D	1
MNT170	Vegetation Management (Manual)	D	2
MNT207	Maintain CRE Cables	D	3
MNT210	Maintain Non-Traction Power Supplies	D	2
MNT211	Maintain OHL Components	D	2
MNT212	Maintain Points Heating	D	1

Table 35: MUC Confidence Gradings by MNT code.

As shown in the table above, nominal accuracy scores vary from “1” (accuracy of ±1%) to “3” (accuracy of ±10%) for the MUCs shown in Statement 14.

The distribution of Accuracy grades has changed between 2010/11, 2011/12 and 2012/13 as shown in Table 36 overleaf.

Accuracy Band	Number of MNT codes		
	FY 2010/11	FY 2011/12	FY 2012/13
1	5	2	24
2	19	28	56
3	21	18	25
4	5	2	0
Total number of MNT codes	**50**	**50**	**105**

Table 36: Distribution of Accuracy Grades.

It can be seen in that there has been a significant improvement in the accuracy across the MNT codes between FY2010/11 and FY2012/13. This is the first assessment in which none of the MUCs have been classified with a "4" (accuracy of ±25%).[53] We consider that it should be within Network Rail's capability to achieve an accuracy grade of "1" across all MNT codes.

Summary accuracy grading

We have provided a summary accuracy grading for the MUC figures, based on our overall assessment of MUC accuracy. This is set out in Table 37 overleaf.

[53] As a means of illustration, certain MNT codes were able to achieve a rating of "1" on the following basis:

- baseline MUC values were relatively close to the year-end MUC values;
- there were no costs recorded without work;
- there was no work recorded with no cost; and
- a low proportion of errors were corrected (e.g. assuming 5% of the errors were "missed" for the given job code, this would still lead to only a minor deviation in the unit cost value below the 1% threshold).

Accuracy Band	Description	Comments
1	Calculation processes automated (to a degree commensurate with dataset size); calculations verified to be accurate and based on 100% sample of data; external data sources fully verified. KPIs expected to be accurate to within ±1%.	Calculation processes are automated and the number of opportunities for error due to manual entry of data has been greatly reduced. However, there remain inconsistencies between systems such as timesheets and hours recorded in Ellipse and there is no clear understanding of the impact that using a national labour rate has on MUCs.
2	KPIs expected to be accurate to within ±5%.	Had Network Rail been able to provide the source data within the requested timescales, we consider that it would have been likely to attain an overall accuracy grading of "2". This is based on the scale of errors identified through our nominal assessment of accuracy by individual MNT code documented above.
3	Shortfalls against several attributes: e.g. significant manual input to calculations or incomplete data verification or less than 100% sampling used. KPIs expected to be accurate to within ±10%.	
4	KPIs expected to be accurate to within ±25%.	
5	KPIs unlikely to be accurate to within ±25%.	
X1	KPI is calculated on a very small sample of data.	
X2	**Accuracy cannot be assessed for some other reason.**	**Network Rail has been unable to provide requested week 3 source data for periods 2-9 of the year FY 12-13 within the requested timescales for this review. As a result, it has not been possible for a definitive assessment of accuracy to be completed.**

Table 37: Summary Accuracy Grading for MUC data.

8.3.3 Reporter opinion

Our assessed confidence grading for the MUCs presented in Network Rail's 2012/13 regulatory accounts is **DX2.**

With regard to reliability, we recognise that Network Rail has continued to implement measures to improve the MUC reporting process over the past year. However, our reliability assessment has been impacted by issues encountered in the provision of MUC source data requested for this review. Network Rail was unable to provide the week 3 reports from Period 2 to 9 within the original review timescales. Although Network Rail has informed us of alternative data validation arrangements implemented during Periods 2-9, we have seen no written evidence documenting the alternative process during that period.

Had Network Rail been able to provide the source data requested, together with fully documented evidence of the mitigation measures described during Periods 2-9, that the we consider that it would have been likely to attain an overall confidence grading of **B2**. We consider that it should be within Network Rail's capability to achieve an accuracy grade of "1" across all MNT codes.

However, the inability of Network Rail to supply the data within the requested timescales, especially following assurances that this would be possible, has reduced our confidence in the systems in place. Combined with the lack of written records documenting the effective communication and implementation of the described mitigation measures during Periods 2-9, we consider this to be major shortcoming, for which a reliability grading of **"D"** is assigned.

The process shortcomings described above have also impacted our analysis of data accuracy. Although our nominal analysis of accuracy by individual MNT code suggests Network Rail is likely to have achieved an accuracy grading of "2" had it been able to provide the requested source data,[54] the inability to provide this data means in a timely manner has meant we have been unable to deliver our assessment fully in line with our defined approach. As a result, we are unable to give a definitive accuracy grading due to lack of evidence required to support our findings. On this basis, our overall accuracy grading for the 2012/13 MUCs is **"X2"**.

[54] As documented earlier in this chapter, we have undertaken a nominal analysis of accuracy by individual MNT code, based on the assumption that the mitigations described by Network Rail were implemented (even though this has not been substantively proven with any documentation). The purpose of this analysis has been to assess what the level of data accuracy would have been, had Network Rail been able to evidence the Periods 2-9 mitigations it described. The results of that assessment indicate that Network Rail would have achieved an improvement in terms of overall levels of accuracy; a greater proportion of MNT codes would have achieved a "1" grading compared to last year, and none of the MNT codes would have reported a "4" (the first time this would have happened in any of our reviews).

9 RUC (Renewals Unit Cost) Confidence Grading Analysis

9.1 Introduction and background

We present in this section the results of our confidence grading analysis of the Renewals Unit Costs (RUCs) presented in Statement 15 of the regulatory accounts.

9.2 Approach and scope

We have undertaken an assessment of the RUC calculation process in accordance with the confidence grading definitions, which are included as Appendix G to this report.

Network Rail has stated that it considers the scope of this confidence grading assessment should be limited to a review of the high level arithmetic calculation presented in Statement 15, on the basis of which the RUC figures are formulated.[55] Our approach to this confidence grading is therefore focused on the basic RUC calculation of expenditure divided by volume, as presented in Statement 15.

We note that the underlying expenditure and volume data supporting the RUC numbers are subject to separate reviews / audits. Expenditure figures are part of PwC's annual statutory audit of Network Rail's financial accounts. Volume reporting has been the subject of a number of recent reviews by the Independent Reporter; and a review to update previous findings is currently underway as part of the Arup mandate "Audit of Network Rail's Annual Return and Renewals Volumes".

9.3 Results of confidence grading analysis

Reliability

The RUCs are based on a simple arithmetic calculation undertaken by Network Rail's central finance team. This involves simply dividing the total renewal cost attributed to each asset renewal line item in Statement 15 by the volume reported for the same item, in order to derive the renewal unit cost.

This calculation process is described in Network Rail's RUC handbook. Both the total cost and the volume figures for each line item are shown in Statement 15, alongside the resulting RUC figure.

On this basis, we consider the reliability grading for the RUCs to be **A.**

[55] Network Rail has indicated that any assessment of the underlying source data from which the RUCs are derived is not applicable in this regard. In the absence of any data or analysis to support a deeper assessment of underlying expenditure and volume data feeding into the RUC calculation, our approach to this confidence grading is therefore limited to a simple review of the RUC calculations as described above.

Accuracy

As described in our review of the numbers presented in Statement 15 (see Section 10.7), Network Rail's calculation of a renewals unit cost value on the basis of cost divided by volume has been found to be, in all cases, without error.

On this basis, the applicable accuracy grading is **1**.

9.4 Reporter opinion

As indicated above, Arup has awarded a confidence grading score for the RUCs of A1, based on a review of the high-level calculation of expenditure divided by volume presented in Statement 15.

We do not consider this simple analysis of the RUCs to have yielded any significant findings or insights for Network Rail or the ORR. We would recommend the reports / outputs of the relevant audits undertaken by PwC on the cost accounting side and Arup on the volume reporting side be reviewed in order to gain more meaningful insights into the source data feeding into the RUC calculation.

10 Regulatory Accounts Statements Data Review

10.1 Introduction

We set out in this chapter our review of the following specific statements within the Regulatory Accounts, and their consistency with other documents provided by Network Rail:

Statement 8b parts (1) and (2) - Analysis of maintenance expenditure and headcount by MDU

Statement 9b - Detailed analysis of renewals expenditure

Statement 12 - Analysis of efficiency (Real Economic Efficiency Measure)

Statement 13 - Volume Incentives

Statement 14 – Maintenance Unit Costs (to be completed)

Statement 15 - Renewals unit costs and coverage (to be completed)

We note that at the time of writing of this report, the directors' review has not been provided.

10.2 Statement 8b parts (1) and (2) - Analysis of maintenance expenditure and headcount by MDU

We summarise our review of Statement 8b (part 1) in line with mandate requirements in Table 38 below.

Review Area	Arup Assessment
The breakdown of spend by MDU is consistent with the remainder of the regulatory accounts	The breakdown of spend by MDU in Part 1 of this statement is consistent with the way in which headcount is broken down by MDU in Part 2. No breakdown of spend by MDU is shown in other parts of the regulatory accounts.
The amounts of spend by MDU agrees to the underlying accounting records and have been correctly extracted	Spending data shown in this statement have been compiled directly from Hyperion, Network Rail's financial management system. The total MDU and HQ maintenance expenditure presented in this statement agrees to the actual total direct maintenance expenditure used in the REEM efficiency calculation.
Where costs or headcounts have been allocated that this allocation has been made on a reasonable basis and any other estimate used is reasonable	Costs and headcount figures presented in these statements appear to have been extracted directly from Hyperion, Network Rail's financial management system. No additional adjustments or allocations have been applied to the figures.
The headcount has been correctly extracted from the underlying records and that any estimates used are reasonable	Headcount has been correctly extracted from the underlying accounting system.[56]
The sub-totals and totals in the table down cast and cross cast	Sub-totals and totals for both parts of this statement down cast and cross cast correctly.
The disaggregated amounts for England and Wales and Scotland add up to the Great Britain amounts	Disaggregated maintenance expenditures and MDU headcounts for England and Wales and Scotland add up to the Great Britain figures.
Network Rail's narrative on the table is reasonable and details set out in the commentary agree to the underlying accounting records or other supporting documentation	Narrative on this statement appears reasonable and fairly represents the cost and headcount figures presented.

Table 38: Review of Statement 8b (parts 1 & 2).

[56] Headcount figures provided in file, "Copy of Net Ops 1213 Reg Accounts.xls"

10.3 Statement 9b - Detailed analysis of renewals expenditure

We summarise our review of Statement 9b in line with mandate requirements in Table 39 below.

Review Area	Arup Assessment
The breakdown of spend by asset category by total is consistent with the remainder of the regulatory accounts	Actual headline spending figures in this Statement for Track, Telecoms and Electrification are broadly consistent with relevant figures found in REEM efficiency calculations[57] and Statement 15 (where applicable). Actual renewals spending figure for Signalling in this Statement is consistent with that shown on Statement 15 but higher than in the REEM calculation[58]. Plant & Machinery, which is not included in Statement 15, also appears higher in Statement 9b than in the REEM calculation[59]. There are also some discrepancies between the ways in which renewals costs for Telecoms, FTN and Other Renewals (IT, Corporate Offices etc.) have been allocated in the REEM renewals efficiency calculation and this statement. Total renewals expenditure in this statement is higher[60] than the total figure seen in REEM efficiency calculation. Reconciliation between the two figures provided by Network Rail shows that expenditures included within this statement but excluded from REEM (Statement 12) include civils asset renewals, schemes previously classified as enhancements, expenditures that were not funded in PR08 and works that were deferred from CP3 or brought forward from CP5[61]. Other observations at sub-asset category levels for main asset categories with reportable unit costs: <u>Track</u> There are minor discrepancies between the ways in which renewals costs are allocated in this statement and in Statement 15. Whilst refurbishment costs have been allocated under Plain Line and Switches & Crossings in this statement, they have been classified as non-volume costs in Statement 15 and REEM renewals efficiency calculations. <u>Civils</u> Total actual spending figures for Civils ("Structures") shown in this statement are consistent in total terms with those shown on Statement 15,

[57] As seen in REEM Model 130604 1818 changes.xls provided by Network Rail on 10 June 2013.
[58] £607 million (rounded) as opposed to £551.2 million
[59] £120 million (rounded) as opposed to £81.7 million.
[60] Renewals expenditure in REEM Model is £2.05 versus £2.76 billion as shown in this statement.
[61] According to Reconciliation of Statement 9b to REEM.xls provided by Network Rail, the £714 million variance between the two renewals expenditure figures include:

- £463 million are Civils which are not included in REEM.
- Fleet purchases in Plant & Machinery – not funded in PR08 £43 million
- CP5 expenditure brought forward from CP5 in Signalling £32 million
- Crossrail expenditure in Signalling – not funded in PR08 £24 million
- Roll over from CP3 £9 million
- Milton Keynes project – not funded in PR08 £11 million
- ORBIS project – not funded in PR08 £39 million
- Other non PR08 renewals £85 million

Review Area	Arup Assessment
	but they are some differences in the way each sub-category is accounted in Statement 9b and Statement 15. Whilst costs for RWIs shown in Statement 9b include all renewals spending incurred during the Financial Year, those shown in Statement 15 and used for REEM efficiency calculations also include costs for projects that were started before the financial year but completed within the financial year. Actual renewals costs reported in Statement 15 also exclude costs for projects that were started during the financial year but are not completed within the financial year. <u>Signalling</u> The way in which signalling renewals expenditures have been split down to sub-asset types in Statement 9b is different from the ways they are split in Statement 15 and in REEM efficiency calculations. Network Rail explains that non-conventional re-signalling items e.g. Level Crossings, ERTMS, Minor Works etc. have been captured as 'non-volume' costs in REEM efficiency calculations. There is a £56 million discrepancy, £32 million of which can be accounted as roll-over enhanced spend from CP5 (therefore not in PR08 determination). Crossrail expenditure also has the same profile.
The amounts of spend by asset type agree to the underlying accounting records and have been correctly extracted	We are able to trace renewals spending figures at asset-type level for all major asset types shown in this statement back to the year-end Investment Expenditure Report[62], which we understand to contain cost figures taken directly from Network Rail's General Ledger. The Investment Expenditure Report presents some discrepancies with the Regulatory Financial Statements due to differences in accounting practice[63].
Where costs have been allocated between categories that this allocation has been made on a reasonable basis and any other estimate used is reasonable	Renewals expenditures for each asset are compiled directly from cost information provided by the financial controller of the asset team based on expenditures reported in the General Ledger. We consider this to be a reasonable basis for compiling these numbers.
The sub-totals and totals in the table down cast and cross cast	Individual 'Actual' expenditure lines generally add up to subtotals and totals in this statement. Network Rail has indicated that "plug-figures" of up to £1million have been added to or subtracted from some expenditure lines to balance the discrepancies between the sum of all expenditure lines for each asset and the subtotals due to rounding. We do not consider this to have material effect on the figures presented. Individual expenditure lines under the 'PR08' column do not add up to the subtotal for some asset categories. This was due to the unavailability of certain detailed PR08 categories.
The disaggregated amounts for England and Wales and Scotland add up to the Great Britain amounts	Disaggregated expenditure figures for England and Wales and Scotland add up to the Great Britain amounts.

[62] FY13 Delcap (24.04.13 CW).xls provided by Network Rail on 11 June 2013
[63] £100 million of difference between the two documents due to Statement 9b including:
- £72 million current year non PR08 cost saving enhancements
- £28 million prior year non PR08 cost saving enhancements

Review Area	Arup Assessment
Network Rail's narrative on the table is reasonable and details set out in the commentary agree to the underlying accounting records or other supporting documentation	We consider Network Rail's commentaries on this statement are reasonable and generally reflect the figures presented in this statement. The narratives provided are consistent with expenditure information provided for each renewals asset area in support of the analysis of REEM efficiencies.

Table 39: Review of Statement 9b.

10.4 Statement 12 - Analysis of efficiency (Real Economic Efficiency Measure)

We summarise our review of Statement 12 in line with mandate requirements below in Table 40 below.

Review Area	Arup Assessment
Network Rail has clearly documented policies for the recognition of efficiencies.	Network Rail has developed a REEM efficiency handbook. See Section 3.2.
Network Rail has clearly documented processes for calculating efficiencies within which assumptions are clearly laid out and which demonstrate consistency with policies documented.	Network Rail defines its processes for calculating efficiency in its REEM handbook, together within underlying principles. This includes the requirement to provide evidence of positive management actions explaining efficiency savings being reported, as well as evidence of robustness and sustainability in line with ORR guidance.
Network Rail's calculation of its real economic efficiency measure is in accordance with its policies and is reasonable. This should include an assessment of whether the data used to calculate the measures is accurate, of a sufficient quality and consistent with the purpose of the measures.	We review the process Network Rail has followed for the calculation of REEM efficiency for each element of constituent expenditure in chapters 4-7 in this report.
The breakdown of variances between actual and REEM trajectory renewals expenditure between deferral and efficiency is reasonable.	We review the breakdown of PR08 and actual renewals expenditure variances between deferral and efficiency in the relevant sections of chapter 7 in this report.
Efficiency savings that have been recognised have been achieved on a sustainable basis.	We review the sustainability of REEM efficiencies being reported for each element of constituent expenditure in chapters 4-7.
The amounts of expenditure used in the efficiency calculation have been correctly extracted from the underlying accounting records.	We review the provenance of expenditure data underpinning the REEM calculation for each element of constituent expenditure in chapters 4-7.
The baselines used are the ones agreed by the ORR.	We review the baselines underpinning the REEM calculation for each element of constituent expenditure in chapters 4-7.
The sub-totals and totals in the table down cast and cross cast.	We can confirm the sub-totals and totals in the table down cast and cross cast.
The disaggregated amounts for England and Wales and Scotland add up to the	We can confirm the disaggregated amounts for England and Wales and Scotland add up to the Great Britain

Review Area	Arup Assessment
Great Britain amounts.	amounts.
Network Rail's narrative within the statement is reasonable and agrees with the details set out in the narrative to the underlying supporting documentation.	We comment on Network Rail's supporting evidence underpinning its REEM efficiencies for each element of constituent expenditure in chapters 4-7.
Network Rail's documented explanations of the positive management actions which have resulted in efficiencies are reasonable and that the details set out in the explanations are consistent with the underlying accounting records or other supporting documentation.	We comment on Network Rail's supporting evidence underpinning its REEM efficiencies including explanations of positive management actions driving efficiency savings in chapters 4-7.
The internal analysis, challenge and reporting ensures that the breakdown of efficiencies between scope and unit cost is sufficiently accurate and that Network Rail can adequately explain movements from the previous year. and	We comment on the internal analysis, challenge and reporting process for REEM in chapter 3.
The reporter should also briefly review Network Rail's progress with respect to volume delivery for the year to date versus planned levels and any material risks or changes in approach by the business that may lead to volume delivery being over or under planned levels for the year in question.	We comment on Network Rail's maintenance and renewal volumes compared to plan for maintenance and renewals activities in chapters 6 and 7 respectively.

Table 40: Review of Statement 12.

10.5 Statement 13 - Volume Incentives

We summarise our review of Statement 13 in line with mandate requirements below.

Review Area	Arup Assessment
Network Rail's calculation of its performance on the volume incentive is in accordance with the PR08 determination. This should include an assessment of whether the data used to calculate the measures is accurate, of a sufficient quality and consistent with the purpose of the measures. To achieve this, Arup will coordinate as appropriate with the Independent Auditor (PwC).	We note that passenger train miles is the only volume metric that has triggered incentive payments. The calculation methodology used by Network Rail to calculate volume incentives agrees to the methodology used by ORR[64]. Volume data used for this calculation appear to have been extracted directly from Network Rail's train performance database. We consider this to be reasonable and consistent to the purpose of volume incentive calculation.
Where income or costs have been allocated that this allocation has been made on a reasonable basis and any other estimate used is reasonable	Volume data used for this calculation appear to have been extracted directly from Network Rail's train performance database. Data used for the calculation include detailed and reasonable breakdowns to routes and operators. Geographical allocation of incentive payment amounts is also performed according to the actual volume splits between England & Wales and Scotland. We consider this approach to be reasonable.
The sub-totals and totals in the table down cast and cross cast	Totals in this statement down cast correctly.
The disaggregated amounts for England and Wales and Scotland add up to the Great Britain amounts	Disaggregated volume incentive payment amounts for England and Wales and Scotland add up to the Great Britain amount.
The disaggregated amounts broken down by operating route add up to the Great Britain amounts; and	Not applicable (breakdown on an operating route basis not reviewed as part of this assignment).
Network Rail's narrative on the table is reasonable and the details set out in the commentary agree to the underlying accounting records or other supporting documentation	Narrative on the table includes an explanation to the purpose of volume incentive payments and the volume incentive amounts earned in the current year. They are in line with the descriptions set out in PR08 Determination and the figures presented in the statement.

Table 41: Review of Statement 13.

[64] According to the ORR calculation "ORR-#372747-v1 Volume_incentive_calculations_for_Network_Rail.xls" provided to us for the 2010/11 Regulatory Financial Statements review

10.6 Statement 14 – Maintenance Unit Costs

We summarise our review of Statement 14 in line with mandate requirements in Table 42 below.

Review Area	Arup Assessment
The unit costs have been calculated in accordance with the company's unit cost handbook	We review the process Network Rail has followed for the calculation of the MUCs in chapter 8 of this report.
The information to calculate the unit costs has been correctly extracted from the underlying accounting records and that any estimates used are reasonable	The way in which information used to calculate the MUCs is extracted from the underlying accounting systems is reviewed in chapter 8 of this report.
Where applicable the sub-totals and totals in the table down cast and cross cast	Sub-totals and totals for all parts of this statement down cast and cross cast correctly.
Where applicable the disaggregated amounts for England and Wales and Scotland add up to the Great Britain amounts	The disaggregated amounts for England & Wales and Scotland add up to the Great Britain totals.
Network Rail's narrative on the table is reasonable and the details set out in the commentary agree to the underlying accounting records or other supporting documentation	The narrative describing improvements to the MUC framework is reasonable. However, Statement 14 itself displays only 30 MUC codes (out of a total of 108 MUC codes now being reported against, as described in Chapter 8 of this report). It is not clear why Network Rail has chosen to limited the number of MUCs being displayed in this statement. It is also unclear why Network Rail's narrative highlights a lower level of expenditure being captured under the 30 MUC codes displayed; this is at odds with Network Rail highlighting improved coverage earlier in the same narrative.

Table 42: Review of Statement 14.

10.7 Statement 15 - Renewals unit costs and coverage

We summarise our review of Statement 15 in line with mandate requirements below.

Review Area	Arup Assessment
The unit costs have been calculated in accordance with the company's unit cost handbook	The calculation method presented by Network Rail for each of the four asset categories for which RUCs are reported is consistent with the methods described for the respective asset categories in the Renewal Unit Costs Handbook.
The information to calculate the unit costs has been correctly extracted from the underlying accounting records and that any estimates used are reasonable	Information presented has been correctly extracted from the relevant source data systems. Renewal cost data have been sourced from the general ledger, and volume data have been provided from the P3e system. For civils maintenance-related components of RUC spend, cost and volume data have been derived from a separate spreadsheet. Extracts of original expenditure source data have been provided for review (see our review of Statement 9b).
Where applicable the sub-totals and totals in the table down cast and cross cast	All sub-totals and totals presented in the tables cast down and across. Expenditure figures by asset type are consistent with the figures in Statement 9b.
Where applicable the disaggregated amounts for England and Wales and Scotland add up to the Great Britain amounts	Disaggregated total renewals cost figures for England & Wales and Scotland add up to the Great Britain amounts.
Network Rail's narrative on the table is reasonable and the details set out in the commentary agree to the underlying accounting records or other supporting documentation	We consider Network Rail's narrative describing volumes of work delivered and the associated cost to be reasonable. For track, signalling and telecoms the narrative is consistent with information provided to support the relevant elements of the REEM efficiency calculation.

Table 43: Review of Statement 15.

Appendix A: Regulatory Accounts Mandate AO/43

Regulatory accounts data assurance reporter mandate [AO/043]

Background
This mandate sets out the requirements for the independent reporter's review of sections of the regulatory financial statements of Network Rail for the year ended 31 March 2013, which comprise:

Statement 8b – Analysis of maintenance expenditure by MDU;
Statement 9b – Detailed analysis of renewals expenditure;
Statement 12 – Analysis of efficiency (Real Economic Efficiency Measure);
Statement 13 – Volume incentives;
Statement 14 – Unit costs;
Statement 15 – Renewals unit costs and coverage;

Strategic objective
The strategic objective of this independent reporter review is to determine the reliability and accuracy of the information presented in certain sections of Network Rail's regulatory financial statements set out within this mandate. In particular, given the importance of the issues raised in Network Rail's reporting of efficiencies in previous reviews, the reporter should assess the degree to which Network Rail's reporting has improved, highlight continuing uncertainties and specify any further improvements that should be made for efficiency reporting.

Directors' review and management commentary
The reporter will review whether Network Rail's explanations in its director's review and in the commentary on the statements within the regulatory financial statements listed above of the variances between actual efficiency and unit costs and those assumed in its 2012-13 budget, CP4 delivery plan, and the ORR's PR08 determination are reasonable.

Statement 8b (parts 1 and 2) – Analysis of maintenance expenditure by MDU
The reporter will review Statement 8b of the regulatory financial statements for Great Britain, England & Wales and Scotland, to confirm whether:

1. the breakdown of spend by MDU is consistent with the remainder of the regulatory accounts;
2. the amounts of spend by MDU agrees to the underlying accounting records and have been correctly extracted; and
3. where costs or headcounts have been allocated that this allocation has been made on a reasonable basis and any other estimate used is reasonable;
4. the headcount has been correctly extracted from the underlying records and that any estimates used are reasonable;
5. the sub-totals and totals in the table down cast and cross cast;
6. the disaggregated amounts for England and Wales and Scotland add up to the Great Britain amounts; and
7. Network Rail's narrative on the table is reasonable and details set out in the commentary agree to the underlying accounting records or other supporting documentation.

Statement 9b – Detailed analysis of renewals expenditure

The reporter will review Statements 9a and 9b to confirm whether:

1. the breakdown of spend by asset category by total is consistent with the remainder of the regulatory accounts;
2. the amounts of spend by asset type agree to the underlying accounting records and have been correctly extracted;
3. where costs have been allocated between categories that this allocation has been made on a reasonable basis and any other estimate used is reasonable;
4. the sub-totals and totals in the table down cast and cross cast; and
5. the disaggregated amounts for England and Wales and Scotland add up to the Great Britain amounts; and
6. Network Rail's narrative on the table is reasonable and details set out in the commentary agree to the underlying accounting records or other supporting documentation.

Statement 12 – Analysis of efficiency (Real Economic Efficiency Measure)

The reporter will review the Statement 12 efficiency statements for Great Britain, England & Wales and Scotland to confirm whether:

1. Network Rail has clearly documented policies for the recognition of efficiencies;
2. Network Rail has clearly documented processes for calculating efficiencies within which assumptions are clearly laid out and which demonstrate consistency with policies documented under (1.);
3. Network Rail's interim calculation of its real economic efficiency measure is in accordance with its policies and is reasonable. This should include an assessment of whether the data used to calculate the measures is accurate, of a sufficient quality and consistent with the purpose of the measures;
4. the breakdown of variances between actual and REEM trajectory renewals expenditure between deferral and efficiency is reasonable;
5. efficiency savings that have been recognised have been achieved on a sustainable basis;
6. the amounts of expenditure used in the efficiency calculation have been correctly extracted from the underlying accounting records;
7. the baselines used are the ones agreed by the ORR;
8. the sub-totals and totals in the table down cast and cross cast;
9. the disaggregated amounts for England and Wales and Scotland add up to the Great Britain amounts;
10. Network Rail's narrative within the statement is reasonable and agrees with the details set out in the narrative to the underlying supporting documentation.
11. Network Rail's documented explanations of the positive management actions which have resulted in efficiencies are reasonable and that the details set out in the explanations are consistent with the underlying accounting records or other supporting documentation;
12. the internal analysis, challenge and reporting ensures that the breakdown of efficiencies between scope and unit cost is sufficiently accurate and

that Network Rail can adequately explain movements from the previous year; and

13. the reporter should also briefly review Network Rail's progress with respect to volume delivery for the year to date versus planned levels and any material risks or changes in approach by the business that may lead to volume delivery being over or under planned levels for the year in question.

Statement 13

The reporter will review Statement 13 of the regulatory financial statements for Great Britain, England & Wales and Scotland, together with the statements broken down by operating route, to confirm whether:

1. Network Rail's calculation of its performance on the volume incentive is in accordance with the PR08 determination. This should include an assessment of whether the data used to calculate the measures are accurate, of a sufficient quality and consistent with the purpose of the measures. To achieve this, Arup will coordinate as appropriate with the Independent Auditor (PwC);
2. where income or costs have been allocated that this allocation has been made on a reasonable basis and any other estimate used is reasonable;
3. the sub-totals and totals in the table down cast and cross cast;
4. the disaggregated amounts for England and Wales and Scotland add up to the Great Britain amounts;
5. the disaggregated amounts broken down by operating route add up to the Great Britain amounts; and
6. Network Rail's narrative on the table is reasonable and the details set out in the commentary agree to the underlying accounting records or other supporting documentation.

Statements 14 and 15

The reporter will review Statements 14 and 15 of the regulatory financial statements for Great Britain, England & Wales and Scotland, as listed in the Appendix to this mandate. The reporter will assess the accuracy and reliability of each reported unit cost in accordance with its confidence grading system, in particular whether:

a) the unit costs have been calculated in accordance with the company's unit cost handbook;
b) the information to calculate the unit costs has been correctly extracted from the underlying accounting records and that any estimates used are reasonable;
c) where applicable the sub-totals and totals in the table down cast and cross cast;
d) where applicable the disaggregated amounts for England and Wales and Scotland add up to the Great Britain amounts; and
e) Network Rail's narrative on the table is reasonable and the details set out in the commentary agree to the underlying accounting records or other supporting documentation.

This assessment will identify how the quality of data in 2012-13 compares to previous years where appropriate.

Deliverables:

- Year-end report – this will cover the entire mandate.

Delivery dates:

- Initial year-end draft report issued by [Friday, 31 May 2013]
- Draft year-end final report issued by [Friday, 21 June 2013]
- Final year-end report issued by [Friday, 28 June 2013]

Appendix B: Independent Reporter Regulatory Accounts Opinion Letter (30 July 2013)

We reproduce below, Arup's opinion letter of 30th July 2013, presented as part of Network Rail's Regulatory Financial Statements published on 31st July 2013.

Our ref SJS/NRIL/DOlv2.0

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The Board of Directors
Network Rail Infrastructure Limited
Kings Place
90 York Way
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For the attention of Patrick Butcher, Group Finance Director

30 July 2013

Dear Sirs,

Network Rail Infrastructure Limited, regulatory accounts statements 2012/13: Independent Reporter's Report to the Company and the Office of Rail Regulation (ORR) – Reporter's opinion

Introduction

In accordance with the terms of engagement for the Independent Reporter, we have reviewed the sections of the regulatory financial statements of Network Rail Infrastructure Limited (the Company) for the year ended 31 March 2013, which comprise:

Statement 8b – Analysis of maintenance expenditure by Maintenance Delivery Unit (MDU);
Statement 9b – Detailed analysis of renewals expenditure;
Statement 12 – Analysis of efficiency (Real Economic Efficiency Measure);
Statement 13 – Volume incentives;
Statement 14 – Maintenance unit costs; and
Statement 15 – Renewals unit costs and coverage.

Respective responsibilities of directors and reporters

As described in the statement of directors' responsibilities, the Company's directors are responsible for the preparation of the regulatory financial statements in accordance with Condition 11 of the Network Licence. As stated in Clause 2.26 of the Regulatory Accounting Guidelines (RAGs) dated March 2013, the Regulator may use a reporter to validate some of the information provided by Network Rail in the regulatory accounts. This complements the work of the auditors.

Work completed – basis of opinion

We have conducted our review on a test basis, focusing upon evidence relevant to the amounts and disclosures in the statements listed in our terms of reference. Our review has comprised sample testing of the regulatory financial statements to underlying supporting information and reconciliation to other parts of the financial statements where appropriate.

We have performed where possible, compliance tests to confirm the adequacy of accounting controls and procedures and detailed substantive testing to confirm the accuracy of accounting entries with reference to original underlying data records.

We have also reviewed the extent to which Network Rail is able to demonstrate that its maintenance and renewals activities are robust and sustainable.

Opinion

Based on our review and audit of information and evidence provided in respect of the statements within the Regulatory Accounts, we confirm that in our opinion the statements that we have reviewed (listed in the introduction above) have been prepared in accordance with the Regulatory Accounting Guidelines and are consistent with the underlying financial statements.

However, we consider there to be uncertainty with respect to efficiencies being reported in relation to a number of asset renewal and maintenance areas.

For track renewals, we consider there to be uncertainty associated with the volume efficiency calculation associated with plain line track renewals. The Company has continued to experience significant shortfalls in the delivery of its planned volume of plain line track renewals during 2012/13 and has now indicated there is a "likely deferral" of 280km of Plain Line renewal into CP5.

We consider that non-delivery of planned plain line volume during 2012/13 may impact adversely on the capability of the infrastructure to deliver regulated outputs in the future. We consider there to be a risk that expenditure of up to £85m associated with delivery of the deferred volume may be inefficiently incurred[1]. Further analysis would be required in order for us to adequately assess what proportion (if any) of expenditure associated with an "inefficient" deferred volume of work could affect reported efficiencies in CP4.

For electrification and Fixed Telephone Network (FTN) assets, Network Rail is anticipating deferral of around £116m of its CP4 renewals programme into CP5. This comprises £103m of electrification renewals, together with £13m of FTN renewals. We consider non-delivery of programme of work associated with this expenditure during CP4 may impact on the capability of the infrastructure to deliver required outputs in future. There is a risk that deferral may result in additional cost being incurred. Further analysis would be required in order for us to adequately assess what proportion (if any) of the £116m of expenditure associated with an "inefficient" deferral of planned work could affect reported efficiencies in CP4.

[1] We also note that much of the cost associated with this "deferred work" has been incurred under 'take or pay' style contracts. This will have had the effect of increasing Network Rail's unit costs for track in 2012/13.

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30 July 2013

With regard to buildings renewals, we have not been able to assure ourselves that the efficiency amounts associated with the positive management actions (PMAs) cited by Network Rail have been calculated to an appropriate standard. We have been unable to link the claimed efficiency savings with cost information at sub-asset or project level. Further relevant evidence and analysis would be required in order for us to adequately assess what proportion, if any, of £100m efficiencies should not be claimed as efficiency.

For plant and machinery renewals, we have not received an explanation of how the portions of the efficiency total attributed to the categories "Signalling, Power & Communications" and "Civils" have been calculated. We have not had received evidence demonstrating how the efficiencies have been realized. The total claimed efficiencies in respect of these two categories of plant and machinery expenditure amount to approximately £28m.

For certain categories of maintenance activity (associated with maintaining track-related asset condition) we have not received sufficient evidence to fully demonstrate that there is no linkage between the reduction in expenditure and non-delivery of regulated CP4 outputs (train service performance, measured using the 'PPM' for 'Long distance', 'London & SE', 'Regional' services as well as 'freight delay per 100 train kilometres'). The total claimed efficiencies in respect of these categories of expenditure amount to approximately £35m. Further relevant evidence and analysis would be required in order for us to adequately assess what proportion, if any, of this expenditure relates to non-performance and hence should not be claimed as efficiency.

Yours faithfully,

Stefan Sanders
Named Independent Part 'A' Reporter
Ove Arup & Partners Ltd
30 July 2013

Appendix C: Review of documentation relating to performance during 2012/13

We have reviewed a range of documentation in relation to the shortfall in Network Rail's required performance outputs during 2012/13. This has informed our overall assessment of the robustness of maintenance efficiencies (see chapter 6). We comment on some of the key additional documents reviewed in the table below.

Document	Relevant data / analysis presented	Reporter observations
Breakdown table of delay minutes by category	This table compares total Network Rail-incurred delay minutes during 2012/13 by category to target delay minutes contained within the JPIPs, as well as comparison with last year's results (2011/12). These figures are broken down into 14 delay categories. Results depicted in the table indicate the following: • Network Rail has recorded a total of 8.8 million delay minutes during 2012/13, which is 12.2% (962k) above the target set in the JPIPs. FT12/13 total delay minutes were also 5.1% higher than last year (2011/12). • For only two out of fourteen delay minute categories does Network Rail record delay levels inside target: "External factors" delays are over 300k minutes inside target, whilst TSR delays are slightly ahead of target. All remaining categories show delays in excess of the total. • Just over 1 million delay minutes were directly attributed to weather. This is 87% higher than target, with 474k surplus delay minutes accounting for almost half of the total number of minutes in excess of target. • Of the remaining categories, the following five account for 592k delay minutes in excess of target (over 60% of the total excess minutes): o Other non-track (includes electrification infrastructure): 169k minutes (30.3%) in excess of target o Other infrastructure / possessions: 125k minutes (19.8%) in excess of target	Alongside the delay minutes directly attributed to weather, Network Rail has indicated that almost all other delay categories (including the five listed opposite that account for around almost 600k excess delay minutes) have been negatively influenced – to a greater or lesser extent – by the adverse weather conditions. No quantified estimation of the magnitude of weather-based causes in their impact on other delay categories has been provided by Network Rail over the course of this review, which has indicated that quantifying the impact of weather would be challenging, given the complexity of causal factors driving delay. However, some analysis is being carried out by the ORR which

Document	Relevant data / analysis presented	Reporter observations
	o Structures: 106k minutes (193.1%) in excess of target o Track defects: 102k minutes (15.3%) in excess of target o Signalling systems: 91k minutes (14.0%) in excess of target • For all five of the above measures, 2012/13 delay minutes were also higher than in 2011/12 – although this varied from just +3% for signalling to +169% for structures.	we comment upon below.
Long Distance and London & South East recovery plans	Network Rail produced recovery plans for the Long Distance and London & South East sectors in April 2012 and September 2012 respectively. Each plan sets out revised targets for the key performance measures PPM, CaSL and total delay minutes for each sector, broken down by TOC and by delay category. The documents define the measures to be implemented, together with the "delay minute benefit", in terms of the number of delay minutes estimated to be saved. Measures listed include: • Main "JPIP" performance improvement measures, defined under 16 categories;[65]	It is evident that that Network Rail sought to take steps through the recovery plans to mitigate potential performance impact associated with severe weather conditions during 2012/13.

[65] The 16 x main JPIP measures are:
- Autumn mitigation plan, involving measures for improved track adhesion.
- Civil engineering improvements, including drainage improvements and bridge strike mitigation.
- Measures to reduce trespass and fatalities.
- Intelligent infrastructure, focusing on remote condition monitoring technology.
- Benefits from major capacity enhancements on the infrastructure
- Operations improvements involving better management, cooperation and analysis.
- Other, includes level crossing delay mitigation, staff training and policy.
- Points improvement through better maintenance
- Possession management and staff competency arrangements,

Document	Relevant data / analysis presented	Reporter observations
	• Additional "Base +" measures, relating to a programme of measures identified in autumn 2011;[66] • Base ++ initiatives relate to further measures identified through cooperation with operators.[67] Both recovery plans include measures to mitigate the impact of weather, and civil engineering improvement measures within the JPIP initiatives listed. Weather mitigation measures include more effective preparation for winter conditions, improved management of flood risk at known risk sites, and review of earthworks and embankment	

- Power supply improvements
- Signal & telecoms equipment improvements
- Track improvements
- Train detection improvements
- Train planning
- Vandalism & theft
- Weather mitigations

[66] Base + initiatives comprise:

- Freight programme
- Timetable for performance
- Control centre actions
- Rules Changes
- Incident response times
- Fleet programme
- Remote condition monitoring, and
- Modelling

[67] Base ++ initiatives include:

- "red route" measures to improve planning and delivery on route sections of the highest criticality;
- for the LSE plan, timetable planning alterations for peak periods;
- for the LD plan, better regulation of services relating to prioritisation / optimisation of train paths

Document	Relevant data / analysis presented	Reporter observations
	condition. Civil engineering measures include improvements to drainage channels and culverts.	
LD and LSE recovery plans quarterly progress reports (Q3 / Q4 2012/13)	The quarterly progress report provides update and commentary on the following: • Progress in JPIP / Base + / Base ++ improvement measures relative to plan. Network Rail reports that implementation of measures was close to planned level in Q3, and ahead of plan in Q4. • Actual train performance compared to target: significant performance shortfalls reported for both services sectors in both quarters. Commentary is given on causal factors. • Quarterly revision of forecast. Due to performance shortfalls, Network Rail presents revised target trajectories for the key performance measures to the end of CP4, with a downward revision of the profile in the Q3 report, and a further downward revision following the worsening performance trend in the Q4 report. • Additional actions being taken, in response to performance issues identified. In the Q3 report, Network Rail highlights reliability and performance problems associated with high rainfall and flooding – exacerbated by already saturated ground resulting from above average rainfall also occurring in previous months. In particular this affected earthworks, track ballast and cabling assets. Other delay-causing factors cited include possession overruns and train planning issues, conductor rail icing, autumn conditions (leaves on the line), and overhead line incidents. In the Q4 report, Network Rail indicates that below average temperatures had a significant adverse effect on performance, with both snow and freezing temperatures affecting track assets in particular. Other delay-causing factors cited include possession overruns, train planning and timetabling issues, conductor rail icing, OLE incidents / de-wirements. For delays not directly attributed to weather, Network Rail has indicated that weather had an indirect impact on some of these categories, e.g. track and cabling problems associated with water ingress, ice affecting conductor rail and OLE	Although the progress reports highlight the adverse weather conditions as the predominant cause of below-target performance, other factors not directly relating to weather conditions are also documented. Network Rail identifies weather related disruption as having had indirect impact on asset performance / “other” activities (e.g. possessions), etc. There is no quantified analysis to ascertain the extent to which severe / extreme weather was the root cause of performance shortfalls in these areas.

Document	Relevant data / analysis presented	Reporter observations
	equipment, or general disruption leading to increased reaction times.	
Long Distance and London & South East recovery plans – review of delivery 2012/13	Following a similar format to the quarterly reports documented above, this report summarises the year's performance for the Long Distance and London & South East sectors against plan. The report states that "we have not delivered the 2012/13 targets for the LD and LSE sectors due to the effects of prolonged and occasionally severe weather events and their wider impact on infrastructure." The report highlights the actual count of infrastructure incidents is at a "record low", but the benefits are partially offset by rising levels of delay per incident. Weather-related delays are discussed further in the "underlying causation" section of the report. The report suggests the severity of weather conditions – especially the impact of flooding and saturated ground – was such, that this outweighed the positive impact of various measures put in place since the start of CP4 to better plan and prepare for seasonal conditions. The report refers to analysis Network Rail is carrying out of the relationship between weather conditions, asset failure rates and general performance. Network Rail indicates that the analyses have established a clear causal link between weather and those asset failures that are not necessarily directly reported as weather-related in Network Rail's systems, although it is noted that cause-effect linkage is often not clear. The report also comments on the adverse impact of increase levels of traffic / congestion on the network, and how this increases delay levels. The report identifies weather conditions as an ongoing risk, and documents proposals during 2012/13 for the business to gain a better understanding of the impact of weather on performance.	The report reiterates the attribution by Network Rail of its performance shortfall to severe weather conditions. Once again, detailed quantification of the overall impact of weather in relation to total delay numbers is not provided.
Train performance – the impact of the weather	Additional charts and commentary on weather impact on performance, including charts depicting the increasing levels of direct weather-attributed delay minutes during CP4 (2012/13 and 2011/12 in particular), and various statistics regarding rainfall levels during 2012/13. The report also notes that the "majority of the railway's civil assets [are] not designed to modern standards, and most cuttings and embankments [are] not designed at all, so are particularly vulnerable". The report highlights "under-investment over decades" and "reduced funding" worsening the delay impact.	Whilst the report provides a full overview of rainfall patterns during CP4, assessment of the cold temperatures is limited to a comparison between 2012/13 and the previous year. No detailed long-term review of the extent of cold weather

Document	Relevant data / analysis presented	Reporter observations
		during 2012/13 compared to previous years is provided.
2008 Strategic Business Plan update – performance plan (supporting document)	Document augmenting Network Rail's main 2008 Strategic Business Plan, includes analysis of the delay-causing impact of "severe weather" and other delay-causing factors. The document lists an "increased number of severe weather events" as one of a number of risk factors for performance. Network Rail characterises these risks as being relatively small on a national PPM scale or very difficult to quantify and uncertain." The document also states that Network Rail "believe[s] that the external/weather category will be affected by increasingly severe weather and external caused delay that we will become better at managing resulting in a neutral position." As a result, Network Rail indicates that it expects delay minutes relating to weather related categories will remain constant.	This document appears to demonstrate that Network Rail was aware of the likelihood of increasing instances of severe weather prior to the start of CP4, a risk which it considered it would become better at managing, thereby avoiding an increase in weather-related delays.
ORR Periodic Review 2008	The PR08 makes reference to provision for extreme weather in the section of the determination relating to earthworks funding. The ORR states on p.77 of the periodic review that it was "effectively providing Network Rail with more funding for earthwork structure repairs and remedial works to coastal and estuarial defences in CP4 than it sought. Given the sensitivity of these structures to extreme weather events, we believe that continuation of existing levels of expenditure instead of the reductions that Network Rail proposed is a sensible provision for dealing with the effects of climate change." As a result of this assessment, the ORR's assessed CP4 expenditure provision for earthworks renewals was over 20% higher than the amount projected within Network Rail's 2008 SBP.	Whilst maintenance of earthworks assets is captured as renewals capex under Network Rail's financial reporting process (and hence not part of the REEM maintenance efficiency calculation), this highlights that, once again, extreme weather and flooding were known risks at the start of CP4.
ORR analysis of underlying train performance (delay minutes and PPM) in	In June 2013 the ORR completed a draft assessment of Network Rail's train performance during 2012/13, which entailed an assessment of the impact of the weather conditions experienced during the year. The report focuses on the relationship between precipitation levels and levels of performance (recorded in terms of weather delay minutes and PPM).	The results of the ORR's high-level analysis suggest the days in which extreme precipitation were experienced and the subsequent impact on performance may be less

Document	Relevant data / analysis presented	Reporter observations
2012-13	The report firstly reviews actual weather patterns in 2012/13 and compares these to the previous three years of CP4. Results of a statistical test have been cited, confirming that the mean level of precipitation was higher during the year and can be considered statistically significant compared with the previous three years of CP4. The analysis then involves identifying specific days where a relationship can be made between higher precipitation levels and performance being below a certain threshold. For the days in which this relationship is identified, the ORR has adjusted the given delay minute / PPM level for that day, by replacing it with the overall period average, based on its percentage variance during CP4 from the end of year MAA. The ORR has applied the methodology described above to adjust the National PPM figure for 44 days between 2009/10 and 2012/13 to produce a revised PPM moving annual average (MAA) profile. Using the same approach for PPM in the long-distance sector, ORR has adjusted a total of 55 days; whilst in the London & South East (LSE) sector, the ORR has adjusted 54 days. The report concludes the following from this analysis: "Adjustment of the delay minutes data and PPM data by sector highlights that performance would, typically still be worse than periodic and end of year targets, particularly in the LSE and long distance sectors, suggesting other factors outside of weather may have also impacted performance, such as ineffective management of seasonal preparation." The report also charts the relationship between the profile of PPM MAA in CP4, and the average precipitation during each period. The aim was to assess whether the impact of precipitation had a clear impact on the PPM MAA profile. Neither the long distance nor the LSE charts show any conclusive pattern in terms of the PPM MAA profile relative to levels of precipitation during the given period. The report acknowledges the limitations of its analysis. Most notably in relation to the impact of the cold weather and rapid changes in temperature on performance levels, which for practical reasons was not factored into the analysis. This analysis also aimed to consider the time lag between weather events occurring and the impact on performance but	strong than would be expected based on Network Rail's narrative. The ORR's approach has involved adjusting daily performance levels when extreme weather was experienced. Despite these adjustments to daily performance, the results suggest that post-adjusted performance metrics would continue to be significantly below target.

Document	Relevant data / analysis presented	Reporter observations
	due to the variation in timescales between different assets/incidents, this may not be fully reflected. The report highlights that the approach used has been based on total precipitation68, not taking into account the potential impact of shorter but heavier bursts of precipitation that may cause flooding but do not register as sustained precipitation. The report also acknowledges that a specific metric for snow may also have provided further insight into the analysis, given that the impact of snow on the rail network differs from that caused by rainfall.	
Track geometry faults narrative from Network Rail's draft Annual Return	Commentary analysing trends in various track geometry measures during 2012/13, and over the course of CP4. The report charts a slight improvement by the end of 2012/13 in the count of track geometry faults per 100km compared to the end of 2011/12. The period-by-period graph showing the numbers of faults depicts significantly increased fault levels during the first half of 2012/13 suggesting that on average faults per 100km during the year were higher. Network Rail indicates the increase in faults recorded during the first half of 2012/13 is partly the result of a new measuring train, and that this explains around 30% of the recorded increase in faults. Network Rail explains that the remaining 70% increase in recorded faults was caused by "twist". Network Rail attributes the increase in twist faults both to high rainfall that results in softening of the ground, and to lack of effective repair due to difficulty in locating faults, resource shortage and shortage of skilled personnel. Over the course of CP4, the count of geometry faults has shown a slight upward trend since 2008/09, although the end of 2012/13 fault count has reduced from the previous year and matches the figure for 2009/10. Network Rail attributes this trend both to increasing traffic levels on the network increasing wear, and to improved measurement systems resulting in more faults being detected.	This analysis appears to identify longer-term increases in the levels of track geometry, which are not simply the result of adverse weather conditions. Noting its policy commitment to reduce track geometry faults to the level of 35.9 faults per 100km by the end of CP4 (compared to 40.3 faults per 100km at 2012/13 outturn), Network Rail states the actions and resources required to achieve this are being assessed.
Narrative on electrification failure from	Tables have been provided recording numbers of electrification failures by routes during 2012/13 compared to earlier years in CP4. Figures for both overhead line electrification (OLE) and conductor rail (3rd rail) infrastructure are	We note the greatest number of OLE incidents during 2012/13 affects the

[68] Total precipitation was measured by recording the average precipitation levels at 19 separate weather stations.

Document	Relevant data / analysis presented	Reporter observations
the "Asset Management" section of Network Rail's draft Annual Return	provided. The total count of 8 x conductor rail failure during 2012/13 represents a significant improvement, with this number less than half the previous year and the lowest during CP4 by some margin. In contrast, the total count of overhead line incidents increased slightly from 50 in 2011/12 to 52 in 2012/13 – although this is still below failure counts earlier in CP4. A significant reduction in the count of incidents on the East Anglia route was outweighed by increases in reported incidents on the LNE and LNW routes.	LNW south route – the busiest long-distance section of route on the network. Delay minute data show significant impact in terms of delay minutes from "de-wirement" incidents in LNW south.

Appendix D: Review of progress in relation to previous recommendations

Ref.	Previous recommendation to Network Rail	Review of progress – 2011/12 regulatory accounts review	Review of progress during 2012/13
2011. RA.11 **[IR]**	We recommend that Network Rail provide analysis which monitors progress towards delivering planned volumes over the duration of the Control Period, for each asset category. This analysis should show the implications of any deferrals for outputs / volumes to be delivered over the rest of the Control Period.	**Limited progress**: We have suggested that the ORR and Network Rail will need to consider in detail the volumes delivered for the majority of renewals categories at future reviews. Network Rail has reported that the volumes planned for the final two years of CP4 are deliverable. Detailed examination of track, signalling, civils, telecoms, buildings, E&P and PM delivery will be necessary to ensure the company will not defer work into CP5. We note, in relation to this recommendation, the following comment from Network Rail: "NR does not agree that delivery or otherwise of indicative volumes for the remainder of the control period is of itself relevant to efficiency claimed for the year being reported on. NR has instead demonstrated the sustainability of its asset management, including understanding the potential impact of work deferred in the year. NR will not be taking any further action on this recommendation." (Received 5th July 2012).	**No further progress.**
2011. RA.12 **[IR]**	In line with the ORR's 2006 guidance on the monitoring and treatment of underspend, we recommend that Network Rail provide a commentary on deferred expenditure, for each asset category. This should be supported by evidence that the	**Limited progress**: Network Rail has provided more detailed evidence related to the robustness and sustainability of its expenditure reductions for several asset areas. Formal written evidence, in the form of asset management reports monitoring KPI performance, change controls and delivery plans relative to the efficiency Network Rail has reported would aid future reviews. We note, in relation to this recommendation, the following comment from Network Rail: "NR does not agree with the interpretation put forward by Arup. As part of the year end	**No further progress.**

	deferrals are both robust and sustainable, as defined in the ORR's letter of June 2010.	review, NR has provided a robust set of documentation demonstrating that the application of asset policies will maintain asset condition in the short, medium and long term. NR will not be taking any further action on this recommendation." (Comment received 5th July 2012).	
2011. RA.13 **[IR]**	Where Network Rail cannot offer satisfactory evidence of either the PMAs or sustainability of activities underlying the efficiencies it wishes to claim, we recommend that it should adopt a more prudent approach to its reporting. In practice, this may mean reflecting uncertainty by applying a degree of contingency, or reporting a range.	**No change**: Network Rail reports that it disqualifies efficiency which it finds cannot be supported by evidence of positive management action and/or asset sustainability and robustness. We conclude that Network Rail and the ORR should consider adopting formal methods for demonstrating prudence, including reflecting uncertainty by applying a degree of contingency, or reporting a range. We note, in relation to this recommendation, the following comment from Network Rail: "NR has already stated that the accounts on which the efficiency calculation is based are prepared on a prudent basis; that as REEM is a year on year comparison it is not appropriate to 'defer' efficiency recognition to a future year or control period; and that therefore no prudence adjustment will be made in the REEM calculation. NR will not be taking any further action on this recommendation." (Comment received 5th July 2012).	**No further progress.**
2011. RA.1 **[2010/2011]**	We recommend a fully systematic and comprehensive guide setting out how source data is developed for the CEM and REEM calculation processes.	**Significant progress**: Network Rail has developed an Efficiency Handbook, which sets out the calculation process and assumptions that form the basis for the CEM and REEM efficiency calculations. The Handbook includes an explanation of the nature of expenditure and the basis for efficiency calculation for each component of expenditure (opex, maintenance, renewals (by asset category)), descriptions of the type of expenditure in terms of activity / function, and an explanation of how respective baseline values are derived. Network Rail has explained that it has finalised the draft version of the Handbook used at P06. We note, in relation to this recommendation, the following comment from Network Rail:	**No further progress.**

		"NR considers this action closed following the issue of the Efficiency Handbook." (Comment received 5th July 2012).	
2011. RA.2 **[2010/2011]**	We recommend the system of spreadsheets used to calculate the CEM [REEM] efficiency measure is re-organised and integrated to simplify the flow of data and linkage among them.	**Significant progress**: Network Rail has developed an integrated efficiency calculation model clearly setting out the REEM efficiency calculation inputs, formulae and outputs. An Excel spreadsheet provides an overview of the main expenditure elements, and calculations of efficiency (including a breakdown into volume and unit cost efficiency where applicable). Input cost and volume data are clearly identified. Network Rail has indicated that it plans to link expenditures (and volumes) directly to the Experion financial accounting system (although this measure has yet to be implemented). The labelling applied to the data fields appears sufficient as an audit trail. At P06, we suggested that Network Rail procure an independent audit of the REEM efficiency model, in line with industry best practice. Network Rail has said that it does not plan to do so, because it has checked its REEM spreadsheets internally. We note, in relation to this recommendation, the following comment from Network Rail: "NR considers this action closed following the creation and implementation of the REEM model." (Comment received 5th July 2012).	**No further progress.**
2011. RA.3 **[2010/2011]**	For non-reportable volume based renewal activities we recommend the disaggregation of the renewals efficiency calculation by asset category. To provide a robust and auditable basis for efficiency calculations we consider it essential that outturn expenditure levels can be compared against a credible pre-	**Significant progress**: NR has disaggregated the calculation of renewals efficiency for non-reportable volume based categories to facilitate efficiency calculations for each renewals expenditure category. A separate breakdown and explanation of efficiencies achieved for each asset area has been provided. We note, in relation to this recommendation, the following comment from Network Rail: "NR considers this action closed as non volume efficiency has been calculated and substantiated on an asset by asset basis." (Comment received 5th July 2012).	**No further progress.**

	efficient baseline value for every individual asset category.		
2011. RA.4 **[2010/2012]**	We recommend that the present level of unit cost coverage utilized for CEM purposes is increased through the incorporation of other asset categories for which the CAF unit cost framework is already utilized, including operational property, telecoms and electrification renewals.	**Limited progress:** Network Rail has indicated it will not be able to extend the level of renewals unit cost coverage, because it is unable to derive the necessary baseline volume and cost information that enable consistent baseline volume and unit cost rates, reflective of the position at the end of CP3 (2008/09), to be derived. We note, in relation to this recommendation, the following comment from Network Rail: "In view of the absence of a credible baseline, NR does not accept this recommendation and will not be taking any further action." (Comment received 5th July 2012).	**No further progress.**
2011. RA.5 **[2010/2012]**	We recommend that Network Rail improves the granularity of efficiency reporting for non-unit cost based asset categories, (i.e. categories that cannot be captured under the CAF framework (see RA.4)), through breakdown of given asset cost categories into sub-categories, to give greater visibility of the performance and efficiency levels for given asset categories.	**Moderate progress**: Network Rail's implementation of a more rigorous and structured efficiency reporting progress has included the requirement to report evidence of the impact of positive management actions in quantified terms for the given expenditure area. In a number of areas a greater level of granularity has been achieved, e.g. project-by-project reporting for electrification and telecoms, whilst for IM a breakdown into hardware / software/ system integrator sub-asset types has been introduced. We note, in relation to this recommendation, the following comment from Network Rail: "In view of the absence of a credible baseline, NR does not accept this recommendation and will not be taking any further action." (Comment received 5th July 2012).	**No further progress.**

2011. RA.6 **[2010/2012]**	We recommend the implementation of a robust, documented procedure for the monitoring and analysis of unit cost efficiencies through which specific forward-looking efficiency targets are embedded into the efficiency reporting process.	Track renewals: **Moderate progress**: significant progress has been achieved, with baseline and target unit cost values clearly set out for both the unit cost categories. Forward-looking projections through implementation of particular measures have been developed. The P06 unit cost values were been monitored against the values, and the level of progress analysed. At year-end, it is clear that track asset management continues to monitor progress against unit rate values. Other expenditure categories: **Limited progress.** Although in some areas, the impact of positive management actions is set out, there is little evidence of forward-looking monitoring of unit cost efficiencies against a target trajectory. " We note, in relation to this recommendation, the following comment from Network Rail: "NR has previously rejected this recommendation as not relevant to historical efficiency reporting and will not be taking any further action." (Comment received 5th July 2012).	**No further progress.**
2011. RA.8* **[2010/2012]**	To support the documented efficiency monitoring and analysis procedures set out under recommendations RA6 and RA7, we recommend that Network Rail develops specific tests / criteria setting out minimum requirements for the provision of "bottom-up", asset specific evidence through which declared efficiencies for each asset type / unit cost category are substantiated.	**Moderate progress**: Network Rail's Efficiency Handbook sets out criteria for the provision of evidence to support declared efficiencies that apply to all expenditure categories. Network Rail sets out requirements for evidence of positive management actions, and has developed a *pro forma* that must be completed by each asset team / function of the business overseeing the given asset areas. Network Rail's handbook also sets out requirements for provision of evidence to demonstrate the robustness and sustainability of the nature and volume of work undertaken. For some asset categories, such as signalling and civils renewals, we have suggested that Network Rail could improve the accuracy and/or granularity of its reporting through cost benchmarking (e.g. when Network Rail reports cost savings related to contract management). Network Rail again has said it does not agree with this recommendation. We note, in relation to this recommendation, the following comment from Network Rail:	**No further progress.**

		"NR has previously rejected this recommendation firstly because the concept is unworkable and secondly because REEM seeks to measure efficiency against a 2008/09 historic baseline and therefore comparison to historic or current benchmarks is irrelevant. NR will not be taking any further action on this recommendation." (Comment received 5th July 2012).	
2011. RA.9 **[2010/2012]**	We recommend that Network Rail and the ORR explore options for alteration of the methodology by which volume efficiency is calculated in the CEM, to enable any uncertainties in relation to forward-looking / CP4 volumes, associated with deferral and deviation/slippage vs. plan, to be taken into account within the volume efficiency calculation.	**Limited progress**: Network Rail is not proposing to alter the volume efficiency methodology on this basis. We note, in relation to this recommendation, the following comment from Network Rail: "NR has previously rejected this recommendation as not relevant to historical efficiency reporting and will not be taking any further action." (Comment received 5th July 2012).	**No further progress.**
2011. RA.10 **[2010/2012]**	We recommend that Network Rail and ORR review asset policies and how they influence and shape work banks. These may well have helped to reduce the level of uncertainty associated with the sustainability test on NR's asset policies that ORR performed previously.	**Significant progress**: Review by the Independent Reporter in progress.	**Significant progress**

Appendix E: Approach and methodology

Scope and areas of focus

This report has presented the results of our review of relevant statements of Network Rail's 2012/13 regulatory accounts. The full scope of our review is set out in the assignment mandate (attached as 0).

Our review has drawn upon Network Rail's internal documents, relevant spreadsheet data and calculations, and meetings with Network Rail staff. Where appropriate we make recommendations based on our findings, as well as reviewing Network Rail's progress in relation to previous recommendations and issues raised in our previous Reporter reviews.

Expenditure figures and monetary values presented in this report are in 2012/13 prices, unless stated otherwise.

Data consistency

For each of the relevant statements, we have undertaken a desktop review of the numerical consistency of the figures presented in the respective tables, including the breakdown of GB totals between England & Wales and Scotland. We have also checked that figures presented in different statements (e.g. renewals data in Statement 9b) are consistent with figures presented elsewhere (e.g. Statement 12 efficiencies).

REEM efficiency evidence

A central area of focus in our review has been the assessment of the underlying evidence base to support declared efficiencies in Statement 12 of the regulatory accounts. Efficiency is reported through the Real Economic Efficiency Measure (REEM), a measure that compares actual outturn expenditure for 2012/13 with inflation-adjusted 'pre-efficient' baseline (roughly, 2008/09). (This is explained in more detail in the chapters that follow.) Our approach to reviewing efficiency evidence focuses on three principal aspects:

- Positive Management Actions (PMAs): the extent to which improvements in efficiency can be traced back to specific actions taken by management.
- Robustness: whether policies and plans can deliver required CP4 outputs.
- Sustainability: if demand on the network were to remain steady, would application of the same policy (and plans) continue to deliver the outputs specified for the final year of CP4 indefinitely? We interpret this as testing the extent to which stated efficiencies are achieved without risking future adverse impacts on the condition of Network Rail's asset base.

Unit cost confidence grading

Our review of maintenance and renewal unit costs presented in Statements 14 and 15 of the regulatory accounts has involved the assessment of data quality and reliability using the established confidence grading methodology. This involves detailed review of input data quality and calculations, On this basis, an alpha-

numeric grading is assigned to each unit cost to reflect our judgement of the following:

- System reliability: assessment of the reliability of the unit cost reporting process, transparency, and quality controls.
- Accuracy: estimated accuracy and potential error margin in percentage terms.

A more detailed description of the confidence grading methodology is provided in Appendix H.

Risk-based approach

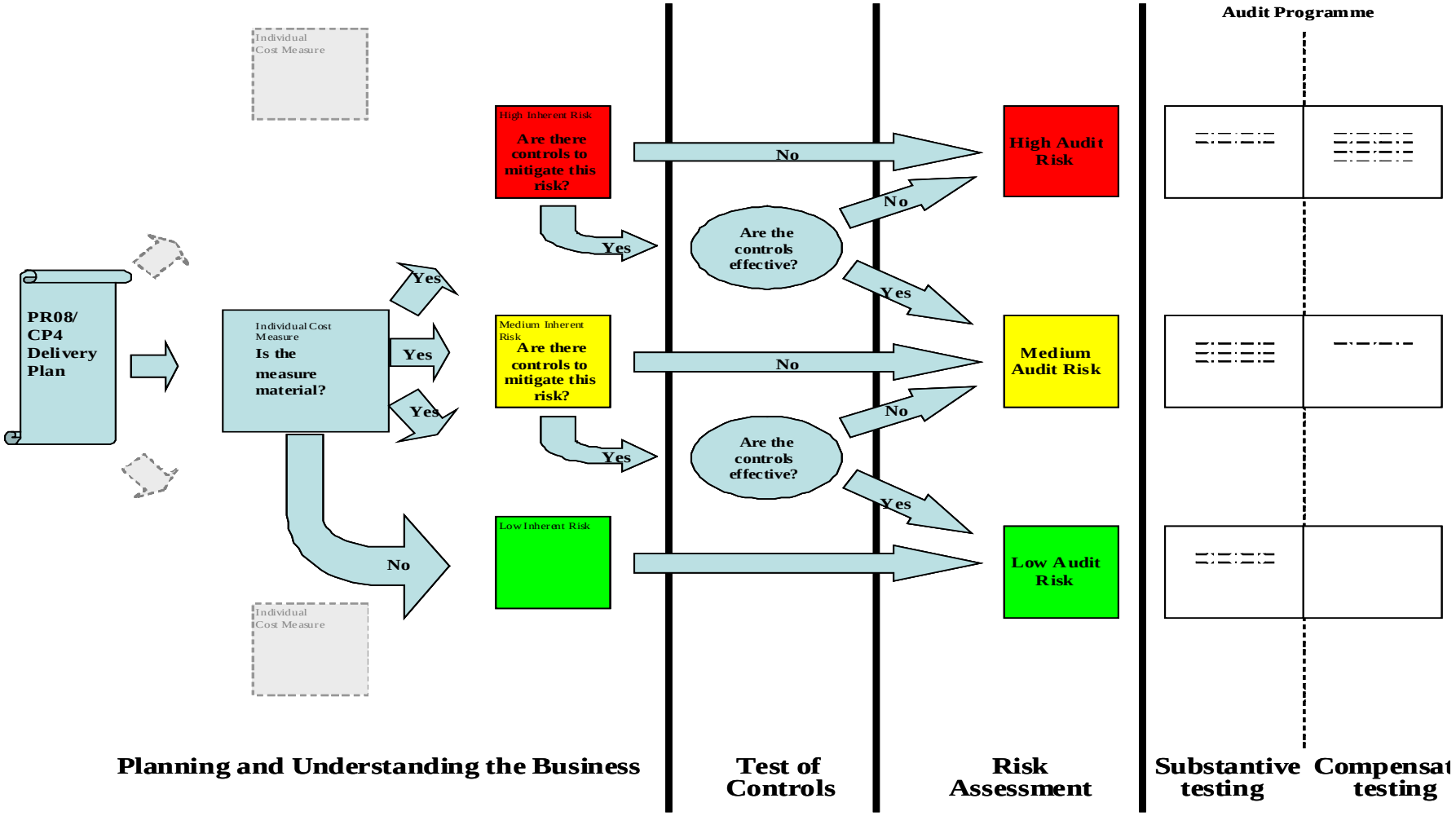
Underlying our proposed methodology will be a risk-based approach, through which a continual focus is retained on the relevance and implications of key outputs within the Regulatory Accounts for the planning and regulation of Network Rail's business activities, and the inherent risk from an audit perspective that they represent.

The level of risk assessed for the respective data elements will inform our testing and auditing approach, with areas of data for which there is perceived to be a high level of audit risk subject more detailed auditing and scrutiny. Critical aspects that are likely to inform our judgement include potential lack of visibility of key data calculations, undocumented or unsubstantiated judgements or analysis within the formulation process, sub-optimal levels of data integrity and completeness, or distortion of overall results.

Our risk based approach will involve:

- Process assurance: a review of process governance, reporting systems and controls and the extent to which this ensures the reliability and robustness of results presented in the relevant statements.
- Data review: this will include an assessment of the data evidence base and rationale underpinning the results presented and the supporting assumptions, together with the review and validation of data outputs.

A diagrammatic overview of our risk-based approach is set out on the next page.


Audit Programme
Individual Cost Measure
High Inherent Risk
Are there controls to mitigate this risk?
No
High Audit Risk
No
Yes
Are the controls effective?
Yes
PR08/ CP4 Delivery Plan
Individual Cost Measure
Is the measure material?
Yes
Yes
Yes
Medium Inherent Risk
Are there controls to mitigate this risk?
No
Medium Audit Risk
No
Yes
Are the controls effective?
Yes
No
Low Inherent Risk
Low Audit Risk
Individual Cost Measure
Planning and Understanding the Business
Test of Controls
Risk Assessment
Substantive testing
Compensat testing

Methodology

Our methodology in undertaking this review has centred on:

- Process assurance, including assessment of the quality, reliability and integrity of the efficiency reporting process; and
- Review of asset expenditure efficiency data, including assessment of the supporting evidence base Network Rail has provided.

Our approach combines a desk-based review of Network Rail's internal documents, a review of spreadsheets used for the calculation of efficiency metrics and meetings with various teams within Network Rail. Findings from these exercises underpin the opinions presented in this report.

Review of Network Rail's internal documents

We have reviewed Network Rail's internal guidance notes and policy statements to understand Network Rail's internal planning and efficiency calculation processes. To assess whether decisions and assumptions made in calculating the efficiency measures are reasonable, we have also requested and received internal records and documentation that Network Rail uses throughout these processes. Appendix G lists all the documentation provided from Network Rail for this review.

Review of the REEM efficiency model

We have reviewed the model developed by Network Rail in MS Excel for calculating the REEM efficiency measure. Source data and formulae have been examined to enable us to assess the consistency and suitability of the calculation methodology.

Meetings with Network Rail

A number of meetings have been held with Network Rail's Financial Control and Asset Management teams, with a particular focus on maintenance and renewals cost efficiencies. By meeting both teams, we have been able to gain an holistic view of the interactions between the efficiency reporting process and the asset management practices, as well as insights into how checks and balances are achieved within the organisation. Appendix F lists all meetings held in relation to this mandate.

Appendix F: Meetings held

Subject	Date	Location	Present: Network Rail / (Other)	Present: Arup
Kick-off	17 April	King's Place, room 2	Andrew Ballsdon; Andrew Leo	Alexander Jan; Tim Ashwin
Maintenance efficiencies	24 April 09:00-11:00	QMK	Andrew Ballsdon; Robert Thomas; Ben Edwards; Louise Kavanagh; Andrew Leo	Alexander Jan; Tim Ashwin; Julien Eaton
Track efficiencies	29 April 14:00-16:00	QMK	Andrew Ballsdon; Uma Shanker; Sue Coverdale; Steve Denys; Emma West; Andrew Leo	Alexander Jan; Tim Ashwin; Julien Eaton
Signalling efficiencies	07 May	King's Place, room 11	Ben Edwards; Andrew Shaw; Andy Smith; James Drury; Simon Appleyard; Andrew Leo	Tim Ashwin; Tania Smith
Operational property efficiencies	09 May	King's Place	Louise Kavanagh; Steve Sutcliffe; Andrew Leo	Alexander Jan; Tim Ashwin; Tania Smith
Update meeting with ORR	13 May 15:00-16:00	ORR offices	Gordon Cole; Amanda Clark	Alexander Jan
Telecoms efficiencies	17 May 2pm	Teleconference (with screen sharing)	Erwin Klumpers, Daniel Kite; Richard Lawes; Andrew Leo	Tania Smith
Plant & Machinery efficiencies	21 May 10:30-11:30	Call	Louise Brotherton; Michael Black; Andrew Leo	Tim Ashwin; Julien Eaton
Performance	31 May 10:00-11:30	QMK	Robert Freeman; Janine Fountain; Andrew Leo	Tim Ashwin; Oliver Billings; Julien Eaton
Regulatory Financial statements review	11 June 11:30-12:30	King's Place	Liam Rattigan	Tim Ashwin; Julien Eaton

Appendix G: Documents received from Network Rail

Ref	Title	Description	File name	Date received
REEM efficiency reporting; process assurance documents				
EFF-1	Consolidated template for Arup using P13 excl maint pages	REEM efficiencies numbers (Opex and Renewals) GB and by region (9 tables)	Consolidated template for Arup using P13 excl maint pages.pdf	18 April 2013
EFF-2	Consolidated template for Arup using P13 data maint pages	REEM efficiencies numbers - Maintenance - GB and by region (3p table)	Consolidated template for Arup using P13 data maint pages.pdf	18 April 2013
EFF-3	Long Distance and London and the South East Performance Recovery Plans 2012 - 2014 - Quarter 3 Progress Report	Network Rail report with analysis of Q3 performance in long-distance and London & SE sectors including performance against JPIP targets.	NRQR LDRP LSEP Q3 20130201 Final.pdf	02 May 2013
EFF-4	Long Distance and London and the South East Performance Recovery Plans 2012 - 2014 - Quarter 4 Progress Report	Network Rail report with analysis of Q4 performance in long-distance and London & SE sectors including performance against JPIP targets.	NRQR LDRP LSEP Q4 2012-13 Final.pdf	02 May 2013
EFF-5	Performance Causal Analysis	Breakdown of causes of poor performance (1p of tables)	Perf Casual P13 ERM.pdf	03 May 2013
EFF-6	Performance questions - NR answers	NR answers to Arup questions document (8p Word inc tables and graphs)	ARUP IR - 20130510 Performance questions.docx	24 May 2013

Ref	Title	Description	File name	Date received
EFF-7	Train Performance - the impact of weather	Presentation on impact of weather on train performance supporting answers to Arup questions (17 slides ppt)	Weather and Performance March 2013 (2).ppt	24 May 2013
EFF-8	LD & LSE Performance Recovery Plans - Review of delivery in 2012/13	Report on performance delivery in 2012/13 (28p pdf)	Network Rail year review 2012-13 FINAL (2).pdf	24 May 2013
EFF-9	Occasional topic - PPM breakdown	Breakdown of PPM per cause, including counter factual analysis for mild weather (1 slide pdf)	Pages from 2012P13 Corp Dashboard_20130412.pdf	29 May 2013
EFF-10	Network Rail Efficiency Handbook	Document detailing efficiency methodology (34p Word)	NR Efficiency Handbook v2.doc	29 May 2013
EFF-11	Long Distance Sector Recovery Plan 2012-2014	Recovery plan for LD sector 2012-14 (137p pdf)	LDRP PK FINAL 270712 v2.pdf	03 June 2013
EFF-12	London & South East Sector Plan 2012-14	Plan for LSE sector 2012-14 (163p pdf)	LSEP 280912 Issue 2 _Final_.pdf	03 June 2013
EFF-13	Top 15 incidents by period	13 sheet xls with top 15 incidents per period	Top 15 incidents by period 2012-2013.xls	03 June 2013
EFF-14	Rail industry performance by franchised TOC- cumulative plan	Multiple sheet xls with PPM performance per TOC	Automated POPR Delay Overview Matrix P13 2012-13.xls	03 June 2013

Ref	Title	Description	File name	Date received
	2012/13			
EFF-15	Category and Delay Reason Code listing	Breakdown of each asset category for performance measure and corresponding codes	Category and Delay Reason Code listing.xls	03 June 2013
EFF-16	OLE Incidents LNW LNE EM 2009-2013	List of all LNW LNE & EM OLE incidents with DMs 2009-2013	OLE Incidents LNW LNE EM 2009-2013.xls	03 June 2013
EFF-17	Performance meeting response to action 10	Chart update (slide 11 weather analysis)	Performance meeting response to action 10.msg	04 June 2013
EFF-18	REEM model	Zip file containing REEM model Excel	REEM Model 130604 1818 changes.zip	10 June 2013
	REEM model	REEM model Excel file	REEM Model 130604 1818 changes.xls	10 June 2013
EFF-19	2012/13 Performance for Severe Weather, Autumn and Structures	Severe Weather, Autumn and Structures delay by sub category, with target and actual minutes for 12/13 (1 sheet xls) - provided as response to action from Performance meeting	SR - Arup Data Request.xls	07 June 2013
EFF-20	SBP update supporting document - Performance plan (April 2008)	SBP Performance plan set out in 2008 (33p pdf report)	Performance plan - April 08 v15 (2).pdf	07 June 2013

Ref	Title	Description	File name	Date received
EFF-21	Wessex Efficiencies - further detail	Further detail on efficiency process and actions at Wessex (1p word)	Wessex Efficiencies.doc	12 June 2013
Maintenance efficiency (REEM)				
MTCE-1	Maintenance 2012/13 Efficiency Report	Report: analysis of efficiency savings by Maintenance since 2008/09 baseline (35p report)	Maintenance 1213 PMA report.pdf	18 April 2013
MTCE-2	Asset Measure 12-13	List of asset measures issues - actual and target (table)	ARUP_Asset Measures.xls	23 April 2013
MTCE-3	Maintenance PMA Summary	Summary of PMAs and related efficiency (16p of tables)	Maintenance PMA Summary.pdf	03 May 2013
MTCE-4	Corrected Appendix C	Correction to Maintenance 1213 PMA report's Appendix C (1p table)	Corrected Appendix C.pdf	03 May 2013
MTCE-5	Performance Recovery Schemes authorised to date	Summary of performance recovery schemes and authorised amount put towards (£m)	Performance Recovery Fund.xls	03 May 2013
MTCE-6	Wessex Local Efficiencies Detail - BP 12-13	Summary of efficiencies for the Wessex route, description and efficiency amount (1 table)	Wessex 12-13 Local Efficiences.xls	03 May 2013

Ref	Title	Description	File name	Date received
MTCE-7	Western Local Efficiencies Detail - BP 12-13	Summary of efficiencies for the Western route, description and efficiency amount (1 table)	Western 12-13 Local Efficiences.xls	03 May 2013
MTCE-8	CEM Final FY13 With HQ Overheads (No Links 7th May) Version 2.xls	Spreadsheet containing MUC breakdown (volume and unit costs) for 2012/13 vs. baseline and associated volume, unit cost, other efficiency	Copy of CEM Final FY13 With HQ Overheads (No Links 7th May) Version 2.xls	08 May 2013
MTCE-9	FY13 Maintenance Function CEM	CEM list of activities, baseline and actual 1213 (1 table)	FY13 CEM Final (Maintenance & Other Maintenance) - National.xls	29 May 2013
MTCE-10	Standard job log	Job log example in new format FY13 (1 table)	Standard Job log (new FY13) 31.03.2013.xls	29 May 2013
MTCE-11	PMA Further Questions	Response to Oliver Billings' further technical questions on maintenance performance (3p Word)	PMA further questions v2.doc	11 June 2013
MTCE-12	Asset KPI Report - 2013/14 Period 2	4 slide interactive ppt report on KPIs: ASI, Wrong Side Failure, Train delay incidents and minutes	Asset KPI Report - Network - Period 2.ppt	11 June 2013
Maintenance costs and MUCs				
MUC-1	Maintenance Unit Cost Manual FY13, version 3	100p manual/explanatory document on MUCs	MUC Manual 04012013 v1 (2).pdf	10 May 2013

Ref	Title	Description	File name	Date received
MUC-2	CEM Final FY13 National 10th May	Spreadsheet containing MUC breakdown (volume and unit costs) for 2012/13 vs. baseline and associated volume, unit cost, other efficiency	CEM Final FY13 National 10th May.xls	10 May 2013
MUC-3	MUCs data quality risk mitigations	Forwarded email from Laura Savio-Foster detailing data quality risk mitigation	MUCs from Louise Kavanagh.pdf	07 June 2013
MUC-4	MUCs - Business Object Unit Cost 4 report fix - UPDATE	Attached email - guidance on MUCs data quality risk mitigation guidance sent from NR HQ to local routes	FW MUCs - Business Object Unit Cost 4 report fix - UPDATE.msg	07 June 2013
MUC-5	11/12 to 12/13 MUC reconciliation	Email from Rebecca Williams reconciliating MUC info from 2011-12 and 2012-13	Email RW 20130607 - MUC reconciliation 1112-1213.pdf	07 June 2013
MUC-6	Pages from MUC Manual 2013 pdf - Adobe Acrobat.pdf	Sign off sheet for MUC Manual	Pages from MUC Manual 2013 pdf - Adobe Acrobat.pdf	16 January 2013
MUC-7	New Statement 14	2012/13 reported MUCs	FY13 Statement 14 13.5.2013 Final.xls	14 May 2013
MUC-8	Business Intelligence for Infrastructure Maintenance (BIIM) Data Warehouse Architecture	Diagram showing the data warehouse architecture	BIIM - DW Block Diagram - v4 120430a.vsd	14 May 2013

Ref	Title	Description	File name	Date received
MUC-9	DERIVATION of B.I.I.M. DATA ITEMS	V1.39. This document identifies the columns from the Ellipse tables that are needed to satisfy the BIIM reporting requirements and any transformations or calculations that need to be applied to them. It also describes the relationships between tables.	DERIVATION FROM BIIM DATA ITEMS v1.39.doc	14 May 2013
MUC-10	The Detailed Solution DesignBusiness Intelligence for Infrastructure Maintenance	V3.3. Definition of the deliverables to be produced for the Detailed Solution Design (DSD) phase of the Business Intelligence for Infrastructure Maintenance project.	DSD for 106736 Business Intelligence for Infrastructure Maintenance V3.3.pdf	14 May 2013
MUC-11	The Detailed Solution DesignBusiness Intelligence for Infrastructure Maintenance	V3.2. Definition of the deliverables to be produced for the Detailed Solution Design (DSD) phase of the Business Intelligence for Infrastructure Maintenance project.	DSD for ISAR4014 Business Intelligence for Infrastructure Maintenance V3.2.doc	14 May 2013
MUC-12	ISAR 4014 – BIIM – Unit Costs Report Specification	This document presents the basic data, layout and navigation requirements of the Unit Cost reports to be developed by BIIM.	ISAR 4014 - BIIM - Requirements - Unit Costs (report 4&5 specs).doc	14 May 2013
MUC-13			ISAR 4014 – BIIM – Unit Costs Report Specification.doc	14 May 2013

Ref	Title	Description	File name	Date received
MUC-14	BUSINESS INTELLIGENCE FOR INFRASTRUCTURE MAINTENANCE	This document addresses the requirements held in ISAR 4014 – Business Intelligence for Infrastructure Maintenance as they relate to the Oracle E-Business Suite, specifically the data extract required from the General Ledger and Oracle Projects modules.	MD050 - Business Intelligence for Infrastructure Maintenance.doc	14 May 2013
MUC-15	ERP-BIIM Maintenance unit Cost Extracts.	This document defines the technical components required to develop the components for ERP-BIIM Maintenance Unit cost Information Extract .This Application Extension Technical Design document complements the Application Extension Functional Design document for MD050 - Business Intelligence for Infrastructure Maintenance.doc. You should consider the set to be the complete detailed design.	MD070-106736-BIIM Maintenance Unit Cost.doc	14 May 2013
MUC-16	DERIVATION of B.I.I.M. DATA ITEMS	V1.39. This document identifies the columns from the Ellipse tables that are needed to satisfy the BIIM reporting requirements and any transformations or calculations that need to be applied to them. It also describes the relationships between tables.	NOTESv1.39.doc	14 May 2013
MUC-17	YTD Detail	P1 Wk1 YTD Detail	P1 Wk1.xls	14 May 2013
MUC-18	YTD Detail	P1 Wk3 YTD Detail	P1 Wk3.xls	14 May 2013

Ref	Title	Description	File name	Date received
MUC-19	YTD Detail	P2 Wk1 YTD Detail	P2 Wk1.xls	14 May 2013
MUC-21	YTD Detail	P3 Wk1 YTD Detail	P3 Wk1.xls	14 May 2013
MUC-23	YTD Detail	P4 Wk1 YTD Detail	P4 Wk1.xls	14 May 2013
MUC-25	YTD Detail	P5 Wk1 YTD Detail	P5 Wk1.xls	14 May 2013
MUC-27	YTD Detail	P6 Wk1 YTD Detail	P6 Wk1.xls	14 May 2013
MUC-29	YTD Detail	P7 Wk1 YTD Detail	P7 Wk1.xls	14 May 2013
MUC-31	YTD Detail	P8 Wk1 YTD Detail	P8 Wk1.xls	14 May 2013
MUC-33	YTD Detail	P9 Wk1 YTD Detail	P9 Wk1.xls	14 May 2013
MUC-35	YTD Detail	P10 Wk1 YTD Detail	P10 Wk1.xls	14 May 2013
MUC-36	YTD Detail	P10 Wk3 YTD Detail	P10 Wk3.xls	14 May 2013

Ref	Title	Description	File name	Date received
MUC-37	YTD Detail	P11 Wk1 YTD Detail	P11 Wk1.xls	14 May 2013
MUC-38	YTD Detail	P11 Wk3 YTD Detail	P11 Wk3.xls	14 May 2013
MUC-39	YTD Detail	P12 Wk1 YTD Detail	P12 Wk1.xls	14 May 2013
MUC-40	YTD Detail	P12 Wk3 YTD Detail	P12 Wk3.xls	14 May 2013
MUC-41	YTD Detail	P13 Wk1 YTD Detail	P13 Wk1.xls	14 May 2013
MUC-42	YTD Detail	P13 Wk3 YTD Detail	P13 Wk3.xls	14 May 2013
MUC-43	MNT MUC CEM Submission 1-13 (extract).xls	P1 Hyperion data detailing cost and work by MNT code within Route	MNT MUC CEM Submission 1-13 (extract).xls	14 May 2013
MUC-44	MNT MUC CEM Submission 2-13 (extract).xls	P2 Hyperion data detailing cost and work by MNT code within Route	MNT MUC CEM Submission 2-13 (extract).xls	14 May 2013
MUC-45	MNT MUC CEM Submission 3-13 (extract).xls	P3 Hyperion data detailing cost and work by MNT code within Route	MNT MUC CEM Submission 3-13 (extract).xls	14 May 2013

Ref	Title	Description	File name	Date received
MUC-46	MNT MUC CEM Submission 4-13.xls	P4 Hyperion data detailing cost and work by MNT code within Route	MNT MUC CEM Submission 4-13.xls	14 May 2013
MUC-47	MNT MUC CEM Submission 5-13.xls	P5 Hyperion data detailing cost and work by MNT code within Route	MNT MUC CEM Submission 5-13.xls	14 May 2013
MUC-48	MNT MUC CEM Submission 6-13.xls	P6 Hyperion data detailing cost and work by MNT code within Route	MNT MUC CEM Submission 6-13.xls	14 May 2013
MUC-49	MNT MUC CEM Submission 7-13.xls	P7 Hyperion data detailing cost and work by MNT code within Route	MNT MUC CEM Submission 7-13.xls	14 May 2013
MUC-50	MUC Hyperion report P8.XLS	P8 Hyperion data detailing cost, work and baselines by MNT code within Route	MUC Hyperion report P8.XLS	14 May 2013
MUC-51	MUC Hyperion report P9.XLS	P9 Hyperion data detailing cost, work and baselines by MNT code within Route	MUC Hyperion report P9.XLS	14 May 2013
MUC-52	MUC Hyperion report P10.XLS	P10 Hyperion data detailing cost, work and baselines by MNT code within Route	MUC Hyperion report P10.XLS	14 May 2013
MUC-53	MUC Hyperion report P11.XLS	P11 Hyperion data detailing cost, work and baselines by	MUC Hyperion report P11.XLS	14 May 2013

Ref	Title	Description	File name	Date received
		MNT code within Route		
MUC-54	MUC Hyperion report P12.XLS	P12 Hyperion data detailing cost, work and baselines by MNT code within Route	MUC Hyperion report P12.XLS	14 May 2013
MUC-55	MUC Hyperion report P13.XLS	P13 Hyperion data detailing cost, work and baselines by MNT code within Route	MUC Hyperion report P13.XLS	14 May 2013
MUC-56	FY13 Maintenance Function CEM	FY13 Maintenance Function CEM	FY13 CEM Final (Maintenance & Other Maintenance) - National.xls	15 May 2013
MUC-57	Standard Job log (new FY13) 31.03.2013	NEW standard jobs ADDED since 01.04.2012 to 31.03.2013	Standard Job log (new FY13) 31.03.2013.xls	15 May 2013
Operations cost efficiency (REEM)				
OPEX-1	OCS & RAM PMA Summary	Summary of OPEX PMAs and efficiency impact (1p table)	OCS & RAM PMA Summary FY13.pdf	18 April 2013
Track renewals (REEM)				
TRACK-1	Efficiency Report - Track Renewals FY 2012/13	Track Renewals Efficiency Report (36p text + graphs report)	TRACK EFFICIENCY REPORT 1213 (FINAL).doc	23 April 2013

Ref	Title	Description	File name	Date received
TRACK-2	Maintenance delivered plain line cost increases	Details of cost increases associated with Plain Line track renewals delivered by maintenance, focusing on increases in four routes.	Track Maintenance delivered plain line cost increases.doc	15 May 2013
TRACK-3	RADR - Ipswich depot - deferred renewals reviewed (Apr 2013)	Forms on deferred work on Ipswich route and review of action (10p of forms) - serving as additional example from the RADR process	ipswich depot defer renewals reviewed april 2013 .pdf	22 May 2013
TRACK-4	Quadrant analysis of lost volumes	Presentation of lost volumes (PL and S&C) by criticality band ("Quadrant analysis") (3p PowerPoint)	Quadrant Analysis of lost vol (2).ppt	22 May 2013
TRACK-5	RADR slim	Zip file containing a number of RADR examples (forms on deferred works and review of action)	RADR slim.zip	22 May 2013
TRACK-6	RADR - Brighton south	RADR forms for Brighton South (4p pdf)	2012_13 TME Brighton South RADR.pdf	22 May 2013
TRACK-7	RADR - Ely (West Anglia NLL&T)	RADR form for West Anglia NLL&T (1p pdf)	ely defer form.pdf	22 May 2013
TRACK-8	RADR - Kent	RADR forms for Kent (Crofton Road S&C, Sandwich, Chartham Hatch)	Kent RADR 2012.3.pdf	22 May 2013
TRACK-9	RADR - Scotland	RADR forms for Scotland (Girdwoodend Dn, Martin's	radr scotland.pdf	22 May 2013

Ref	Title	Description	File name	Date received
		(Law South)) (2p pdf)		
TRACK-10	RADR - Romford (Great Eastern)	RADR forms for Romford (8p pdf) - inc Gidea Park	Romford renewal shortfall docs_2013040809183200.pdf	22 May 2013
TRACK-11	Open track questions	Email response to remaining track questions - including criticality bands and deferral accounting	Email LR 20130612 - Response to track questions.pdf	12 June 2013
TRACK-12	Track geometry faults - Annual Return 2013	Extract from Annual Return 2013 detailing Track geometry faults and narrative (4p Word doc)	Track geometry faults narrative Annual Return 2013.doc	14 June 2013
TRACK-13	Light Maintenance Dept Stewardship Measure	Email response to track geometry faults question - Light Maintenance Depot Stewardship Measure table extracted from draft of Annual Return	Email AL 20130614 - Light Maintenance Depot Stewardship Measure.pdf	14 June 2013
Buildings (operational property) renewals (REEM)				
BLDG-1	Renewals Op Props - Positive Management Actions	Summary of Operational Property PMAs and efficiency impact (1p table)	op prop pma 12_13.pdf	22 April 2013
BLDG-2	Operational property calculations 12-13	Calculation of operational property savings 12-13 (1p of tables)	op props calcs 12_13.pdf	22 April 2013

Ref	Title	Description	File name	Date received
BLDG-3	Civils & Operational Property Positive Management Action - additional details	Further information on PMAs in Civils and in Operational Property (mostly methodological) (2p text)	Civils Ops Prop PMAs Additional Detail.pdf	22 April 2013
BLDG-4	Operational property policy "ready reckoner"	Op prop policy checker model depending on station and assets (4 sheet excel model)	Policy & SSM tool v1.06.xlsm	17 May 2013
BLDG-5	Investment policy verifier	Op prop investment policy checker model (Excel model)	Investment policy verifier_v1.0.xls	17 May 2013
BLDG-6	B&C PMAs - Workbank Planning	Op prop table of non financial KPIs, provided as reponse to Action from Op Prop meeting: "NR to confirm numbers within the VAWP paper for this year" (1 slide pdf)	Workbank Planning KPIs (2).pdf	24 May 2013
BLDG-7	Operational Property - CP4 12/13 Slippage	Slide detailing op prop slippage into 2013/14, in response to Action from Op Prop meeting: "NR to provide further detail on what work has been moved to 13/14 and how much it's worth" (1 slide pdf)	Buildings CP4 12-13 Slippage.pdf	24 May 2013
BLDG-8	Operational Property Efficiency during CP4	Operational Property Efficiency during CP4	CEM non-volume efficiency_Ops Prop DP_P13 v3.xls	29 May 201
BLDG-9	Operational Property PMA	Operational Property PMA calculations	PMA Proformav2_BC_P13 v3	29 May 201

Ref	Title	Description	File name	Date received
	calculations			
BLDG-10	Operational Property Consolidated Change Control P11-12 (12/13 Baseline) to P13-13	Change control log for operational property	Consolidated Buildings CC P1-13 to 13-13	29 May 201
Civils renewals (REEM)				
CVLS-1	Renewals Civils - Positive Management Actions	Summary of Civils PMAs and efficiency impact (1p table)	Civils PMA 12_13.pdf	22 April 2013
CVLS-2	Civils calculations 12-13	Calculation of civils savings 12-13 (2p of tables)	civils calcs 12_13.pdf	22 April 2013
CVLS-3	Civils & Operational Property Positive Management Action - additional details	Further information on PMAs in Civils and in Operational Property (mostly methodological) (2p text)	Civils Ops Prop PMAs Additional Detail.pdf	22 April 2013
Electrification and power renewals (REEM)				
E&P-1	Efficiency Report- Electrification & Plant Renewals (April 2013)	Report/summary of E&P efficiencies by area (18p text and graphs report)	Electrification Plant Efficiency Summary_April 2013 v1 1.pdf	22 April 2013
E&P-2	E&P calculations 12-13	Calculation ofE&P savings 12-13 (2p of tables)	EP calcs 2012_13.pdf	22 April 2013

Ref	Title	Description	File name	Date received
E&P-3	Response to EP action no. 19 in log	Email explanation of measures implemented by Network Rail in its E&P delivery programme to ensure planned volumes for FY 2013/14.	Response to EP action no. 19 in log.msg	17 May 2013
E&P-4	E&P reponses to issues & queries (final)	Questions from I&Q log with responses for E&P areas	EP response final.xls	22 May 2013
E&P-5	Section 3 - Asset management	Section 3 - Asset management of the Annual Return (9p word) - includes historical analysis on OLE	Electrification v2 1 (2).doc	22 May 2013
E&P-6	Section 4 - Activity: E&P renewal activity volumes	Section 4 of the Annual Return (4p word), deals with E&P volumes	Electrification_Section 4_2013 Prep (2).doc	22 May 2013
Signalling renewals (REEM)				
SIG-1	Transformation Programme EID 04a Modular Signalling	Summary of Modular Signalling project and objectives (1p)	Signalling Transformations.pdf	30 April 2013
SIG-2	Signalling - Positive Management Actions	Summary of Signalling PMAs and efficiency impact (6p of tables)	Signalling PMAs Final 1213.pdf	30 April 2013
SIG-3	Signalling - Positive Management	Summary of Signalling PMAs and efficiency impact (6p	Signalling PMAs Final 1213 2.xls	01 May 2013

Ref	Title	Description	File name	Date received
	Actions	of tables in excel)		
SIG-4	Signalling Sustainability	Long term sustainability (financials & volumes) charts (2 charts, 3p)	Signalling Sustainability.pdf	01 May 2013
SIG-5	Signalling Stewardship Indicator	1 chart - SSI over 2011/12 and 2012/13	ssi 2012_13.pdf	01 May 2013
Telecoms renewals & FTN (REEM)				
TEL-1	PMAs telecoms 9Apr project detail	Summary of telecoms PMAs and individual project tables (multiple sheet spreadsheet)	PMAs telecoms 9Apr project detail.xls	22 April 2013
TEL-2	Renewals Telecoms - Positive Management Actions	Summary of Telecoms Renewals PMAs and efficiency impact (2 sheet spreadsheet)	PMA telecoms Proforma 21 Apr.xls	22 April 2013
TEL-3	FTN/GSM-R 2012/13 Year End Efficiency Schedule	Summary of GSM-R Programme efficiency schedule, cost and CP5 projected spend (2p report)	2012-13 FTN GSM-R Efficiency.doc	15 May 2013
TEL-4	NRT funded renewals efficiencies	List summary of Telecoms efficiencies (multiple sheet excel)	NRT funded Renewals Efficienciesv3(P13).xls	17 May 2013
TEL-5	Telecoms Capex Efficiencies FY13	Powerpoint presentation on Overstated PMA submission and methodology for efficiencies (2 slides)	Telecoms Capex Efficiencies FY13 (2).ppt	17 May 2013

Ref	Title	Description	File name	Date received
TEL-6	Annual Return- Telecom renewals	Telecom renewals extract from Annual Return report (7p word report)	Annual Return Telecom renewals.doc	12 June 2013
TEL-7	Annual Return- Telecoms condition	Telecoms condition extract from Annual Return report (3p word report)	Annual Return Telecoms condition.doc	12 June 2013
IT & Other renewals (REEM)				
IT-1	IM Efficiencies 12-13	Efficiencies template applied to IM (IT) - includes inflation instructions etc. (3p spreadsheet)	Efficiencies - Template nonvol P13.xls	22 April 2013
IT-2	IM Renewals Efficiencies 2012/13	Description of PMAs in IM and efficiency impact, including breakdown (2p text)	IM PMA 2012-13.pdf	22 April 2013
PM-1	P&M NDS REEM Efficiency Submission	Breakdown of baseline and actual expenditure for 2012/13 P&M NDS (4 sheet excel) provided ahead of P&M teleconference.	P&M NDS Info for Arup meeting.xls	21 May 2013
Other Regulatory Accounts statements				
Other-1	Analysis of underlying train performance (delay minutes and	ORR analysis by Sneha Patel on weather impact on PPM and DM (17p doc report)	Weather analysis_201213.docx	04 June 2013

Ref	Title	Description	File name	Date received
	PPM) in 2012-13			
Other-2	Regulatory statements data	Zip file of NR reg statements for 2012/13 containing 2 elements below:	Data for Arup 3jun.zip (extracted to subfolder)	03 June 2013
Other-2.1	Arup stats FY1213	Data behind regulatory statements (multiple sheet xls)	Arup stats FY1213.xls	03 June 2013
Other-2.2	Regulatory financial statements (69p report)	Regulatory financial statements from NR detailing numbers and efficiencies	RFS FY1213 extract for Arup 3Jun.doc	03 June 2013
Other-3	Supporting documents to regulatory financial statements	Supporting documents to regulatory financial statements, see 7 elements below:	VARIOUS	11 June 2013
Other-3.1	Network Operations report	Network Operations report supporting statements 8b1 and 8b2	Net Ops 1213 Reg Accounts.xls	11 June 2013
Other-3.2	Investment Expenditure Report 2012/13	See sheet "Hyperion extract" - Hyperion data for renewals expenditure per route	FY13 Delcap (24.04.13 CW).xls	11 June 2013
Other-3.3	Track non volume summary	Summary of "other" areas within track (drainage, fencing…)	Track Non Volume Summary (3).xls	11 June 2013

Ref	Title	Description	File name	Date received
Other-3.4	PR08 Numbers for Regulatory Accounts	PR08 Numbers per statement in each sheet	2012-13 PR08 Numbers for Regulatory Accounts [updated 28.02.13].xls	11 June 2013
Other-3.5	Letter to Paul McMahon	Letter outlining baseline adjustments (support to Statement 12), agreed by ORR	Letter to Paul McMahon re TCS 121110.pdf	11 June 2013
Other-3.6	Freight volume incentive	Methodology/workings document for freight volume incentive (stmt 14)	Freight volume incentive 12_13.xls	11 June 2013
Other-3.7	Passenger volume incentive	Methodology/workings document for passenger volume incentive (stmt 14)	Passenger Volume Incentive 12_13.xls	11 June 2013
Other-4	RFS-REEM reconciliation	Email from Liam Rattigan detailing reconciliation of numbers between RFS and REEM	Email LR 20130613 - RFS-REEM reconciliation.pdf	13 June 2013
Other-5	RUC Handbook	Renewals Unit Cost handbook, describing the calculation processes and principles for RUC reporting	Unit Cost Handbook 27.05.2012 (2).pdf	*Provided for last year's (FY11/12) review*

Appendix H: Unit cost confidence grading methodology

Our review of unit costs presented in Statements 15 and 16 of the regulatory accounts has included a confidence grading analysis. This is an assessment of data reliability and accuracy using an alpha-numeric scoring system that is based on the definitions set out below.

System reliability grading system

System Reliability Band	Description
A	Appropriate, auditable, properly documented, well-defined and written records, reporting arrangements, procedures, investigations and analysis shall be maintained, and consistently applied across Network Rail. Where appropriate the systems used to collect and analyse the data will be automated. The system is regularly reviewed and updated by Network Rail's senior management so that it remains fit for purpose. This includes identifying potential risks that could materially affect the reliability of the system or the accuracy of the data and identifying ways that these risks can be mitigated. The system that is used is recognised as representing best practice and is an effective method of data collation and analysis. If necessary, it also uses appropriate algorithms. The system is resourced by appropriate numbers of effective people who have been appropriately trained. Appropriate contingency plans will also be in place to ensure that if the system fails there is an alternative way of sourcing and processing data to produce appropriate outputs. Appropriate internal verification of the data and the data processing system is carried out and appropriate control systems and governance arrangements are in place. The outputs and any analysis produced by the system are subject to management analysis and challenge. This includes being able to adequately explain variances between expected and actual results, time-series data, targets etc. There may be some negligible shortcomings in the system that would only have a negligible affect on the reliability of the system.
B	As A, but with minor shortcomings in the system. The minor shortcomings would only have a minor effect on the reliability of the system.
C	As A, but with some significant shortcomings in the system. The significant shortcomings would have a significant effect on the reliability of the system.
D	As A, but with some highly significant shortcomings in the system. The highly significant shortcomings would have a highly significant effect on the reliability of the system.

Notes:

1. System reliability is a measure of the overall reliability, quality, robustness and integrity of the system that produces the data.

2. Some examples of the potential shortcomings include old assessment, missing documentation, insufficient internal verification and undocumented reliance on third-party data.

Accuracy grading system

Accuracy Band	Description
1*	Data used to calculate the measure is accurate to within 0.1%
1	Data used to calculate the measure is accurate to within 1%
2	Data used to calculate the measure is accurate to within 5%
3	Data used to calculate the measure is accurate to within 10%
4	Data used to calculate the measure is accurate to within 25%
5	Data used to calculate the measure is accurate to within 50%
6	Data used to calculate the measure is inaccurate by more than 50%
X	Data accuracy cannot be measured

Notes:

1. Accuracy is a measure of the closeness of the data used in the system to the true values.

2. Accuracy is defined at the 95% confidence level - i.e. the true value of 95% of the data points will be in the accuracy bands defined above.