Office of Rail Regulation

Part A Independent Reporter Mandate

Mandate AO/023: Network Rail 2011/12 Regulatory Accounts

Year-end review

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Contents

Glossary

ABC	Activity Based Costing
ARS	Asset Risk Score
ASI	Asset Stewardship Indicator
B&C	Buildings and Civils
CaSL	Cancellations and Significant Lateness
CEM	Cost Efficiency Measure
ckm	Composite kilometres
CP4	Control Period 4
E&P	Electrification and Fixed Plant
E&PSI	Electrification and Fixed Plant Stewardship Indicator
EBSM	Efficiency Benefit Sharing Mechanism
FTN	Fixed Telecom Network
FY 10/11	Financial year 2010/11
GL	General Ledger
GRIP	Governance for Railway Investment Projects' process
GSM-R	Global System for Mobile Communications - Railway
GTG	Good Track Geometry
HAMT	Head of Asset Management Track
IM	Information Management
IR	Part A Independent Reporter (Ove Arup)
IT	Information Technology
KPI	Key Performance Indicator
LMDSM	Light Maintenance Depot Stewardship Measure
MBR	Management Business Review
MDU	Maintenance Delivery Unit
MNT	Maintenance activity code
MOM	Mobile Operations Manager
MUC	Maintenance Unit Cost
NDS	National Delivery Service
NOS	Network Operations Strategy
O&CS	Operations and Customer Service
O&M	Operations and Maintenance
OM&R	Operations, Maintenance and Renewals
Opex	Operating expenditure
OP	Oracle Projects
ORR	Office of Rail Regulation
OTL	Oracle Time & Labour
OTM	On-track Machinery
P&M	Plant & Machinery
P06 / P6	Period Six
P3e	Primavera Enterprise project planning software

PETS	Public Emergency Telephone System
PfPI	Process for Performance Improvement
PHT	Professional Head of Track
PMA	Positive Management Action
PPM	Public Performance Measure
PR08	ORR Periodic Review 2008
PTG	Poor Track Geometry
RADR	Reliability and Delivery Risk
RAMP	Route Asset Management Plan
REEM	Real Economic Efficiency Measure
RoSE	Reliability-centred maintenance signalling
RUC	Renewals Unit Cost
RWI	Repeatable Work Item
S&C	Switches and Crossings
SAC	Signalling Asset Conditions
SBP	Strategic Business Plan
SCMI	Structures Condition Marking Index
SEU	Signal Equivalent Units
SICA	Signalling Infrastructure Condition Assessment
Sqm	Square metres
SSI	Signalling Stewardship Indicator
SSM	Station Stewardship Measure
TOC	Train Operating Company
TRS4	High Output Track Plant Technology
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

In accordance with our Independent Reporter mandate AO/23: Network Rail 2011/12 Regulatory Accounts Data Assurance, Arup has been asked to review key cost and efficiency information presented in and supporting Network Rail's 2011/12 Regulatory Accounts. This report for the full year builds on an interim (Period 6) review completed in January 2012 and previous years' reviews.[1]

This executive summary presents a brief review of our findings related to each maintenance, operations and renewals expenditure area or asset group. Detailed discussion of reported efficiencies and supporting evidence can be found in the main body of this report. The analysis undertaken through this mandate has informed the contents of Arup's opinion letter, which forms part of the 2011/12 regulatory accounts statements. We reproduce Arup's opinion letter (dated 31 July 2012) in Appendix F of this report.

Network Rail's Regulatory Accounts are the primary source of information about the company's regulatory financial position and performance. Their main purpose is to inform the determination of access charges and to monitor compliance with the most recent review of access charges.

We have been asked to assess the transparency and robustness of efficiency results (reflected in Statement 12 of the accounts) and to assess the evidence supporting these calculations. For the purposes of calculating efficiency under the REEM measure, efficiency is defined as the expenditure savings Network Rail has made since the start of the Control Period. Our assessment takes into account the robustness and sustainability of expenditure in line with asset policy and the outputs required of the company through the regulatory settlement (including network safety, asset condition, reliability, capability and capacity).

In the context of the 'EBSM' (Efficiency Benefit Sharing Mechanism), the mandate also requires an assessment of the extent to which evidence of Positive Management Actions (PMAs) provided cumulatively in 2011/12 may apply to 2010/11 efficiency calculations.

We have been asked to review Network Rail's analysis of reductions in operating and maintenance costs during 2011/12, commenting on the extent to which expenditure reductions have contributed to any breach of licence.

We note that Network Rail has informed us of the following:

"At a meeting between Paul Plummer, Cathryn Ross and others on 10 May 2012 it was agreed in principle that no adjustment would be made to REEM for missed outputs."[2]

The mandate also asked that we review a number of financial statements and unit costs for accuracy. A full copy of the mandate can be found at Appendix A.

[1] This includes our review of Network Rail's 2010/11 regulatory accounts (mandate reference AO/011), for which Arup's final report (v.1.1) was released on 30 September 2011.
[2] Information received within comments provided by Network Rail, 18th May 2012.

1.2 Approach

Our approach to completing this analysis has combined process assurance - assessment of the quality, reliability and integrity of the efficiency reporting process – with a detailed review of expenditure efficiency data and the supporting evidence base. We have undertaken desk-based data and evidence reviews and held a number of meetings with Network Rail staff. Our analysis of these areas has been focused on those items of expenditure which can be considered to be material from an audit perspective.

The Real Economic Efficiency Measure (REEM) efficiency calculation is a principal area of focus for this review. In Statement 12, Network Rail calculates expenditure efficiency by comparing current expenditure to inflation-adjusted, 2008/09 expenditure ("the 'pre-efficient' baseline"). The company calculates efficiency for each of its maintenance, operations and renewals expenditure categories and sub-categories.

Maintenance and renewals unit costs, set out in Statements 14-15 of the accounts, also are important inputs to Network Rail's efficiency reporting. Our findings in relation to maintenance and renewals unit cost data quality are found in Chapters 19 and 20 respectively.

We have also undertaken a data assurance review of other regulatory accounts statements containing information relating to maintenance and renewals expenditure, as well as the volume incentive. The results of our review of these statements is contained in Chapter 18 of our report.

1.3 Process assurance: Summary of findings and opinion

Network Rail has presented efficiency results in a REEM statement with calculations undertaken through an Excel model. It has supported these calculations with documented evidence of Positive Management Actions (PMAs) aimed at delivering efficiencies. Network Rail also has provided evidence to support its view that the changes to expenditure are robust and sustainable.

We find that Network Rail has made significant progress in developing an efficiency reporting process and structure since our 2010/11 review. There is evidence that reported efficiencies have been subjected to internal challenge and reported in a model, according to standards outlined in an official "Efficiency Handbook."

As outlined in section 3.4 of this report, we recommend that Network Rail adopt some changes to its reporting structure, incorporating greater visibility of projected outputs and expenditure for each asset and expenditure area. In our P06 report we recommended the efficiency model is externally audited, in line with industry best practice. We maintain this opinion. Network Rail has reported that it does not intend to have the model externally audited, having checked the spreadsheets, inputs and outputs itself and reconciled the numbers with spreadsheets and data sources containing previous efficiency calculations. Although we have worked to verify and cross-check the results presented to us, we cannot provide full assurance of the model or its calculations.

1.4 Maintenance efficiency

For 2011/12, Network Rail is reporting £1bn of expenditure on its maintenance activities and £255m of efficiency relative to the 2008/09 REEM baseline. We consider that evidence provided by Network Rail of cost saving and efficiency measures taken in its maintenance programme to be a reasonable explanation of how positive management actions have driven efficiency savings. We consider the majority of efficiency being declared is substantiated to a satisfactory level.

Network Rail has missed some of its targets in relation to train performance, as set out in the PR08 determination. There has been a licence breach notified by the ORR in a press release dated 19 December 2011 in relation to declining performance in the freight sector.[3] The ORR has also notified Network Rail that it is likely to be in breach of Condition 1 of its network licence with regard to its Public Performance Measure (PPM) commitment for the long distance sector in 2013-14, following an extended period of performance below target levels.[4] Analysis provided by Network Rail to ORR that we have reviewed indicates a number of contributory factors to Network Rail's below-target performance in relation to the PPM and freight performance measures. These include a decline in track quality and reduced productivity benefits in maintenance activities.[5]

Network Rail and ORR have concluded that a proportion of these problems are in turn linked maintenance volume/quality (which is in turn affected by productivity and access). In addition, ORR has indicated that it considers that maintenance restructuring and operating cost reductions may have led to cuts being made too soon, and that Network Rail accepted this;[6] however, we note that in response, Network Rail has written to the ORR stating that it does not accept this interpretation.[7]

We have reviewed in detail the material provided. Specifically we consider reductions in On-Track Machinery (OTM) activity (including tamping and stoneblowing) are relevant. Of the total £20.9m efficiencies calculated for these activities, we estimate that £16.7m cannot therefore be considered to have met robustness criteria for efficiencies.[8] This represents the proportion of this efficiency attributable to the Long Distance, London & SE and Scotland passenger sectors, plus freight, each of which has experienced shortfalls in required performance levels.[9]

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[3] ORR press notice: "Network Rail in breach of licence for declining performance": ORR website, 19th December 2011

[4] Letter from ORR (Richard Price) to Network Rail (David Higgins), "ORR Board decision on Network Rail's performance in the long distance sector in 2012-13 and 2013-14.", 29th May 2012

[5] Letter from Network Rail (Robin Gisby) to ORR (Michael Beswick), "RE: Breach of condition 1 of Network Rail's network licence with regard to operational performance", 30 March 2012", Annex 1, "Passenger Train Performance in Context" (slide pack), Slide 13. Note, the reference to reduced productivity was subsequently rescinded in a letter from David Higgins to Richard Price dated 22 July 2012.

[6] Letter from ORR (Richard Price) to Network Rail (David Higgins), 29th May 2012 "ORR Board decision on Network Rail's performance in the long-distance sector in 2012-13 and 2013-14"

[7] Letter from Network Rail (David Higgins) to ORR (Richard Price), 22 July 2012: "ORR Board decision on Network Rail's performance in the long-distance sector in 2012-13 and 2013-14"

[8] For full details of the calculations underpinning our estimation of uncertainty see Appendix G.

[9] In the absence of information to allow us to apportion efficiencies by a distribution of assets according to train service category, the apportionment of efficiency amounts to the Long Distance

The above assessment represents our best efforts at an estimation of uncertainty based on information provided to us. Further relevant evidence and analysis would be required in order for us to make a definitive assessment of what proportion of maintenance expenditure relates to non-performance and hence should not be claimed as efficiency.
We note, with regard to the previous paragraph, the following comment from Network Rail:

"NR has provided a significant amount of evidence to Arup relating to maintenance activities, track geometry and track failures causing delay which is not reflected in the findings on OTM savings." (Comment received 5th July 2012).

1.5 Operations expenditure efficiency

Total Network Rail operations expenditure amounts to some £1.3bn per annum. In 2011/12, Network Rail is reporting Network Operations expenditure of some £441m, and efficiency of £33m. Network Rail is reporting Operations support expenditure of £484m and efficiency of some £68m. The remaining expenditure is categories as "Support Costs", for which separate PMA evidence for a number of categories has been provided.

We note that the impact of operations expenditure reductions relates more to the company's business functions than to the robustness and sustainability of outputs at the asset level. The negative impacts on business functioning due to expenditure reductions are, for the most part, likely to be evident immediately. We found no evidence to suggest that changes in operations expenditure have affected network robustness.

To demonstrate the robustness and sustainability of operations efficiencies in future years we consider that it will be important for Network Rail to continue to demonstrate that Network Operations Strategy (NOS) headcount reductions have no adverse impact on network reliability and resulting delivery of required outputs in the medium- and long-term.

1.6 Track renewals efficiency

Network Rail is reporting some £702m of track renewals expenditure in 2011/12, with a total reported efficiency of some £223m (24%). Around 90% of track renewals expenditure is captured in volume and unit cost terms, split between the two categories "Plain Line" and "Switches and Crossings" (S&C).

Network Rail has provided detailed, quantified evidence linking these savings to specific PMAs. We consider this evidence provides a suitable base for supporting the unit cost efficiencies the business has reported. Network Rail also has provided evidence of the "deliverability" of planned renewals volumes within Control Period 4 (CP4). We consider this evidence to be reasonable.

We consider the evidence provided by Network Rail of the robustness of its renewals programme, in terms of its ability to deliver required outputs for remainder of CP4, to be reasonable. Whilst we consider that a risk of a volume

/ London & SE / Scotland and Freight categories is based on 2011/12 train km for these categories relative to total train km.

shortfall by the end of CP4 remains, Network Rail has explained that it "over-plans" work to account for potential slippage within the control period. Generally, it appears that volume which the company did not deliver in 2011/12, will not impact upon network performance in CP4 (the robustness test). The company has demonstrated that the volumes it has not delivered in 2011/12 are distributed amongst track criticality bands. This provides us with comfort that the risk of creating a backlog of work on critical parts of the network is minimal.

With respect to sustainability, the company has assured us of its ability to complete renewal works without deferring significant volumes into CP5. Network Rail has delivered higher volumes of renewals in CP3. We believe it is capable of delivering the renewals volumes planned for CP4.

Risks around the use of the high output machine and access remain. It will be important for Network Rail and ORR to review, in detail, the nature of track works completed and planned leading up to the end of CP4, and we anticipate that deliverability of CP4 volumes will remain an area of focus in future reviews of Network Rail's REEM efficiencies for the remainder of CP4.

1.7 Signalling renewals efficiency

Network Rail is reporting some £442m of signalling renewals expenditure in 2011/12 and total efficiency of £108m (20%). For the areas where detailed information has been provided (GRIP 5-7), we find that the expenditure control process is supported by detailed data, including a project-by-project cost breakdown, supporting these efficiencies. The control and reporting process also appears to demonstrate the robustness and sustainability of management actions, by showing the impact of such actions on cost and the timing of delivery of volumes at the individual project level.

We note that the reported signalling volumes are projected to increase significantly in the final year of the Control Period to meet the volumes presently included in the Delivery Plan. Network Rail plans these volumes based on an assessment of renewals activity levels required to deliver longer-term network outputs. Network Rail considers that the volumes required are deliverable, indicating that the increase in reported volumes towards the end of CP4 reflects the completion of a number of long-running projects. The volumes for these projects are reported at the point of commissioning.

On balance, we conclude that Network Rail's reported efficiencies for signalling assets have been based on a sufficiently documented evidence base. The evidence provided for GRIP 5-8 breaks down the claimed efficiency at the project level. In the future, we recommend that Network Rail expand project-level coverage of the data provided to include GRIP 1-4. We consider tt will be necessary for Network Rail and the ORR to monitor delivery progress and plans for the remainder of CP4. We conclude that the ORR's tests of robustness and sustainability have been met.

1.8 Civils renewals efficiency

Since the previous draft version of this report was completed (22nd June 2012), we have been notified that the ORR and Network Rail have agreed not to include civils renewals expenditure within the 2011/12 REEM efficiency measure and

EBSM calculation.[10] Consequently, the REEM figures contained within Statement 12 of the regulatory accounts been recalculated to exclude civils renewals expenditure in its entirety.

The revised REEM renewals calculation is summarised in Chapter 6 of this report. The opinion contained within Arup's final audit letter of 31st July 2012 accompanying Network Rail's 2011/12 Regulatory Accounts, has also been amended (see Appendix F).

However, the ORR has instructed us to retain commentary within this report of Civils efficiency evidence supporting earlier versions of REEM. We reproduce this analysis below (and in Chapter 9 of this report).

From hereon in we refer to Network Rail's previous REEM figures, which included the calculation of civils renewals efficiencies, as the "previous REEM calculation".

In its previous REEM analysis, Network Rail reported £373m of civils renewals expenditure in 2011/12, with an efficiency of £76m (17%). Network Rail reported management actions relating principally to improved work bank planning and stability, supported by several KPIs. We consider that Network Rail's analysis supported by these KPIs provided a reasonable level of visibility of the factors associated with civils efficiency within the previous REEM calculation at a broad, summary level.

We also assessed the transparency and traceability of the volumes underpinning Network Rail's civils volume efficiency calculation within the previous REEM calculation. More information was available than in last year's audit to explain changes to delivered renewals volumes, but we consider that Network Rail should provide further assurance of the stability and deliverability of volumes for our next review. We note that Network Rail received £233m of additional funding via the Government's Autumn Statement.[11] Network Rail, the ORR and Arup agreed that this additional funding is outside the scope of this REEM analysis. We note that this is future expenditure that Network Rail has stated will not impact on delivery of the company's core work bank (or 2011/12 reported efficiency).

As noted in our interim review, we consider that Network Rail could provide visibility of cost savings at more granular level by employing benchmarking and comparison methods.

We concluded that Network Rail provided reasonable evidence of positive management actions. However, Network Rail's civils asset policy covering activities in 2011/12 is not considered by ORR (or indeed Network Rail) to be sustainable. Under the RAGs, all of the volume efficiencies for 2011/12 within Network Rail's previous REEM calculation would need to be disallowed as a result. As with last year, it is our opinion that that a proportion of Network Rail's unit cost efficiencies within the previous REEM calculation may still be valid. This is because a proportion of the works delivered in 2011/12 is likely to have

[10] As referenced in the Email from Gordon Cole (ORR) to Network Rail, "FW: Draft note for NR: Our approach to civils in our assessment of efficiency", 6th July 2012

[11] The Autumn Statement is one of two statements HM Treasury, under the Chancellor of the Exchequer, makes to Parliament annually. Both the Autumn Statement and the annual Budget include economic forecasts and statistics. Under George Osborne, the focus of the Autumn Statement has been economic growth and government finances.

been undertaken if a sustainable asset policy were in place. On this basis, we consider that £36.7m of civils renewals efficiency within Network Rail's previous REEM calculation relating to volume savings may have been overstated. We also consider that £12.1m of civils unit cost efficiency (representing 20% of the total unit cost efficiency) may also have been overstated. We provide a breakdown of the calculations underpinning our estimation of civils uncertainty in Appendix G.

1.9 Buildings (operational property) renewals efficiency

Network Rail is reporting £267m of buildings expenditure, with efficiency of £71m (21%). As it does for civils renewals, Network Rail reports management actions relating principally to improved work bank planning and stability, supported by several KPIs. We consider that Network Rail's analysis supported by these KPIs provides a reasonable level of visibility of the factors associated with claimed efficiency at a broad, summary level. As noted in our Interim Review, we consider that Network Rail could provide visibility of cost savings at more granular level by employing benchmarking and comparison methods.

Network Rail has indicated that, based on the work bank that has been developed in line with asset policy, it remains on-track to deliver the required renewals programme planned for the remainder of CP4. Our previous review of the change control log documents suggested a reasonable checking mechanism is in place that ensures changes to the work bank are justified.

We have concluded that Network Rail's reported efficiencies for building assets have been based on a sufficiently detailed and documented evidence base and appear to satisfy the ORR's tests of robustness and sustainability.

1.10 Telecoms and FTN renewals efficiency

Network Rail is reporting some £40.2m of telecoms and £167m of FTN (Fixed Telecom Network) renewals expenditure during 2011/12. Telecoms efficiency is reported as £13.7m, whilst an inefficiency is reported for FTN of -£5.2m. Network Rail has presented the telecoms efficiencies reported on a project-by-project basis. This helps to evidence Network Rail's case for the robustness and sustainability of management actions, showing the impact of such actions on cost and the timing of delivery of volumes at the individual project level. Volume efficiencies are detailed at a project level (but without narrative), with commentary provided separately to describe and quantify the non-volume efficiencies reported (e.g. those relating to changes in asset policy).

We note that issues relating to the reporting of telecoms volumes were identified by Arup in our review of volumes reporting (mandate AO/025). That report has assessed the company's telecoms reporting as meriting an accuracy grading of "5" (outside +/- 25%). However, the reporting of telecoms volumes itself does not factor in to the REEM telecoms efficiency calculation. Although volume reporting uncertainty may be indicative of wider shortcomings in telecoms renewals reporting processes, Network Rail was able to provide evidence of cost savings at an individual project level to substantiate the efficiencies reported. On this basis, we do not consider uncertainty relating specifically to volume reporting is likely

to materially impact the reported telecoms efficiency level in REEM. Based on the evidence provided by Network Rail for we have been able to conclude that telecoms efficiencies are robust and sustainable.

With respect to FTN assets, the asset management policy relating to telecoms assets is applied by Network Rail to FTN assets (even though FTN is treated as a distinct expenditure category within the REEM efficiency calculation). Although the telecoms asset policy makes limited reference specifically to FTN asset management, we consider that the evidence provided of functional and business specifications which form the basis for planning and delivery of the FTN infrastructure gives a reasonable indication of the robustness and sustainability of the proposed infrastructure expenditure.

1.11 Electrification and Fixed Plant renewals efficiency

Network Rail is reporting some £103m of Electrification and Fixed Plant (E&P) renewals expenditure, and £17m of efficiency (14% vs. baseline). We consider Network Rail's explanation of the PMAs and associated cost savings to be appropriate, providing an acceptable level of confidence. Network Rail reported that the company agreed a new policy with the ORR underpinning the development of the 2010 Delivery Plan update, changing from an aged-based policy to a conditions-based policy. Network Rail has reduced volumes on the basis of this new condition-based asset policy. However, the ORR has indicated that its most recent statement on asset policies, (the 1st June 2010 letter from Michael Lee) does not comment on a revised electrification policy. We recommend that the ORR and Network Rail clarify this issue.

Network Rail reports delivery of outputs is in line with targets agreed with the ORR, based on the revised asset policy involving the move to condition-based renewal. We have found no evidence to date of any slippage of activity within the present Control Period, following revision of work banks based on the new asset policy – although we note that the lack of reported baseline volume measures limits visibility of year-on-year volumes.

We note that issues relating to the reporting of E&P volumes (as well as telecoms) were identified by Arup in our review of volumes reporting (mandate AO/025). That report has assessed the company's E&P reporting as meriting an accuracy grading of "4" (up to +/- 25% inaccuracy). However, the reporting of E&P volumes itself does not factor in the REEM E&P efficiency calculation. Although volume reporting uncertainty may be indicative of wider shortcomings in E&P renewals reporting processes, Network Rail was able to provide evidence of cost savings at an individual programme level, with savings listed for the six major programme renewal areas provided to substantiate the efficiencies reported. On this basis, we do not consider uncertainty relating specifically to volume reporting is likely to materially impact the reported E&P efficiency level in REEM.

We note that Network Rail plans to increase significantly E&P capital expenditure in the final two years of the Control Period. Risk around the delivery of volumes planned for the final two years of the control period remains. For example evidence provided for the Wessex, Sussex and Kent routes shows that the company adhered to slightly less than 60% of deadlines planned in 2011/12. As Network Rail increases the volume of work planned, there is some risk work will

not be completed within the time allocated. Nevertheless, there is evidence that Network Rail has planned for increased delivery and for deferral within CP4, allocating financial and staffing resources to deliver the volumes.

ORR and Network are likely to need to consider E&P volumes in greater detail at future reviews. In particular, plans specifying the volume of E&P renewals required along various routes and Network Rail's previous ability to achieve planned volumes will provide assurance that no work will slip into the final year of the Control Period, and that no unplanned deferral to CP5 is likely to occur.

On the basis of our analysis for 2011/12 and assuming ORR is content with the change to Network Rail's E&P asset policy, we consider efficiencies for this asset type can be considered to have met robustness and sustainability requirements.

1.12 Plant and Machinery renewals efficiency

Network Rail is reporting Plant & Machinery (PM) expenditure of some £117m, and inefficiency of £54m (-85% vs. the REEM).

Network Rail has reported that the significant NDS inefficiency, related to the one-off purchase of fleet vehicles, will yield long-term cost savings. A breakdown of elements of additional expenditure by NDS (based around specific types of plant and machinery) has been provided. On this basis, we consider that the P&M expenditure level does not raise asset sustainability issues, given that current purchases are likely to reduce long-term lease-related costs.

Network Rail also provided a breakdown of P&M renewals expenditure associated with signalling, power, communications and civils assets. On the basis of evidence presented, we consider the REEM efficiency calculation for P&M renewals to be reasonable.

1.13 Information Technology renewals efficiency

Network Rail is reporting £104m of IT expenditure, and some £2.7m of efficiency (some 2% vs. baseline). Since our last report, we have received updated evidence of positive management actions from Network Rail. These appear credible and transparent. PMAs associated with IT cost reductions appear unrelated to the long-term robustness and sustainability of the rail network and we therefore consider them acceptable.

1.14 Network Rail licence breach

The ORR requested that we review Network Rail's assessment as to whether reductions in expenditure claimed as efficiency might have contributed to any breach of licence by the company.

The ORR identified that Network Rail was in breach of licence in a press release dated 19 December 2011 in respect of declining performance in the freight

sector.[12] The ORR also identified that Network Rail is likely to be in breach of Condition 1 of its network licence with regard to its Public Performance Measure (PPM) commitment for the long distance passenger sector in 2013-14.[13]

Following analysis of information provided by Network Rail, we consider that from an efficiency perspective, the most relevant question is whether Network Rail's performance with regard to both long distance and freight performance during 2011/12 is connected with maintenance expenditure reductions. These have been analysed in detail within our wider analysis of maintenance efficiency evidence contained within Chapter 4. Our findings are summarised within section 1.4 above.

1.15 EBSM: 2011/12 PMA evidence - 2010/11 efficiencies

As part of this mandate, the ORR requested that the Reporter assess the nature of the evidence supporting Positive Management Actions (PMAs) provided cumulatively for 2011/12, and the extent to which such evidence may plausibly apply to 2010/11 efficiency calculations. The ORR established an efficiency benefit sharing mechanism (EBSM) in the PR08 determination to incentivise train and freight operating companies to support Network Rail's efforts to improve efficiency.

We have discussed the applicability of PMAs to 2010/11 efficiency calculations with Network Rail in all asset and expenditure area meetings. Network Rail stated that it is not proposing to provide a detailed analysis of this issue, but agreed to provide an indication as to which of the PMAs reported for 2011/12 it considers were also relevant to the efficiencies reported in 2010/11. We report these findings in section 15.2.

Due to the limited information provided so far to support this assessment, we are unable to comment conclusively on the application of PMAs to 2010/11 reported efficiency. With the exception of telecoms management, Network Rail has indicated in meetings that the PMAs it has reported are likely to apply to some degree to the 2010/11 reported efficiency. We would need to receive further written evidence from Network Rail to clarify the position for most expenditure categories to allow us to form a more definitive view.

1.16 Audit of renewals volume data

In Arup's 2010/11 Regulatory Accounts review (A/O011), we highlighted a risk that renewal volumes for some categories might be over or understated. We concluded that there was a risk that renewals efficiency savings may be £50m higher or lower than reported by Network Rail. We considered this was a material uncertainty. This opinion was based on an analysis of the accuracy of Network Rail's volume reporting process that Arup undertook under a separate mandate.

[12] ORR press notice: "Network Rail in breach of licence for declining performance": ORR website, 19th December 2011
[13] Letter from ORR (Richard Price) to Network Rail (David Higgins), 29th May 2012 "ORR Board decision on Network Rail's performance in the long-distance sector in 2012-13 and 2013-14"

Arup has recently completed a further assessment (AO/025: Audit Of Renewal Volumes Data). A draft report has been issued. We summarise the principal findings from that report in chapter 17.

In the context of efficiency reporting, volume-based efficiencies are recorded in the REEM efficiency calculation in 2011/12 for Track, Signalling and Civils assets only. On the basis of the findings noted in the report undertaken in accordance with Mandate AO/025, it would appear that there is a low risk of volumes of work being over or understated for these asset types.

For telecoms and E&P renewals, Network Rail does not break down its REEM efficiency calculations into volumes and unit costs for either category. Although volume reporting uncertainty identified in these areas may be indicative of wider shortcomings in renewals reporting processes, Network Rail was able to provide evidence of cost savings at a detailed level for both renewals categories. On the basis of the evidence provided, we do not consider uncertainty relating specifically to volume reporting is likely to materially impact the reported efficiency levels in REEM for either telecoms or E&P renewals.

1.17 Review of Regulatory Accounts Statements

Based on our review of information and evidence provided in respect to Statements 9-17 of the Regulatory Accounts, we consider Network Rail has prepared these statements in accordance with the Regulatory Accounting Guidelines. We consider the Regulatory Accounts Statements in detail in Chapter 18. Principal findings include the following:

- Subject to the qualifications noted in this report (primarily for maintenance), headline efficiency calculations that support efficiencies reported in Statement 12 appear reasonable.
- The headline REEM efficiencies calculated are adequately supported by PMA *pro formas* submitted for the main operations, maintenance and renewals asset categories.
- Adjustments have been applied to PR08 pre-efficient assessed expenditures to derive baseline expenditures used for calculating efficiencies for non-volume renewals items.
- Volume Incentive payments reported by Network Rail appear reasonable, based on the volume metrics reported and are consistent with the amounts calculated using the ORR's methodology.
- We discuss Statement 14 (Maintenance Unit Costs) and Statement 15 (Renewals Unit Costs) in the next two sections of this executive summary.

1.18 Maintenance unit costs confidence grading analysis

As part of this mandate, we have been asked to assign confidence gradings to the process by which Network Rail collects and calculates Maintenance Unit Cost (MUC) and to the accuracy of the results presented. Arup completed data quality and confidence grading analyses of MUC unit costs in September 2010 and in September 2011. These reviews focused on input data quality and accuracy, and

the robustness of underlying processes and systems from which Network Rail calculated its MUC figures, similar to this review. Our earlier analysis resulted in the assignment of a Confidence Grading of C4 in 2010 and C2 in 2011; generally, reliability band "C" conveys some significant shortcomings in the process in need of urgent attention.

In this review, we have reviewed how Network Rail has implemented improvements to address issues we identified in previous analysis, and we have assessed how these changes are likely to impact on data quality and reliability. Network Rail has demonstrated considerable effort to improve the processes for collecting data and calculating the MUCs during the last year. Areas of improvement include, for example, expanding MUC coverage to some 78% of maintenance expenditure[14] and introducing new data collection systems.

We have concluded that the MUC reporting process now falls within reliability band "B". We note sound textual records, procedures, investigations or analysis, properly documented and recognised as the best method of assessment, with minor shortcomings; we also note appropriate levels of internal verification, and adequate numbers of fully trained individuals, with some minor shortcomings. Examples of these shortcomings include use of old assessment, some missing documentation, insufficient internal verification, undocumented reliance on third-party data.

We note that we have not completed full analysis of the reporting system, as we were not provided as complete a dataset as last year. Previously, we received the full source data from Ellipse, BMIS and OTL that feeds in to the MUC Macro spreadsheet used for calculating the unit costs. We used this source data to calculate the unit costs ourselves and then compare the calculation to the MUC Macro output.

Taking into account the work that Network Rail has carried out over the last year, we find that the KPIs can be expected to be accurate to within ±5%, and we assign the data to accuracy band 2. Therefore our overall proposed rating is **B2**.

1.19 Renewals unit costs confidence grading analysis

We were asked under the assignment mandate to review Renewals Unit Costs (RUCs) presented in Statement 15 of the Regulatory Accounts. The purpose of the review is to assess the process by which RUC data is collated and calculated and to assess the accuracy and reliability of each reported unit cost, assigning a confidence grading. We reviewed the following asset categories, presented in Statement 15: track; civils; signalling; and telecoms.

To review Network Rail's approach to collecting and calculating the RUCs, we met with members of each asset team and reviewed internal records and documents, including the RUC Handbook and the underlying accounting records. We sought to understand and comment upon the governance, systems and reporting process for each of the asset areas.

Generally, we found a suitable process for collecting cost data from renewals projects. We found that the systems in place appear to be robust but with some

[14] We note that the MUCs included within Statement 14 of the regulatory accounts represent only 35% of total maintenance expenditure.

manual data handling in some areas and that the process for collating project-level costs and volumes for the RUCs is well documented.

However, when analysing original project cost data provided for our review of data accuracy, we identified this project-level data provided for review did not match the figures feeding into the RUC calculations (see Appendix H). This was due to centrally applied adjustments for accruals not included within the original data sample (see 20.3.2.3).

Whilst the RUC handbook sets out the processes and systems by which costs and volumes for renewals delivery in the respective asset areas are captured, there is limited information regarding the process by such adjustments are applied to project level data, to derive the accruals-based figures.

Due to the lack of detailed explanation of the accruals-based treatment of project costs, and adjustments applied for the RUC calculation, the resulting reliability grading applied to the RUC figures is **B**.

Due to the discrepancy between project-level cost data and RUC input calculation figures identified in our original sample dataset (as described above), it was necessary for us to undertake a subsequent analysis of data on the correct basis,, using data from General Ledger transactions listing to enable a like-for-like comparison with the relevant OP project data. This review was restricted to one sample project for each asset category (track, civils, signalling, telecoms).

Our analysis of the very limited set of sample data identified no errors. However, due to the limited scope of sample data applied, which do not constitute a representative sample, we applied an accuracy grading to the RUC dataset of **2.**

On this basis we believe a Confidence Grading of **B2** is applicable across the board, based on our review of reporting systems and the sample data provided.

We consider Network Rail is likely to be able to achieve an improved reliability grading, if it is able to clarify the process by which project level data are centrally adjusted and additional accruals adjustments are made by the HQ Finance Team.

We consider Network Rail may be able to achieve an improved accuracy grading**,** if a more representative set of data can be provided that demonstrate the necessary level of consistency across a representative spread of projects.

On the basis of the review undertaken as outlined above and the Reporter's observations during the review process, the recommendations are made:

- Clarification of the process by which project-level cost data are centrally collated and adjusted to produce accruals-based costs feeding into the RUC calculations. This should be fully documented within the RUC handbook.
- Minimisation of manual data processing through the systems, Civils appear to be using automated data to download and upload data off and onto OP using MORE4APPS as indicated above and this could be adopted as a standard approach across asset categories where practical.
- Clear documentation and annotation of data processing should be produced.

- A more standardised approach for data handling and processing should be implemented within each asset category, with common processes (as far as practicable) identified and defined across asset categories. Track indicated that the South East territory uses automated data processing approach whilst other Track teams in other territories uses a manual approach through the use of core data spreadsheet.
- Less use of Excel spreadsheets where possible to avoid inherent errors within data presented on this basis. Where Excel spreadsheets are deemed unavoidable, the use of standardised templates with clear User Guidance Notes should be considered.

At a joint ORR, Network Rail, Independent Reporter meeting held on 6th September 2012, the depth of scrutiny for the cost-related component of RUC calculations undertaken by the Independent Reporter was discussed. The allocation of expenditure (to renewal) activities within Network Rail's regulatory accounts is already subject to statutory audit. Guidance will be provided to the Independent Reporter to ensure the level of detail and granularity for sampling source cost data for future reviews is reflective of this.

Ove Arup & Partners Limited

7 September 2012

2 Introduction

2.1 Background and Objectives

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 2011/12.

This assignment builds on Arup's previous findings and conclusions as Independent Reporter ("the Reporter") including a half yearly review completed in January of this year based on Period 6 data. This included a review of progress made by Network Rail in relation to Arup's recommendations provided in our 2010/11 review, as well a review of progress made in relation to its own improvement plan.

The work is in accordance with the Reporter mandate AO/023: Regulatory Accounts Data Assurance. A copy of the mandate is included as Appendix A.

As Reporter, we have sought to determine the reliability and accuracy of the information presented by Network Rail. We were asked to review the following prepared by the company:

- Directors' review and management commentary
- 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
- Statements 14-15 (and other unit costs not shown in the published table)

This report details our findings in relation to the efficiencies reported in Statement 12. As part of the current Mandate, the ORR requested that the Reporter assess the nature of the evidence supporting Positive Management Actions (PMAs) provided cumulatively for 2011/12, and the extent to which such evidence may plausibly apply to 2010/11 efficiency calculations.

The ORR also has requested that we consider whether the reduction in expenditure might have contributed to any breach of licence by the company. We have interpreted this to mean an assessment of reduced expenditure during 2011/12 both with regard to the company's actual licence breach relating to freight performance, [15] and its likely licence breach during 2013/14 in relation to the PPM measure relating to the long-distance passenger sector. [16] Evidence provided in relation to these areas of investigation by Network Rail is limited.

[15] As notified in the ORR press notice: "Network Rail in breach of licence for declining performance": ORR website, 19th December 2011
[16] As notified in the letter from ORR (Richard Price) to Network Rail (David Higgins), "ORR Board decision on Network Rail's performance in the long distance sector in 2012-13 and 2013-14.", 29th May 2012

Meetings with asset managers provided some insight into potential causes of licence breach and applicability of PMAs to 2010/11 efficiency reporting. However, we have received only limited analysis of delay attribution from Network Rail, and the company has cautioned that it is not in a position provide analysis of the efficiency reported in 2010/11.

The REEM efficiency calculation, set out in Statement 12, is a principal area of focus for this review. The level of risk assessed for the respective elements of the REEM efficiency calculation has informed our testing and auditing approach. In addition, maintenance and renewals unit costs, set out in Statements 14-15, are key to Network Rail's reporting of efficiency and to the effective analysis and planning of Network Rail's infrastructure delivery going forward. Our findings in these areas are documented in Chapters 19 and 20 of this report.

The objectives of our 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, taking into account Network Rail's interim, P6 reporting.
- 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 2011/12 Interim Review and the 2010/11 Regulatory Accounts review.[17]

In addition, the mandate requires an assessment to be made of the nature of the evidence supporting positive management actions provided cumulatively for 2011/12, and the extent to which such evidence may plausibly apply to 2010/11 efficiency calculations. The purpose of this assessment is to enable the ORR to finalise Efficiency Benefit Sharing Mechanism (EBSM) payments for 2010/11.

2.2 Approach

We have considered operating expenditure, maintenance expenditure and renewals expenditure. Within each expenditure area, we have sought to focus on the areas of greatest significance or materiality.

We present our findings based on our review of Network Rail's internal documents, relevant spreadsheet data and calculations, and meetings with Network Rail staff. We make recommendations based on our findings, as well as commenting on Network Rail's improvements in light of our previous Reporter reviews, taking into account progress made. Expenditure figures and monetary values presented in this report are in FY 11/12 prices, unless noted otherwise.

We appreciate the time and co-operation Network Rail staff have provided to allow us to produce this report.

[17] As detailed in Arup's reports: Mandate AO/005 Audit of the Robustness of the Network Rail Unit Cost Framework, May 2010; Mandate AO/003: Network Rail's Annual Return MUC and CAF audit 2009/10, November 2010; and Mandate A)/011: Regulatory Accounts Data Assurance.

The Real Economic Efficiency Measure (REEM) entails an inflation-adjusted measure of the 'pre-efficient' baseline (roughly, 2008/09). (This is explained in more detail in Network Rail's Efficiency Handbook.)

An assessment of the underlying evidence base to support declared efficiencies has been central to our review. This 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 – Can policies and plans 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.

When reviewing underspend within context of REEM efficiencies, we have looked for evidence of sustainability, particularly with respect to volume efficiencies and any proposed deferrals of activity outside CP4.

2.3 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.
- Our analysis of these areas has been focused on those items of expenditure which we understand to represent significant costs or risks to Network Rail's business.

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.

Review of the efficiency model

We have reviewed the model developed by Network Rail for collating data and calculating efficiency metrics for the Regulatory Accounts. Sources of data have been traced to enable the consistency and suitability of the source figures and

formulae have been examined to allow us to form an opinion as to the reasonableness of the methodologies used.

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 renewals cost efficiencies. By meeting both the Financial Control and Asset Management teams, we are able to gain an holistic view of the interactions between the efficiency reporting process and the asset management practice, and insights into how checks and balances are achieved within the organisation. Network Rail provided additional evidence in support of statements made in meetings. Appendix B lists all meetings held in relation to this mandate.

We are grateful to Network Rail staff for making themselves available to assist us with our work.

3 Process assurance

This chapter of our report provides our analysis of the transparency and robustness of Network Rail's approach to undertaking the analysis that supports its efficiency reporting. These were areas we identified as opportunities for improvement based on our review of Network Rail's 2010/11 Regulatory Accounts.

Our review of the transparency of Network Rail's efficiency results has focused on the company's approach to calculating quantitative data and presenting supporting qualitative evidence. During our Interim Review, we examined Network Rail's approach to developing a new spreadsheet-based model to support its efficiency reporting (the "REEM efficiency model"). We also have considered Network Rail's Efficiency Handbook, which formally defines cost efficiency and real economic efficiency measures. Finally, we have commented on the governance and management of the reporting process and the approach which Network Rail has taken to identifying evidence to underpin its reporting.

We build on our examination of the evidence provided during our Interim Review. Much of the evidence provided by Network Rail has not changed since P06, and we find that our commentary and recommendations still hold at year-end.

3.1 Network Rail's efficiency reporting handbook

Network Rail has undertaken work to develop an efficiency reporting handbook for its managers ("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 provides a description of what expenditure comprises in terms of activity / function for each cost category (opex, maintenance, renewals (by asset category)). This includes an overview of how expenditure is broken down by volume and unit cost (where applicable). The document also sets out how the baseline is derived for respective O&M and renewals categories, including pre-efficient expenditure (based on CP3) and the process by which renewals baselines are adjusted to account for alteration / deferral of activity volume.

For each key asset / expenditure area the document details requirements for business units to provide evidence to support efficiencies being declared. This includes quantified explanation of efficiencies achieved to date through specific Positive Management Actions (PMAs), whereby a *pro forma* is provided enabling the business unit to quantify and provide an explanation of the savings achieved for each action / factor identified. The document also states the general requirement for evidence to demonstrate the sustainability of both actual and planned work. The document places a clear onus on business units to provide the required evidence to support declared efficiencies in their areas.

The handbook sets out a clear framework for improved visibility and transparency of activities and expenditure retrospectively.

3.1.1 Efficiency Handbook: Reporter Opinion

As noted in our P6 review, we consider that the Efficiency Handbook represents significant progress by Network Rail, in terms of developing "a fully systematic and comprehensive guide setting out how source data is developed for the CEM and REEM calculation processes," as recommended in our report of summer 2011 (see recommendation Ref. 2011.RA.1, p.57).

In our interim report, we suggested that Network Rail develop specifications for greater visibility of projected outputs and expenditure. These should be included in the handbook. An effective "look-ahead" would help provide an improved understanding of Network Rail's level of progress towards delivering outputs and efficiency savings over the full Control Period. As discussed at the time of our interim review, Network Rail reports that it does not believe a look-ahead is necessary to substantiate historic efficiencies achieved. We believe a look-ahead could help identify areas where Network Rail is ahead or behind target, and any risks in relation to the deliverability of projected efficiencies and related outputs – a particularly relevant issue when it comes to deferrals / re-scheduling of renewals volumes.

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

3.2.1 Model development and scope

Since the publication of its 2010/11 Regulatory Accounts, Network Rail has developed a model to collate and report efficiency data. Network Rail has used this to support the preparation of its FY 11/12 Regulatory Accounts.

Whereas a complex suite of linked spreadsheets supported previous years' efficiency reporting, Network Rail has now developed a single model to calculate the quantitative analysis supporting presentation of the company's Regulatory Accounts for FY 11/12 and beyond.

It contains a comprehensive breakdown of CEM / REEM calculations, showing input fields, calculation processes and resulting efficiency outputs. A breakdown is provided of opex, maintenance and renewals expenditure by asset / expenditure sub-category, and an overview is given of volume and unit cost efficiency calculations where applicable. The model provides a clear visibility of baseline values derived from 2008/09 figures, including adjustments applied for inflation and the derivation of baseline and actual values for the FY 11/12 P6 figures.

In describing the model and its development, key positive features to which we draw attention are that:

- Network Rail has designed the model to be consistent in appearance and structure with what one would expect to see in a low complexity financial model.
- We understand the model will, eventually be linked to Network Rail's accounting systems, to draw on up-to-date business information. It will not be linked to any other spreadsheets or databases.

- The model includes a flow diagram to illustrate its structure for the benefit of users and reviewers.

3.2.2 Model: Reporter Opinion

We have reviewed the extent to which the model's outputs can be traced back to clearly-marked inputs and sources and reconciled with other information presented to us in the course of our review. Having undertaken that analysis, we report that:

- We were able, without difficulty, to trace model outputs back to the relevant calculations and, ultimately, inputs.
- Inputs were clearly labelled in the model, although the ultimate sources of those inputs were not always clear. We suggest that once the model is linked to Network Rail's accounting systems, the sources for inputs in the mode should be marked clearly in the model itself.
- We saw no examples of 'quasi inputs' (i.e. formulae containing numbers rather than references to properly-marked inputs).

At P06, we identified formulae which we believed could be simplified by breaking them down into two or more steps. Although we did not identify any instances in which this led to an error, reducing the complexity of some calculations would enhance the transparency of the model. We note that Network Rail has improved the clarity of the calculation process, including by circulating a standard template to each asset / expenditure area.

We note that Network Rail has not identified clearly the source of the data serving as inputs for the REEM efficiency calculations. We have raised this issue with Network Rail.

Last year, Arup recommended that any model should be independently audited, prior to submission of the FY 11/12 Regulatory Accounts. Network Rail accepted this recommendation. We understand Network Rail no longer consider this necessary because it has checked the model internally. Network Rail reports that it does not consider the complexity of the model to be such to require an external audit, and has indicated that it has been able to reconcile the calculations within the current model to earlier efficiency spreadsheets and calculations used in previous efficiency reporting (e.g. at the 2011/12 interim) as a means of further validation. Network Rail has also indicated that it intends to continue developing the REEM model in order to simplify it and, ultimately, incorporate calculation within the Hyperion reporting system.

At P6, we also noted that whilst the model gives a clear breakdown of CP4 efficiency progress using YTD figures, it does not provide detailed forward-looking efficiency projections. Network Rail has stated that the model is intended to calculate historical efficiency and not to provide assurance of future deliverability. Our view is that adding this functionality would add value to Network Rail's efficiency reporting.

3.3 Governance of Network Rail's efficiency reporting

Since our last year-end review, Network Rail has made efficiency reporting a corporate priority. In particular, Network Rail has endeavoured to devolve reporting responsibilities to asset management teams, whilst seeking to ensure greater rigour and compliance through its finance function.

A number of key documents form the basis of the efficiency reporting process for all asset groups, feeding information into the central efficiency model. Principal among these for the efficiency reporting process is the PMA reporting sheet. In submitting the PMA sheet, each asset team seeks to link cost savings with a series of volume, unit cost and non-volume-related management actions that it considers are associated with the efficiency declared. Different asset groups presented varying levels of granularity and specificity in reporting costs, which we discuss in relation to each asset type.

3.3.1 Governance of reporting: Reporter Opinion

A marked improvement on last year's reporting is that these reported efficiencies have been subjected to challenge through properly documented meetings, both within the asset groups and between the asset groups and central finance. As part of our review, Network Rail has provided Arup with some minutes from these meetings. We consider these documents demonstrate reasonable attempts to test and challenge the evidence presented.

3.4 Evidence of robustness and sustainability

Network Rail has presented a range of evidence that relates to the robustness and sustainability of asset delivery relating for the various expenditure categories. We note that the term "sustainability" has been used by Network Rail to encompass evidence which both to sustainability, in the sense of ability to continue to deliver outputs in the longer-term, and robustness, which relates to Network Rail's ability to deliver outputs required during CP4.

For most asset types, Network Rail has stated that compliance with ORR-agreed policy necessarily demonstrates sustainability and robustness in this sense. The KPIs and other evidence are provided to show compliance with policy. Whilst we acknowledge that robustness and sustainability may be an implication of policy compliance, we believe it remains important to demonstrate, positively, the link between Network Rail's efficiency actions and robustness and sustainability of activity by the asset. Our view is consistent with "Section 10" of the Efficiency Handbook, which requires Network Rail managers not only to show that asset policies are in place, but also to "demonstrate that actual and planned work are in accordance with asset policy..." (pp. 20).

At our Interim Review, we stated that Network Rail should develop further criteria and tests aimed at demonstrating asset sustainability (and robustness). In particular, we encouraged Network Rail to improve the evidence base reflecting that operations, maintenance and renewals work is being undertaken at appropriate times throughout the Control Period. We discuss our findings in the chapters that follow.

3.5 Process assurance conclusions

3.5.1 Efficiency handbook

As noted in our P6 review, we consider that the Efficiency Handbook represents significant progress by Network Rail. In our interim report, we suggested that Network Rail develop specifications for greater visibility of projected outputs and expenditure. An effective "look-ahead" would help provide an improved understanding of Network Rail's level of progress towards delivering outputs and efficiency savings over the full Control Period. We have included this as a formal recommendation in this year-end report.

3.5.2 REEM Model

The model presented to us by Network Rail represents a major step in improving the transparency of the company's efficiency reporting.

At P06, we identified formulae which we believed could be simplified by breaking them down into two or more steps. Although we did not identify any instances in which this led to an error, reducing the complexity of some calculations would enhance the transparency of the model. We note that Network Rail has improved the clarity of the calculation process, including by circulating a standard template to each asset / expenditure area.

At P6, we also noted that whilst the model gives a clear breakdown of CP4 efficiency progress using YTD figures, it does not provide detailed forward-looking efficiency projections. Our view is that adding this functionality would add value to Network Rail's efficiency reporting.

3.5.3 Governance

A marked improvement on last year's reporting is that these reported efficiencies have been subjected to challenge through properly documented meetings, both within the asset groups and between the asset groups and central finance. As part of our review, Network Rail has provided Arup with some minutes from these meetings. We believe these documents demonstrate reasonable attempts to test and challenge the evidence presented.

4 Maintenance efficiency

This chapter sets out the findings of our review of maintenance efficiencies calculated through the REEM measure and reported in Statement 12. We set out an overview of the costs and efficiencies reported by Network Rail and consider the evidence presented in relation to the management actions supporting these efficiencies, as well as evidence relating to the robustness and sustainability of the cost reductions reported.

4.1 Maintenance: Expenditure overview

Table 1 shows a summary of the maintenance cost and efficiency data reported by Network Rail, compared to the pre-efficient baseline expenditure for 2011/12 (as well as 2010/11). The baseline figure is representative of expenditure during 2008/09 (the CP3 "exit position").

We set out in Table 1 below the current (2011/12) efficiency position, compared to the baseline, which reflects 2008/09 expenditure as the CP3 exit position.

Maintenance expenditure, (2011/12 prices)	**2010/11**	**2011/12**	**CP4 total**
REEM pre-efficient baseline (£m)[18]	1,294	1,257	6,440
Actual expenditure (£m)	1,122	1,002	-
Delivery Plan update 2012 projection	-	-	*5,155*
Actual efficiency / *projected efficiency*	13.2%	20.3%	*20.0%*

Table 1: Maintenance expenditure

As indicated in Table 1, maintenance expenditure totalled some £1bn during 2011/12, representing around one quarter of Network Rail's total O,M&R expenditure.

For 2011/12, Network Rail is reporting efficiency of 20.3% against the pre-efficient baseline. This represents a higher level of efficiency than the corresponding 2010/11 figure of 13.2%. It is higher than ORR's target efficiency trajectory for the third year of the Control Period of 18.9%.[19] Network Rail is projecting a total CP4 maintenance expenditure of £5.2 billion (2011/12 prices) in its latest Delivery Plan update, which represents a total CP4 efficiency of 20.0% when compared to the ORR's target efficiency improvement for the Control Period of 18.0%.[20]

4.2 Maintenance: Efficiency calculation

The table below shows that Network Rail is reporting some £255m of maintenance-related cost efficiencies for 2011/12, representing savings of 20.3% relative to the REEM pre-efficient baseline.

[18] Network Rail has indicated that the 2011/12 pre-efficient baseline is below the level of the 2010/11 pre-efficient baseline due to the "transfer of Telecoms spend from Maintenance to Opex following an internal reorganisation" (Network Rail response to draft report 1.0 – 22nd June).
[19] Set out in the letter from ORR (Bill Emery) to David Higgins (Network Rail), "Success in control period 4", 1st March 2011, p.4.
[20] Source: ibid

4.2.1 Results presented

Maintenance efficiency 2011/12	REEM baseline (£k)	2011/12 Actual (£k)	2011/12 Efficiency (£k)	% Efficiency
MUC (volume-related) total	578,441	491,704	86,737	15.0%
- of which, volume efficiency	-	-	*70,662*	*12.2%*
- of which, unit cost efficiency	-	-	*16,075*	*2.8%*
Non-volume direct costs	494,723	332,107	162,616	32.9%
Indirect costs	183,959	178,439	5,520	3.0%
Total	**1,257,123**	**1,002,250**	**254,873**	**20.3%**

Table 2: 2011/12 maintenance costs and efficiencies

4.2.2 Volume & unit cost efficiency calculations

REEM now captures 49% of maintenance expenditure in volume and unit cost terms (through the MUCs), compared with coverage of 37% for 2010/11. This expenditure is broken down across 41 x MUC activity codes, for which baseline and actual volume and unit costs values are provided to enable corresponding efficiency levels to be calculated. As indicated in the table above, Network Rail attributes £71m of efficiencies to volume savings, and £16m to unit cost savings.

A full breakdown of volume and unit cost efficiencies reported against each of the 41 x MUC activity codes underpinning the volume-based REEM maintenance efficiency is provided in Appendix D of this document.

Since Period 6 of 2011/12 Network Rail has been reporting MUCs internally under a new framework, with 104 new MUC definitions. Network Rail has informed us that these almost entirely replace the original unit cost codes captured to date during CP4, with the new definitions based around a more detailed breakdown of previous activity codes to provide a greater level of detail. However, in order to ensure consistency of the 2011/12 reported unit costs with previous years' regulatory accounts statements and REEM calculations, we understand that Network Rail has retained the original MUC definitions, and that it has "mapped back" 2011/12 expenditure and volumes to these original MUCs.

The original MUC definitions are also directly reported in Statement 14 of the 2011/12 regulatory accounts – through which a comparison with the previous year's (2010/11) MUC values is made.[21] We have undertaken a review the MUCs reported in Statement 14 and made an assessment of the quality and reliability of data supporting the figures; the results of our review are reported in Chapter 19 of this report.

The remaining maintenance expenditure feeding into the efficiency calculation reported in Statement 12 is captured in two high-level categories, without a breakdown of volume and unit cost. The "Non-volume direct costs" category

[21] It is worth noting that out of the 41 x Some of the MUCs feeding into the volume-related element of the REEM maintenance efficiency calculation, only 28 are reported in Statement 14 of the regulatory accounts.

accounts for one third of total maintenance costs, but contributes almost two thirds of the total reported efficiency (£162m of the total £254m).

Indirect costs account for the remaining 18% of expenditure, but contribute only 5% of the total reported efficiency amount.

4.3 Maintenance efficiency evidence: Positive Management Actions (PMAs)

4.3.1 Results presented

Network Rail's evidence to support its maintenance efficiencies was provided primarily in its report entitled "Maintenance 2011/12 Efficiency Report".[22] The report provided details of the PMAs associated with the maintenance efficiencies reported, as well as a more detailed paper, which sets out further commentary about these PMAs. Network Rail also provided us with records of an internal challenge meeting, at which its draft efficiency reporting was subject to a degree of scrutiny and review. At a meeting with Network Rail managers, we were able to discuss the evidence presented and were subsequently provided with further written information about some of the cost reduction initiatives (such as the organisational restructuring and other changes which allowed it to reduce labour costs).

Of the maintenance efficiencies reported, Network Rail places the greatest emphasis in its report on labour-related cost reductions, which account for £163m (or 72%) of the total efficiencies reported in relation to maintenance. The changes supporting these cost reductions included a cumulative headcount reduction of 1,971 staff since 2008/09, as well as the introduction of standardised rostering capability and terms and conditions, and overtime reductions.

Other significant drivers of efficiencies reported included securing discounts from suppliers due to faster payment, and more effective procurement and management of resources, such as vehicles and materials. Network Rail reports several such non-volume savings, which represent a significant portion of total maintenance efficiency. Network Rail reports that these were achieved "through commercial management and negotiation of framework labour contracts and below RPI rate increases. The company has reported that the new Call Off Order Management (COOM) system has enabled better management and control of labour resource and has resulted in cost discounts from some suppliers due to the faster payment method."

The aforementioned paper reports that Network Rail has used resource-based costing accountancy, rather than activity-based costing to calculate the savings associated with maintenance PMAs. The PMAs draw on financial data sourced from Network Rail's core accounting system (the Oracle General Ledger) and do not refer back to specific MUCs. Although Network Rail has sought to identify which MUCs benefit from each of the PMAs reported, this analysis results in only a partial connection between the MUCs supporting the REEM calculation and the PMAs reported.

[22] Reference: "Maintenance 2011/12 Efficiency Report": provided 16th April 2012

4.3.2 PMAs: Reporter opinion

With the data being extracted directly from Network Rail's accounting system and relating to visible cost reductions (e.g. headcount), we consider that the PMAs presented to us by Network Rail comprise a reasonably transparent and reliable explanation of how maintenance costs have been reduced, and demonstrate that those cost reductions relate to planned actions taken by management.

However, the absence of a more visible connection between MUCs supporting Statement 12 and the PMAs provided means it is difficult to directly link activities and cost reductions. We understand that volume and unit cost savings driving the volume-based maintenance efficiency calculation are not systematically analysed at individual MUC level. For volume efficiencies in particular, Network Rail treats any reductions in activity volumes by definition as volume efficiencies through the REEM; however, detailed evidence demonstrating the robustness and sustainability for volume reductions at individual activity level – which we consider factor in demonstrating efficiency – have not been provided.

In the context of Network Rail's failure to deliver targeted performance levels required by the ORR during 2011/12, this presents a challenge, discussed further in the following section.

4.4 Maintenance efficiency evidence: robustness and sustainability

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[23]. Although the guidance is directed primarily towards the analysis of renewals efficiencies, issues relating to robustness and sustainability are also relevant to maintenance activities. Network Rail's Maintenance 2011/12 Efficiency Report recognises this, stating that reducing maintenance spend is only effective in the medium and long term if the remaining expenditure is sufficient to sustain the intended condition and outputs of the asset.

We derive our understanding of sustainability and robustness from definitions set out in the June 2010 letter from ORR to Network Rail.[24] 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*. Although Network Rail has referred with the evidence presented to "sustainability" only, we note that some of the evidence presented may also be relevant to consideration of robustness.

To demonstrate the sustainability and robustness of its maintenance activities and associated efficiencies, the two key measures that Network Rail monitors are:

- Compliance with asset policies; and
- Delivery of outputs.

[23] The key guidance documents include the Regulatory Accounting Guidelines, 2006 guidance on the treatment of underspend and Michael Lee's letter of [June 2010], all of which are cited elsewhere in this report.
[24] Letter from Michael Lee, Director Railway Planning and Performance, ORR, to Paul Plummer, Director Planning and Development, Network Rail, 1 June 2010

Our analysis of the information provided by Network Rail in relation to each of these measures is discussed in turn, below.

4.4.1 Compliance with asset policies

Network Rail's maintenance activities are not governed directly by asset policies *per se*, but by standards which define what should be done to fulfil the policies.

Network Rail categorises maintenance work as one of three types:

- *Cyclical work*: scheduled inspection and servicing activities; company standards state the basic frequency (and volume) of cyclical activities.
- *Work arising*: planned corrective or preventative work; local engineers more commonly set the work priority.
- *Rapid response*: unplanned corrective work; the priority of rapid response work is determined by customers' needs (in the case of a train-delaying incident) or by company standards (for work arising as a result of routine inspection).

Control process

As stated in Network Rail's Maintenance 2011/12 Efficiency Report, the timely delivery of critical work is monitored on a weekly basis by local managers, and every four weeks by senior management. Network Rail has provided us with an example of analysis undertaken for the aforementioned four-weekly review. Figure 3,below, shows the percentage of all maintenance works orders completed by the planned date. This chart indicates a marked improvement in the trend since the end of CP3.

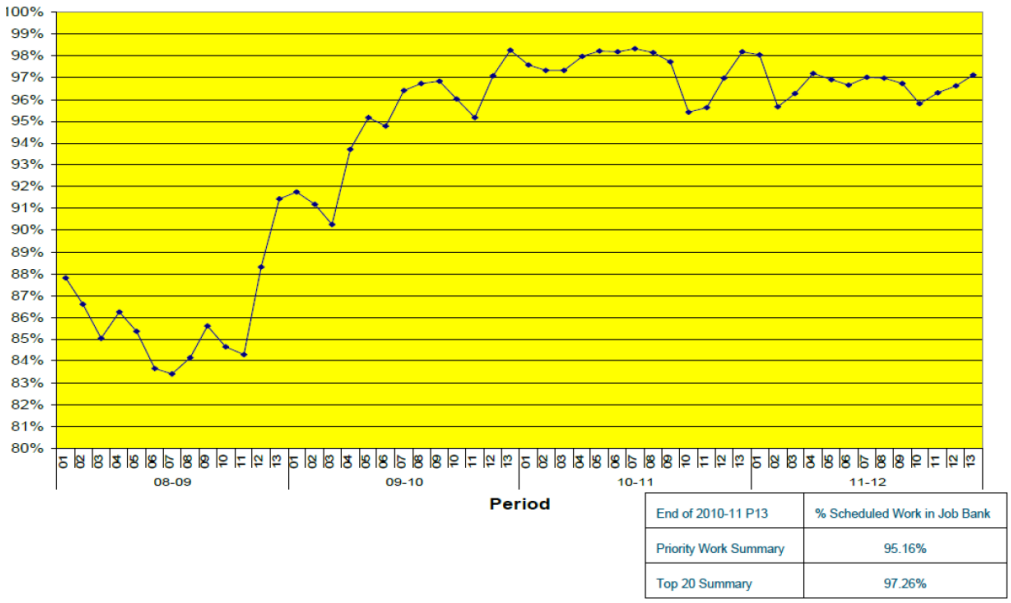

Figure 3: Percentage of Maintenance Works Orders Completed by the Planned Date (source: Network Rail)

During our programme of meetings, Network Rail managers also informed us that the volume of cancelled or reprioritised works orders has remained constant (at

around 5%), and that the average number of times a completed works order is reprioritised / cancelled is around 1.5. This latter figure provides some evidence that the company is not consistently deferring difficult work.

4.4.2 Delivery of asset-related outputs

In addition to monitoring compliance with asset policies, the second key measure by which Network Rail has sought to demonstrate the robustness and sustainability of its maintenance activities relates to the delivery of asset-related outputs. Network Rail states, in its Maintenance 2011/12 Efficiency Report, that the key outputs to be delivered are:

- Safety;
- Asset stewardship; and
- Asset reliability.

Safety-related performance indicators

With regard to safety, Network Rail's analysis of railway user safety indicates that the moving annual average for its KPI (numbers of wrong-side failures with a hazard rating greater than 50) demonstrates a trend of modest year-on-year improvement since the end of CP3. The KPI which Network Rail uses to monitor workforce safety (the Fatalities and Weighted Injuries Index) has remained broadly constant during CP4, with Network Rail stating that this shows and improvement on CP3 exit levels. We note that Network Rail has agreed with the ORR that it will improve safety performance by 3% over CP4, requiring some improvement beyond CP3 exit levels.

Asset stewardship performance indicators

Network Rail's principal internal measure of asset stewardship and reliability – the Asset Stewardship Indicator (ASI) – brings together a broad range of data relating to asset condition. (We note that the ASI itself does not form part of the PR08 determination). Network Rail's progress, during 2011/12, against ASI targets and historical performance is shown in the chart below.

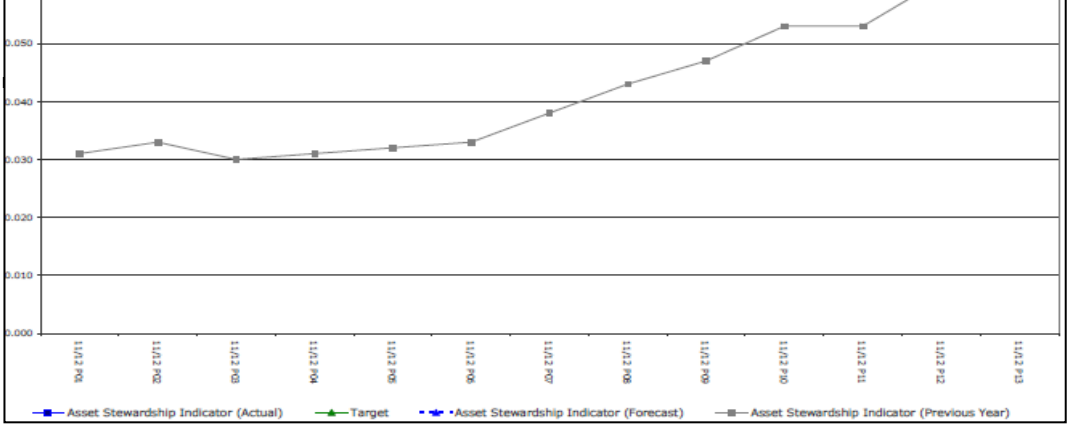

Figure 1: Asset Stewardship Indicator: actual vs. target

The ASI measure of asset condition show in Figure 1 indicates that overall asset condition during 2011/12 has been below the current target level for the latter part of the year, although above the level reported for 2010/11. We note that Network Rail has highlighted that target shown in the above chart is a "stretch target" and that the company has significantly outperformed the original ASI target levels set out in its 2009 Delivery Plan.

Asset reliability performance indicators

Alongside the measure of asset stewardship measured through the ASI described above, Network Rail has also provided us with information about its current performance in relation to asset reliability performance indicators.

These indicators are also monitored by the ORR. In its letter to Network Rail from March 2011, "Success in control period"[25] , The ORR states the following:

"We did not set a formal regulated output requirement for Network Rail's asset serviceability and sustainability (except for station condition) in our determination. Network Rail's compliance with its licence requirements is therefore tested against an extensive dashboard of indicators, including both condition forecasts and activity plans set out in its CP4 delivery plan. The March 2010 delivery plan update gave the key component measures of this dashboard."

Of the 17 condition-related measures cited in the letter, Network Rail provided a table detailing its actual 2011/12 performance against target for 10 measures (relating principally to track)[26] which Network Rail indicated are directly impacted by maintenance activities. We reproduce these measures below.

[25] Letter from ORR (Bill Emery) to David Higgins (Network Rail), 1st March 2011

[26] The 7 x measures set out in the ORR letter of 1st March 2011 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	Original CP4 delivery plan target	CP4 delivery plan 2011 update target	Actual	DP target achieved?	
				Original	2011
GTG	135.4%	137.4%	136.5%	✓	×
PTG	2.54%	2.38%	2.58%	×	×
Geometry faults / 100km	39.5	38.0	41.3	×	×
Rail breaks and immediate defects / 100km	8.8	5.8	3.8	✓	✓
Signalling failures > 10 mins	14,637	16,168	15,631	×	✓
Points failures	4,000	4,420	5,160	×	×
Track circuit failures	4,500	4,973	4,231	✓	✓
Track failures	6,580	6,504	5,494	✓	✓
Power incidents > 300 mins	85	87	75	✓	✓
Telecoms failures > 10 mins	943	721	632	✓	✓

Table 4: Asset measures: actual vs. targets (source: Network Rail)

The asset measures set out in Table 4 indicate that Network Rail is presently achieving six but missing four of both its initial and updated asset reliability targets. The shortfalls are focused mainly around track condition-related measures.

4.4.3 Linkage between CP4 outputs (robustness), asset performance shortfalls and maintenance efficiencies

We review in this section the extent to which there is a linkage between asset performance and reliability shortfalls documented above, and the efficiency measures relating to maintenance activities – in particular, reductions in volume levels for track-related activities.

Following Arup's initial draft report which highlighted the potential robustness issues relating to maintenance efficiencies vis-a-vis indicators of asset performance shortfalls, Network Rail produced an additional report (the "first supplementary report") that included further information and analysis concerning the linkage between the maintenance programme and asset performance and condition – in particular, track condition.[27] As highlighted in the previous section, overall asset stewardship, as measured by the ASI has improved, but Network Rail missed its target in 2011/12. With regard to asset reliability, the four measures that failed to reach target levels were in the two areas of track geometry (three targets missed) and points failures.

We note that Network Rail provided a second supplementary report containing some additional information and analysis on the levels of track condition

[27] Reference: "Maintenance response to version 1.0 of year-end report into Network Rail Regulatory Accounts Interim Data Assurance", provided on 13th June, 2012

maintenance and how this relates to asset condition and train-delaying incidents.[28] This followed the provision of Arup's initial draft report (22nd June), highlighting ongoing conern regarding the robustness of OTM-related efficiencies. We note that the content of this second supplementary paper has been taken into account in the analysis contained within this chapter. However, we note that this has not altered our overall assessment of potential uncertainty in relation to OTM-related efficiencies feeding into the REEM calculation (as documented later in this section).

Track geometry

With regard to track geometry, the first supplementary report documents that Good Track Geometry and Poor Track Geometry measures have shown a deterioration in overall terms since the start of CP4, whilst the track geometry faults have stayed fairly constant (slight deterioration). Traffic volumes have been significantly higher than predicted.

Network Rail has attributed the decline in geometry primarily to exceptionally dry weather conditions during recent years, with levels of rainfall below what could have been reasonably predicted.

The first supplementary report indicates that reductions on volumes of On-Track Machine (OTM) activity correspond to the declining track geometry. We note that reductions in activity levels relating to tamping and stoneblowing contribute a significant proportion of the volume efficiency reported through REEM (see below).

Overall we consider that the evidence provided suggests a linkage between in OTM volume reductions and the track geometry deteriorations which have resulted in the failure to target achieve asset reliability measures discussed previously.

We note that in our previous report we identified a potential relationship between vegetation management and track geometry, whereby reduced levels of vegetation clearance can exacerbate changes in ground conditions during dry periods of weather. As a result, we highlighted potential uncertainty relating to efficiencies associated with the corresponding activity code for vegetation management (MNT074). However, following subsequent discussions with Network Rail, it was clarified activities captured under MNT 074 relate to boundary clearance, maintaining line of sight for signalling and other activities not directly associated with earthwork stability and track form.[29] Therefore we consider it unlikely that changes to this area of expenditure are likely to have influenced track condition.

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[28] Reference: "Track response to Arup feedback of 15 June 2012 on year-end report into Network Rail regulatory accounts interim data assurance", provided on 26th June, 2012

[29] Network Rail informed us that interventions relating to earthwork stability and track form are captured as civils renewals expenditure. Given that civils renewals no longer form part of the current 2011/12 REEM efficiency calculation (see Section 1.8), we have not interrogated this further as an area of potential uncertainty in the REEM.

Points reliability

As indicated in Table 4, Network Rail is currently not achieving target reliability levels in relation to Points Failures. Network Rail's first supplementary paper states that the shortfall in achieving the "very challenging target set at the start of CP4" for points reliability is principally associated with delays in the installation of Remote Condition Monitoring (RCM) equipment.

The Investment Paper provided by Network Rail setting out the benefits of RCM suggests that in quantified terms, the benefit delivered during CP4 following installation of Fixed Points Condition Monitoring will represent £5.8m p.a. in terms of Schedule 8 payments.[30] Network Rail highlights that RCM has now "been fitted to over 5,000 of our 21,000 point ends in running lines, and points performance has improved by over 10% in the past year", and is expecting to achieve further performance improvements to recover performance for the remainder of CP4.[31]

RCM installation is being delivered as an enhancement programme (financed and accounted for separately to maintenance activities). Network Rail has stated that below-target points failure rates should therefore not be directly penalised in maintenance efficiency terms, since the cause of the output shortfall is the non-delivery of a programme enhancement.

However, we do not consider conclusive evidence to have been provided that proves the delay in RCM implementation to have been the predominant cause of excess points failures. We consider that deteriorations in track geometry can (described above) is also likely to have been a significant causal factor in the levels of points failures (in excess of target level during 2011/12). In order to make a more detailed assessment of the causes of the increased points failure rates, we consider more detailed technical information and analysis would be required.

4.4.4 Linkage to train performance outputs

Our review of asset-related outputs discussed in the previous section has highlighted Network Rail is not fully achieving target performance levels for some asset measures – principally relating to track.

Network Rail and ORR agree that asset performance may also be a contributing factor to the delivery of train performance. We have considered it appropriate to assess the extent to which there is a linkage between cost-saving measures underpinning Network Rail's maintenance efficiency calculations and the performance shortfalls that have caused it to miss its required outputs relating to train performance.

[30] Source: Investment Paper "FINAL IP paper for Phase 1 Rollout v6 171209.doc", provided by Network Rail on 13th June 2012.
[31] Source: "Maintenance 1112 Efficiency Report - Supplementary Paper - 13 06 12.doc" , provided by Network Rail on 13th June 2012.

Non-delivery of CP4 train performance outputs

Information published by the ORR relating to Network Rail's 2011/12 performance indicates that a number of CP4 train performance outputs were not achieved.

Train service punctuality targets, measured against requirements through the public performance measure (PPM) were below the target levels set out in the PR08 determination).[32] The 2011/12 PPM figures show punctuality levels have been below the PR08 target level for three out of four passenger categories (long distance, London & SE and Scotland), with only the regional category performing above the target punctuality level.[33]

Punctuality for freight services, measured in terms of number of delay minutes per 100 train km also fell below the PR08 target.[34] ***35***

Network Rail did not fulfil the 2011/12 PR08 target level for the following two performance-related measures:

- Network Rail delay minutes: target missed for England & Wales passenger services.
- Cancellations & significant lateness: target missed for London & SE Services.

We also note that for the missed performance targets cited above, Network Rail also missed target performance levels during 2010/11.

Below-target performance for an extended period has contributed to the ORR's decision to declare Network Rail in breach of its licence with regard to freight performance. [36] It has also contributed to the decision by ORR to state that Network Rail is likely to be in breach of its licence with regard to long-distance passenger performance in 2013/14, and to take "enforcement action", mandating Network Rail to develop plans for improvement. [37]

Linkage between train performance shortfalls and asset performance

We review in this section the extent to which there is a linkage between the train performance shortfalls described above, and asset performance discussed in the previous section.

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[32] ORR Periodic Review, October 2008: p.50

[33] 2011/12 year-end PPM figures were as follows:

- Long distance: 89.1% vs. target 90.9%
- London & SE: 91.7% vs. target 92.4%
- Scotland: 90.7% vs. target 91.7%
- Regional: 92.5% vs. target 91.5%

[34] 2011/12 year-end freight delays were measured at 3.53 minutes per 100 train km, vs. target 3.18 minutes

[35]Source: ibid; p.9

[36] As notified in the ORR press notice: "Network Rail in breach of licence for declining performance": ORR website, 19th December 2011

[37] As notified in the letter from ORR (Richard Price) to Network Rail (David Higgins), "ORR Board decision on Network Rail's performance in the long distance sector in 2012-13 and 2013-14.", 29th May 2012

Following previous notification by ORR to Network Rail in February 2012 of the potential licence breach in relation to long-distance performance, Network Rail responded by providing an in-depth analysis of the underlying performance levels, assessment of the causes of below-target performance areas, and proposed improvement plans and measures going forward. This was set out in a letter to ORR dated 30th March 2012.[38]

The letter makes a number of references to the linkage between train performance and underlying asset condition (particularly in relation to track), including:

- Identification of declining track quality as a factor in the shortfall in long-distance passenger performance;[39]
- Indication that temporary speed restrictions (TSRs) have increased on some routes;[40]
- Rectification of track faults as a prominent factor in the "long distance sector recovery plan" to recover performance. [41]

Network Rail also provided data relating to delay attribution, including a breakdown of minutes of delay attributable to specific infrastructure-related factors. The data show, for example, that three of the "top five underperforming measures" contributing to the shortfall against target total delay minutes are attributable to track-related infrastructure factors.[42, 43]

Efficiency quantum attributable to OTM volume reductions

We set out in ***Table 5*** below the efficiencies calculated under REEM associated with three OTM-related maintenance activities.

Activity	% volume reduction vs. baseline	REEM efficiency (£k)
MNT004 - Plain Line Tamping	27.8%	11,447
MNT005 – Stoneblowing	35.5%	1,648
MNT007 - S&C Tamping	45.1%	7,815
Total		**20,910**

Table 5: OTM and vegetation management efficiencies in maintenance REEM calculation

[38] Letter from Network Rail (Robin Gisby) to ORR (Michael Beswick), "RE: Breach of condition 1 of Network Rail's network licence with regard to operational performance", 30 March 2012
[39] Ibid, Annex 1: Passenger Train Performance in Context: Slide 13
[4040] Ibid, Annex 1: Slide 14
[41] Ibid, Annex 4: Long Distance Sector Recovery Plan 2012-2014: p. 22
[42] Network Rail's Period 13 performance chart indicates for total delay minutes, actual figure at P13 was 8,373k vs. a target level of 7,000k. 3 x track related factors are cited in the "Top 5 underperforming measures": 104B Track Faults including Broken Rails - 166k min in excess of target; 301B Track Circuit Failures - 161k min in excess of target; 101 Points failures - 77k min in excess of target
[43] Source: Summary charts of PPM / performance / delay minutes measures provided by Network Rail on 26 April 2012 (file name: "Pages from P13 Network Operations ERM.pdf - Adobe Acrobat Pro.pdf")

As indicated in Table 5, Network Rail derives £20.9 m of efficiency .through the REEM measure from tamping and stoneblowing savings.

Of the £20.9 m efficiencies calculated for these activities, we estimate that **£16.7m**, cannot be considered to have met the robustness criteria for efficiencies. This represents the proportion of this efficiency attributable to the Long Distance, London & SE and Scotland passenger sectors, plus freight, each of which has experienced shortfalls in required performance levels.[44].

The above assessment represents our best efforts at an estimation of uncertainty based on information provided to us. Further relevant evidence and analysis would be required in order for us to make a definitive assessment of what proportion of maintenance expenditure relates to non-performance and hence should not be claimed as efficiency.

We note, in relation to the previous paragraph, the following comment from Network Rail:

"NR considers that this is not a reasonable conclusion from the significant evidence that has been provided to Arup. The implication of the statement is that NR should reverse the entirety of its savings on OTM and vegetation clearance and return to 2008/09 activity and unit rates in order to be sustainable.

"Although NR considers that there is no evidence that reduced OTM shifts have affected train performance, the compromise solution would be to adjust REEM for the additional OTM shifts that are being purchased in 2012/13, which should represent what Arup considers the unsustainable element of overall OTM savings. This has been quantified at £3.3m and is not considered material." (Comment received 5th July 2012).

4.4.5 Sustainability

Network Rail has included within its maintenance efficiency evidences analysis an overview of long-term trends in various asset condition and performance related measures (including those referred to in previous sections) since before the start of CP4. In general terms, the indicators show improving trends over a number of years (typically, since before the start of CP3), although whilst improvement for some indicators continues has continued during CP4 at a high rate (e.g. broken rails, telecoms failures), certain measures (e.g. signal failures, serious rail defects) show a "levelling off" in performance improvements, whilst track geometry and points failure measures show a deterioration in the latter part of CP4 (discussed in the previous section).

Nevertheless, we consider that from the perspective of sustainability, there is no indication of long-term "insidious decline" in asset condition. Where shortfalls in asset condition measures have been identified, Network Rail sets out in its documentation the measures proposed to rectify and improve the issues encountered, (e.g. additional OTM equipment and management activities to address track geometry issues).

[44] In the absence of information to allow us to apportion efficiencies by a distribution of assets according to train service category, the proportion has been estimated on the basis of 2011/12 train km. For details of this calculation see Appendix G.

Network Rail has also provided evidence showing a trend of falling response times for infrastructure incidents (measured in terms of the time taken to fix infrastructure faults and resume service) during 2011/12.

Overall, we consider the evidence presented does not highlight any indications of long-term sustainability risks relating to Network Rail's delivery of asset-related outputs and infrastructure performance in longer-term that relate to current maintenance programme and associated efficiencies.

4.4.6 Robustness and Sustainability: Reporter opinion

We consider that Network Rail is able to demonstrate that its maintenance activities are broadly compliant with asset policies (via standards). Furthermore, as a result of changes to maintenance regimes implemented since 2011/12, they can be considered not to have undermined the sustainability of the railway's asset base.

In relation to robustness, we consider that evidence provided by Network Rail indicates there is a connection between Network Rail maintenance efficiencies and non-delivery of train performance – although we note that Network Rail has stated it does not recognise this connection. Based on our assessment of evidence provided, as set out in Sections 4.4.2 - 4.4.4 of this chapter, we estimate that £16.7m of the calculated maintenance efficiency cannot be considered to have met the requirements for robustness.

4.5 Maintenance: summary of reporter opinions

For 2011/12, Network Rail is reporting £1bn of expenditure on its maintenance activities, and £255m of efficiency. Having reviewed the evidence supporting these data, we consider that Network Rail has presented a transparent and reasonable explanation of how maintenance costs have been reduced.

However, on the basis of information supplied to date, we are at present unable to conclude that Network Rail has been able to demonstrate that all of the efficiencies reported are robust. Network Rail has missed some of its targets in relation to train performance, as set out in the PR08 determination. Analysis provided by Network Rail to ORR that we have reviewed indicates a number of contributory factors. These include a decline in track quality and reduced productivity benefits in maintenance activities. [45]

Network Rail and ORR have concluded that a proportion of these problems are in turn linked maintenance volume/quality (which is in turn affected by productivity and access). In addition, ORR has indicated that it considers that maintenance restructuring and operating cost reductions may have led to cuts being made too soon, and that Network Rail accepted this;[46] however, we note that in response,

[45] Letter from Network Rail (Robin Gisby) to ORR (Michael Beswick), "RE: Breach of condition 1 of Network Rail's network licence with regard to operational performance", 30 March 2012", Annex 1, "Passenger Train Performance in Context" (slide pack), Slide 13.
[46] Letter from ORR (Richard Price) to Network Rail (David Higgins), 29th May 2012 "ORR Board decision on Network Rail's performance in the long-distance sector in 2012-13 and 2013-14"

Network Rail has written to the ORR stating that it does not accept this interpretation.[47]

We have reviewed in detail the material provided. Specifically we consider reductions in On-Track Machinery (OTM) activity (including tamping and stoneblowing). Of the total £20.9 m efficiencies calculated for these activities, we estimate that £16.7 m cannot therefore be considered to have met the robustness criteria for efficiencies this represents the proportion of efficiency relating to the Long Distance, London & SE and Scotland passenger sectors, plus freight, each of which has experienced shortfalls in required performance levels.[48][49].

[47] Letter from Network Rail (David Higgins) to ORR (Richard Price), 22 July 2012: "ORR Board decision on Network Rail's performance in the long-distance sector in 2012-13 and 2013-14"

[48] In the absence of information to allow us to apportion efficiencies by a distribution of assets according to train service category, the proportion has been estimated on the basis of 2011/12 train km.

[49] For details of the calculations underpinning our estimation of uncertainty see Appendix G.

5 Operations expenditure efficiency

This section of our report reviews operations expenditure (opex) efficiency that Network Rail has reported. We consider the calculated efficiency in the context of Network Rail's planned and actual expenditure during CP4, and we review and assess evidence of Positive Management Actions (PMAs), delivery robustness and delivery sustainability in relation to efficiency being reported.

5.1 Opex: Expenditure overview

Controllable opex, £m (2011/12 prices)	2009/10	2010/11	2011/12	2012/13	2013/14	CP4 Total
CP4 ORR Determination (pre-efficient)						3,995
CP4 Delivery Plan	1,075	1,017	967	919	862	4,842
Delivery Plan update 2011	1,055	1,024	966	947	900	4,892
Delivery Plan update 2012 projection[50]	-	-	-	998	874	4,791
Actual Outturn[51]	**1,055**	**956**	**933**			

Table 6: Operations expenditure

Total Network Rail operations expenditure amounts to some £1.3bn per annum. Network Rail divides total operations expenditure between "controllable" operations expenditure (as shown in the table above) and "non-controllable" operations expenditure. Network Rail and the ORR have agreed that the company should calculate efficiency based upon controllable operations expenditure: money spent which management action could reasonably influence and over which Network Rail retains budgetary control. The majority of operations expenditure, some £933m, relates to controllable costs.

Network Rail further divides controllable opex between Network Operations (formerly referred to as O&CS) and support costs. In 2011/12, Network Operations totalled some £441m, and support costs totalled some £492m.

Network Rail's PR08 determination specified a pre-efficient baseline of some £4bn for controllable opex over CP4.[52] The CP4 delivery plan allocates some £4.9bn to opex over the Control Period, implying an increase of expenditure relative to the PR08 baseline of some 21%. As we discuss below, Network Rail has outlined plans for significant technological investment via its Network Operating Strategy (NOS).

Expenditure to date in the Control Period has just exceeded Network Rail's plans. Actual outturn has totalled some £3.1 billion, whilst the delivery plan anticipated expenditure of some £3 billion between 2009/10 and 2011/12.

Annual expenditure has not been consistently above or below target during the Control Period. The CP4 delivery plan allocated £967m to controllable opex in 2011/12. (The 2011 update of this plan revised this budget downwards by just £1

[50] Network Rail presents its Delivery Plan update 2012 expenditure figures in 2012/13 prices. In absence of information regarding Network Rail's inflation assumptions for 2012/13, we have assumed an inflation rate of 5.16% in converting expenditure figures into 2011/12 prices.
[51] Source 2009/10: Delivery Plan update 2009/10
Source 2010/11: Regulatory Financial Statements for year ended 31 March 2011
Source 2011/12: REEM Model.xls provide by Network Rail on 16 April 2012
[52] ORR Period Review 2008 (ORR, October 2008): p.110 (inflated to 2011/12 prices).

million.) Actual expenditure was some £100m higher than anticipated in 2010/11 and some £41m less than anticipated in 2011/12.

Network Rail plans to decrease its controllable operations expenditure in the remaining two years of the current Control Period. The delivery plan and subsequent updates allocated annually decreasing expenditure between 2009/10 and 2011/12.

5.2 Opex: Efficiency calculation

5.2.1 "Network Operations" opex efficiency

Network Rail reports some £441m of Network Operations opex (i.e. excluding support opex) efficiency during 2011/12, as shown in Table 7 below. The majority of this expenditure - £354m - relates to labour costs, whilst £69m is for indirect costs and £18m is counted as other direct costs. Network Rail has calculated total operations opex efficiency of 7.1% against the REEM pre-efficiency baseline, based on savings of some £34m.

Network Operations opex (excluding support) efficiency 2011/12	**REEM baseline (£k)**	**2011/12 Actual (£k)**	**2011/12 Efficiency (£k)**	**% Efficiency**
Hours	373,459	353,902	19,556	5.2%
Other Direct Costs	20,935	18,461	2,474	11.8%
Indirect Opex	80,223	68,745	11,478	14.3%
Total	**474,617**	**441,108**	**33,508**	**7.1%**

Table 7: Network Operations opex efficiency

Volume-related (hours) savings account for £20m of Operations opex efficiency, representing a decrease of some 5.2% relative to baseline. The company is declaring more significant savings in the "other direct costs" and "indirect opex" areas. Network Rail has calculated 14% and 12% efficiency for "indirect opex" and "other direct costs," respectively.

5.2.2 "Support" opex efficiency

Network Rail reports total operations support cost efficiency of some £68m, representing savings of 12.1% relative to baseline. Table 8 provides an itemised account of support cost expenditure and efficiency. Areas of significant support expenditure include property, human resources and information management. Network Rail is declaring savings between 9 and 16 per cent for each of these categories.

Network Rail has declared significant inefficiency related to several lower expenditure areas. For example, Network Rail has calculated inefficiency in excess of 58% for Safety & Compliance, given a relatively low base of calculation (£2.5m) and increasing expenditure. Other areas of expenditure, including Legal Services, Group and Planning, also show some inefficiency.

Opex: Support cost efficiency 2011/12	REEM baseline (£k)	2011/12 Actual (£k)	2011/12 Efficiency (£k)	% Efficiency
Property	93,996	83,442	10,555	11.2%
Human Resources	82,984	69,567	13,416	16.2%
Information Management	72,182	66,060	6,122	8.5%
Asset Heads	68,547	60,654	7,893	11.5%
Strategic Sourcing	49,939	44,347	5,592	11.2%
Asset Information & Engineering	39,443	37,618	1,824	4.6%
Finance	38,320	37,162	1,158	3.0%
Government & Corporate Affairs	27,049	20,248	6,801	25.1%
National Delivery Service	18,161	14,959	3,202	17.6%
Other Corporate Services	16,831	3,567	13,264	78.8%
Group	15,522	16,146	-624	-4.0%
Planning	12,917	12,981	-63	-0.5%
Other	10,310	9,212	1,098	10.7%
Committed Discretionary Schemes	7,784	7,587	197	2.5%
Legal Services	2,884	4,152	-1,269	-44.0%
Safety & Compliance	2,495	3,965	-1,470	-58.9%
Total	**559,366**	**491,668**	**67,698**	**12.1%**

Table 8: Opex volume and unit cost efficiency

5.2.3 Total opex efficiency

Accounting for support cost savings, Network Rail is reporting total operations savings of some £100m, representing efficiency of some 10% relative to baseline.

5.2.3.1 Volume & unit cost efficiency calculations

Network Rail divides Network Operations labour-hour efficiency into volume and unit cost savings, as shown in Table 9. Overall, the company has reported labour-hour efficiency of £19.6m. Network Rail reports volume related savings of £20.4m relative to the pre-efficient baseline. Year-end labour unit costs were higher than the REEM baseline, and Network Rail is reporting unit (hours) cost inefficiency of -0.2%.

Network Operations Opex (excluding support) efficiency 2011/12	Volume	Unit cost	Total
Hours - Unit cost			
Baseline	16,088	£23.2 k	£373,459 k
Year-end	15,207	£23.3 k	£353,902 k
Efficiency amount	£20,472 k	-£915.4 k	£19,556 k
Efficiency percentage	**5.5%**	**-0.2%**	**5.2%**

Table 9: Network Operations opex volume and unit cost efficiency

5.3 Efficiency evidence: Positive Management Actions (PMAs)

Network Rail has provided evidence that reported Network Operations and operations support expenditure efficiency relates to positive management actions. The company reports that the majority of savings relates to headcount reductions. Some 90% of operations costs are labour-related. The company reports that it has removed staff where technological advancements have permitted labour cost savings. Network Rail reports that that half of claimed operations efficiency related to support-staff headcount reductions, leaving "front-line" staff in place. In particular, the company has been able to reduce operations staff with the reconfiguration of the signalling infrastructure, occurring with the introduction of the Network Operating Strategy (NOS).

5.3.1 Opex: PMAs reported

Below we detail several of the PMAs Network Rail has associated with unit cost, volume and non-volume savings for Network Operations expenditure reductions. We also consider PMAs reported for high-expenditure areas of support cost.

5.3.1.1 Opex: PMAs associated with Network Operations unit cost efficiency

Network Rail has reported year-end unit cost inefficiency of £900k, as discussed above. At P06, Network Rail reported unit cost savings based on the reduction of higher-paid staff, decreasing labour charges and the associated hourly rate. The company is now reporting an overall increase in staff costs. Network Rail managers have not updated unit cost evidence in the PMA *pro forma* since the P6 review. At present there is no explanation of this slight inefficiency. Volume and non-volume-related savings have increased since the time of our interim report.

5.3.1.2 Opex: PMAs associated with Network Operations volume efficiency

Network Rail has reported £20.5m of volume-related savings. As at the interim review, these savings related to seven PMAs. These include but are not limited to:

- Rationalising signalling boxes and associated staff (integrated signalling technology) resulted in a savings of £8.6 million.
- "Other" labour-efficiency related management actions dictated by the NOS, associated with £5.6m of savings.
- Network Rail's "Project Flower" activity analysis and cost benchmarking resulted in the rationalisation of several Mobile Operations Managers, and headcount reduction of 73 positions. We note that this staff reduction has not increased since the interim report. Overall, Network Rail is reporting £3.9m of savings associated with this PMA.

Rationalising the Anglia Integrated Control Office resulted in savings of £1m from the elimination of 19 positions.

5.3.1.3 Opex: PMAs associated with Network Operations non-volume efficiency

In addition to volume-related savings, Network Rail attributes £14m of cost savings to non-volume-related activities. Network Rail associates 14 PMAs with non-volume operations cost savings. Twelve of these relate to headcount reductions. Network Rail reports more than 200 additional operations positions have been rationalised. Network Rail also reports rationalising additional teams, although it does not specify headcounts for these additional office closures.

5.3.1.4 Opex: PMAs associated with support cost efficiency

Network Rail reports PMAs associated with cost savings for several of the support activities, including property and human resources. These PMAs are non-volume associated interventions. For example, Network Rail reports non-volume property support costs savings in excess of £3m due to a "sustainability" campaign. The company reports that it has consolidated its utilities contracts and reduced consumption, thus decreasing costs.

5.3.1.5 PMAs applicable to 2010/11 efficiency

Network Rail has detailed which PMAs it associates with 2010/11 efficiency. Network Rail associates most but not all PMAs reported in 2011/12, with cost savings achieved in 2010/11. Of the 22 PMAs the company has reported, Network Rail has said that seven are not associated with the previous reporting-year's calculated efficiency. Network Rail has reported that the following PMAs are not associated with 2010/11 savings:

- Rostering effectiveness (£0.4m of savings attributed to volume and non-volume efficiency, each, in the current year);
- Rationalisation of operations control (£0.4m of savings in current year); and
- Re-negotiation of station contracts (£1.1m of savings in the current year).

Network Rail also reports that all savings associated with "other" volume, unit cost and non-volume savings are not applicable to the previous reporting year's savings.

5.3.2 PMAs: Reporter opinion

Network Rail has provided PMA *pro formas* that attribute cost savings to specific management actions. We consider that the company has provided sufficient evidence of the credibility of these PMAs. Our view is that the evidence presented in relation to these PMAs is transparent and credible.

5.4 Opex expenditure: robustness and sustainability

ORR guidance, in particular, the letter from Michael Lee to Paul Plummer noted above, on robustness and sustainability particularly focuses on asset renewals. As discussed previously, robustness relates to the company's ability to deliver outputs and maintain service requirements within the current Control Period;

sustainability incorporates longer time horizons and is defined as the ability to maintain adequate service requirements indefinitely, given a constant level of demand.

We recognise that asset-focused definitions of robustness and sustainability may not be suited to an understanding of operations cost reductions. Changes to operations expenditure are likely to affect performance, capacity and reliability requirements immediately. However, we also recognise that some investment decisions, especially related closure of signalling boxes, could have medium and long-term impact on the performance of the railway. We consider operations investment in terms of sustainability and robustness, focusing on the time horizons associated with these terms.

5.4.1 Drivers of cost reduction and efficiency

One of the principal drivers of operations cost efficiency has been the Network Operating Strategy (NOS) announced by Network Rail in July 2011. The NOS is a thirty-year plan to modernise railway technologies and rationalise some 800 signalling boxes along the network. The NOS calls for investment of more than £1 billion during CP5. Network Rail has reported that consolidating signalling boxes into 14 rail operating centres will reduce the cost of the network by some £250m annually. Signalling box closures and staff reductions are to occur in accordance with the company's mandate to provide safe and reliable service.

In terms of the impact of cost reductions on network performance and outputs, Network Rail has highlighted that for the most part, it has reduced costs through the removal of obsolete or aging infrastructure, and that these removals do not conflict with general company policies emphasising safety and reliability. Network Rail concludes that, in practice, these integrated systems improve system performance and resilience, relative to human operation. The company has reported that whilst it plans to remove 1,000 members of staff in this area, its investment in new technology will offset the impact of staff reductions by enabling smarter, leaner processes.

Network Rail has reported that it sees no substantial link between levels of freight or passenger service delays and operations staff reductions. Network Rail reported that one third of all delays are caused by external factors or underlying asset condition – arguably, an issue more dependent on maintenance and renewals activities which involve physical works being undertaken on the asset – than operations. It is clear that opex cost reductions could in some part contribute to delay. We deal with this matter in relation to maintenance expenditure, for which network Rail has supplied the most evidence.

5.4.1.1 Performance indicators

Network Rail reports that it monitors performance to ensure long-term network safety and reliability. The company presented a pack containing several KPIs used to understand the relationship between its operations and performance. Network Rail discussed headline KPIs related to several categories, including: safety, customers, performance, assets, finance and people. Network Rail also discussed its use of track related measures, AC/DC power supply metrics and delay minute measures.

5.4.1.2 Investment control process

Network Rail reported that the control and decision-making framework remains the same as at 2010/11 P06, when Arup undertook its interim review of the present year's Regulatory Accounts. The company relies on the 'BRM' structure, linking sub-route and route-level management with executive reviews. Maintenance and network operations reviews occur together. We consider this process in more detail in that chapter of this report.

The company has engaged in external benchmarking to understand the links between the optimal level of resourcing and potential cost reductions. For example, Network Rail has examined best practices for rationalising Mobile Operations Managers (MOMs) and Section Managers.

5.4.2 Robustness and sustainability: Reporter opinion

We find no evidence to suggest that changes in operations expenditure have impacted network robustness and sustainability. Whilst we have not had the opportunity to review Network Rail's KPIs in detail to understand long-term trends in performance, our limited review of these metrics suggests the company has developed reasonable means for tracking its historical operations performance.

We note that the impact of opex cost reductions relates more to the company's business functions than on the robustness and sustainability of outputs at the asset level, and that negative impacts on business functioning of such reductions are for the most part likely to be evident immediately.

We found no evidence to suggest that changes in opex expenditure have affected network robustness in the short term. The evidence provided does not infer any explicit link between staff cost reductions and network performance. Specifically, we have not found evidence of a linkage with the increased freight delays that gave rise to the recent Network Licence breach. We are confident that the below-target train performance levels is in part attributable to maintenance shortcomings (as discussed in Chapter 4), rather than issues relating to the level or nature of operations expenditure reductions (or renewals efficiency).

To demonstrate the robustness and sustainability of operations efficiencies in future years, we consider that it will be important for Network Rail to continue to demonstrate that NOS headcount reductions have no adverse impact on network reliability and resulting delivery of required outputs in the medium- and long-term. Because the NOS is linked to route-level devolution, it appears possible for Network Rail could use comparative, geographic analysis to improve its understanding of the link between operations expenditure reductions and network delays.

6 Renewals efficiency overview

This chapter presents a brief overview of renewals expenditure efficiency. Network Rail has presented renewals expenditure for the financial year for eight asset categories (specified in the table below), and compared them with a REEM "pre-efficient" baseline.

We note that civils renewals are no longer to be included in the 2011/12 REEM efficiency calculation (see Section 1.8). As a result, the numbers documented in this chapter (which feed into the current REEM numbers provided in the final version of Network Rail's regulatory accounts, dated 31st July 2012), differ from the REEM numbers documented within previous versions of this report.

Renewals expenditure for the updated 2011/12 REEM efficiency calculations now total £2.31bn. Track and signalling categories represent the largest asset groups, respectively, in terms of actual expenditure, accounting for some 59% of renewals costs included within the current REEM calculation.

We note that civils renewals are no longer to be included in the 2011/12 REEM efficiency calculation (see Section 1.8).

Renewals efficiency by asset category	REEM baseline (£k)	2011/12 Actual (£k)	% Total Renewals in REEM	RUC items (£k)	% Covered RUC terms	2011/12 Efficiency (£k)	% Efficiency
Track	924,613	701,672	36.2%	628,318	89.5%	222,940	24.1%
Signalling	591,699	441,265	22.7%	224,000	50.8%	150,435	25.4%
Telecoms	53,915	40,200	2.1%	-	0.0%	13,715	25.4%
Electrification	119,636	102,719	5.3%	-	0.0%	16,916	14.1%
Buildings	337,630	267,000	13.8%	-	0.0%	70,630	20.9%
FTN	161,762	167,000	8.6%	-	0.0%	-5,238	-3.2%
Plant & Machinery	62,862	116,565	6.0%	-	0.0%	-53,703	-85.4%
IT	106,874	104,187	5.4%	-	0.0%	2,687	2.5%
Total	**2,358,990**	**1,940,424**	**100%**	**852,134**	**43.9%**	**418,565**	**17.7%**

Table 10: Renewals expenditure by asset type

Network Rail reports that its renewal activities were 17.7% more efficient when compared to a deferrals-adjusted REEM baseline. In absolute terms, Network Rail reports that total renewals efficiency savings (excluding civils) were £419m in the year reported. Track and signalling cost savings represent some 89% of overall renewals efficiency in the latest REEM efficiency calculation.

Reported expenditure efficiency varies between asset categories. Network Rail is reporting total efficiency savings (including volume and non-volume-based activities) greater than 20% relative to baseline in four categories: track, signalling, building and telecoms. Network Rail has reported two asset categories as inefficient relative to baseline: fixed telecoms network and plant & machinery, which represent 12% of total actual expenditure in the financial year.

In the chapters that follow, we report individually the volume and unit efficiencies for the following renewals expenditure categories, ordered by level of expenditure:

- Track;
- Signalling;
- Buildings;
- Fixed Telecom Network (FTN) and Telecoms; and
- Electrification and Fixed Plant (E&P).

We also comment on efficiency evidence provided for civils renewals category, which fed into previous versions of the 2011/12 REEM calculation, prior to its exclusion in the current figures.

We combine our FTN and telecoms commentary, according to Network Rail's expenditure reporting structure.

We consider evidence of management actions associated with efficiency and evidence of asset sustainability at the group, rather than the asset level, as Network Rail manages efficiency reporting for the asset groups commonly.

Network Rail provided detailed evidence for these asset categories, including meetings with members of staff responsible for efficiency reporting within each asset group. We report separately on Plant and Machinery (PM) and Information Technology (IT), which is part of Information Management (IM).

7 Track renewals efficiency

This chapter contains our review of the track renewals efficiency calculation and underlying evidence, which feeds into the REEM efficiency measure presented in Statement 12 of the Regulatory Accounts. Track renewals expenditure in 2011/12 totalled £701m, which represents 30% of total renewals expenditure for the year.

7.1 Track renewals expenditure overview

7.1.1 CP4 expenditure: planned vs. actual expenditure

Track Renewals Expenditure, £m (2011/12 prices)	**2009/10**	**2010/11**	**2011/12**	**2012/13**	**2013/14**	**CP4 Total**
Plain Line						
CP4 Delivery Plan	472	465	439	434	409	2,219
Delivery Plan update 2011	528	449	491	459	428	2,356
Actual Outturn	528	427	480	-	-	-
Delivery Plan 2012 - projection				*489*	*457*	*2,392*
S&C						
CP4 Delivery Plan	164	196	185	183	173	901
Delivery Plan update 2011	176	171	170	177	174	868
Actual Outturn	176	155	148	-	-	-
Delivery Plan update 2012 projection				*165*	*180*	*830*
Other / Non-volume						
CP4 Delivery Plan	140	133	130	127	123	653
Delivery Plan update 2011	48	46	68	122	106	391
Actual Outturn	48	53	73	-	-	-
Delivery Plan update 2012 projection				*98*	*115*	*341*
Track Total						
CP4 ORR Determination (pre-efficient) [53]						4,589
CP4 Delivery Plan	776	794	754	743	705	3,771
Delivery Plan update 2011	752	668	728	758	708	3,614
Actual Outturn	**752**	**636**	**701**	**-**	-	-
Delivery Plan update 2012 projection				*750*	*752*	*3,564*[54]

Table 11: CP4 track renewals expenditure: planned vs. actual

[53] Source: ORR PR08 determination, p.99 (inflated to 2011/12 prices)
[54] Network Rail presents its Delivery Plan update 2012 expenditure figures in 2012/13 prices. In absence of information regarding Network Rail's inflation assumptions for 2012/13, we have assumed an inflation rate of 5.16% in converting expenditure figures into 2011/12 prices.

As shown in the table above, Plain Line renewals represented 68% of total track renewals expenditure, and Switches and Crossings (S&C) expenditure comprised some 21%, with the remaining 11% categorised as "other" track renewals expenditure.

The 2011 Delivery Plan update, which includes the budget expenditure figures for 2011/12, allocates £3.6 billion of track renewals expenditure over CP4. Planned track renewals expenditure ranges from £668m to £758m per year, with highest renewals expenditure planned in 2009/10 and 2012/13.

Actual expenditure to date has been lower than the level originally planned in the CP4 Delivery Plan, with cumulative track renewals expenditure during the first three years of CP4 c.10% lower than the level originally projected. Actual expenditure during 2011/12 was also 4% less than the budgeted level for the year (reflected in the Delivery Plan update 2011), with S&C expenditure in particular 13% below budget.

In contrast to both the original 2009 Delivery Plan projection showing falling expenditure and the budget projection showing final year expenditure falling after an initial increase in 2012/13, current track expenditure projection shows significant higher expenditure for both 2012/13 and 2013/14. Expenditure is now projected to rise around 7% above current levels. This reflects Network Rail's projected increase in the volumes of Plain Line and S&C to be delivered over this period, in order to fulfil CP4 total volumes agreed with the ORR. However, in overall terms Network Rail is projecting total CP4 track renewals expenditure at £3.56 bn[55] – slightly below the level projected in the budget and 5% lower than the level originally projected in the 2009 Delivery Plan.

7.1.2 Efficiency calculation

Track renewals efficiency	REEM baseline (£k)	2011/12 Actual (£k)	2011/12 Efficiency (£k)	% Efficiency
Plain line renewal	625,805	480,156	145,649	23.3%
S&C renewal	225,438	147,978	77,460	34.4%
Non-volume	73,369	73,354	14	0.0%
Total	**924,613**	**701,488**	**223,124**	**24.1%**

Table 12: Track renewals: efficiency calculation

Table 12 sets out total track renewals expenditure and efficiency reported for 2011/12. Network Rail is reporting some £223 million of expenditure savings, representing total track renewals efficiency of 24% (of which 90% is reported as volume-related expenditure), under the following two RUC categories:

- Plain line renewals (measured per composite kilometre); and
- Switches and Crossings (S&C) renewals (measured per equivalent unit).

Network Rail reports 23.3% efficiency relative to baseline for Plain Line renewals expenditure and 34.4% efficiency relative to baseline for S&C renewals expenditure.

[55] CP4 projected expenditure published in Delivery Plan update 2012, adjusted to 2011/12 prices assuming an inflation rate of 5.16% between 2012 and 2013.

However, for non-volume expenditure (which represents 6% of the total expenditure level) Network Rail is reporting zero efficiency relative to baseline on non-volume expenditure. The company reports £73 million of non-volume track renewals expenditure, representing less than six per cent of total actual expenditure.

7.2 Volume & unit cost efficiency calculations

Table 13 provides a breakdown of the volume and unit cost efficiency for the two volume-related expenditure categories.

Track renewals 2011/12	Volume	Unit cost	Total
Plain Line			
Baseline	2,218 ckm	£282.2 k	£625,805 k
Year-end	1,914 ckm	£250.8 k	£480,156 k
Efficiency amount	£85,693 k	£59,956.5 k	£145,649 k
Efficiency percentage	**13.7%**	**9.6%**	**23.3%**
S&C			
Baseline	421 units	£536.1 k	£225,438 k
Year-end	333 units	£444.4 k	£147,978 k
Efficiency amount	£46,922 k	£30,538.8 k	£77,460 k
Efficiency percentage	**20.8%**	**13.5%**	**34.4%**

Table 13: Track renewals volume and unit cost efficiency

Network Rail's calculation of volume efficiency is based on the assumed efficiency volume reduction, in percentage terms, that Network Rail plans to deliver over the full Control Period.

The in-year baseline is calculated by applying a pre-determined efficiency percentage, which represents the reduction in forecast CP4 (5-year) volumes against the pre-efficient baseline volume. This means that year-on-year efficiencies are based on volume "re-baselining" in order to ensure that the whole-control period volume efficiency is directly reflected in the in-year figures.

Table 14, below, illustrates how the CP4 volume efficiency percentages applied in-year (2011/12) for the two track volume-based categories have been derived.

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

Table 14: Track renewal baseline volume calculation

On this basis of the above, Network Rail has therefore reported 21% volume efficiency for S&C renewals and 14% volume efficiency for Plain Line track renewals, in spite of actual volume levels significantly lower than the 5-year averages for the actual 5-year volume projection. This is because Network Rail is

projecting significantly increased delivery volumes for the remainder of CP4 to deliver the full projected volume. We review this further in Section 0 below). We note that the volume of plain line track delivered in 2011/12 was slightly higher than the annual average for the current control period.

Unit cost efficiency is based on comparison of year-end unit costs compared to the baseline unit cost value, representative of the 2008/09 "pre-efficient" track expenditure level. Unlike the "re-baselined" volume efficiency calculation, the unit cost baseline value should remain unchanged for the duration of CP4.

The baselines used for the 2011/12 track unit cost efficiency calculations are broadly consistent with the values used in last year's (2010/11) track efficiency calculation. As indicated above, unit cost efficiencies are being reported for both Plain Line and S&C renewals. To support the unit cost efficiency in overall terms, Network Rail has provided evidence of positive management actions driving efficiency reductions, which we review in the next section.

7.3 Efficiency evidence: Positive Management Actions (PMAs)

7.3.1 Track renewals: PMAs reported

Network Rail has provided a quantification of cost savings associated with fourteen positive management actions (PMAs). Network Rail structures track PMA reporting both in terms of efficiency type (unit cost, volume, non-volume and "work mix") and in terms of unit cost category (Plain Line and S&C). Network Rail is reporting the same PMAs as at the P6 interim review, although the expenditure effect associated with some PMAs has changed. We consider Network Rail's PMA descriptions in the sub-sections below, noting some changes since our interim review.

7.3.2 Track renewals: PMAs related to unit cost efficiency

Network Rail has reported nine positive management actions associated with track renewals unit cost savings, which total more than £90 million.

Network Rail is reporting Plain Line unit cost efficiency of some £60 million overall. This is in spite of increased materials costs, which result in an inefficiency of -£3.6 million, attributed by Network Rail to the rising cost of steel during the control period (although it is worth noting that materials costs (and related inefficiency) have decreased since period six. In 2011/12, management has compensated for the unit cost inefficiency via site and indirect cost savings. Network Rail reports three PMAs:

- Improved Plain Line site costs: Management has renegotiated contracts, moving from cost reimbursement to fixed price contracts, resulting in a unit cost efficiency of £40.9 million.
- Improved Plain Line indirect costs: Management reduced headcount by 30 people in 2010, reduced central charges, and eliminated NDS charges, which were charged centrally at the end of the baseline period and allocated against indirect costs. Network Rail reports Plain Line indirect cost savings of £23.1 million.

- Reorganisation of maintenance management: Network Rail declares that "Phase 2bc" management has created a more flexible, cost efficient maintenance delivery team.

For S&C renewals, Network Rail is reporting unit cost efficiency of approximately £30 million. This is in spite of inefficiencies associated with increased design costs (resulting from higher complexity components), and indirect cost inefficiency (relating to increased apportionment of indirect spend across delivery programmes due to an accounting policy change). The following three PMAs have offset this factor and driven the overall S&C unit cost savings:

- Improved S&C site costs: Management has renegotiated contracts, moving from cost reimbursement to fixed price contracts,
- Improved S&C production process: Network Rail declares that S&C unit costs have decreased as the result of reduced on-site materials handling
- Reorganisation of maintenance management: As above, Network Rail declares that "Phase 2bc" management has created a more flexible, cost efficient maintenance delivery team.

7.3.3 Track renewals: PMAs related to non-volume efficiency

Network Rail reports no efficiency (or inefficiency) related to non-volume track renewals. Network Rail has reported that it has not recognised efficiency in 2011/12 because it has deferred works to later years within the control period. We discuss deferrals later in this chapter.

7.3.4 Track renewals: PMAs related to "work mix" efficiency

Network Rail is reporting S&C work mix efficiency of £3.7m. However, this is more than offset by a work-mix inefficiency of £5.3m calculated for Plain Line renewals, with a lower proportion of (typically lower cost) renewals being delivered by the maintenance function. As a result, an overall work mix inefficiency of £1.6m across the two categories has been reported.

7.3.5 Track renewals: PMAs related to volume efficiency

For the purposes of this review, we have considered the evidence of PMAs relating to volume efficiencies within the context of our underlying assessment of robustness and sustainability. Network Rail is reporting track renewals volume efficiencies of £132.6 million, despite delivery shortfalls compared to volumes and associated expenditure levels set out by Network Rail in its 2011/12 budget – although Network Rail notes that it is "claiming efficiency only on work done", pointing out that a lower-than-planned level of total efficiency results in a proportionate reduction in the total efficiency amount.

£85.7 million of the REEM savings are associated with Plain Line volume efficiency and £46.9 million with S&C volume efficiency; Network Rail attributes these savings to the revision of the CP4 asset policy, leading to reduced volumes planned for the first two years of the Control Period. We review this further in the next section of this chapter.

7.3.6 PMAs: Reporter opinion

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 (FY2011/12)" to be a reasonable evidence base to support the unit cost efficiencies being reported. Network Rail has provided detailed analysis and quantified breakdown of each element of efficiency driving unit cost savings, which we consider provides a robust evidence base to support the unit cost efficiencies reported.

7.4 Track renewals expenditure: robustness and sustainability

7.4.1 Asset policy compliance

Network Rail has stated that claimed track renewals efficiencies are in line with asset policy, and that the ORR confirmed the robustness and sustainability of the policy and plans in June 2010.

An important element of Network Rail's track renewals efficiency calculation relates to volume efficiency savings. Network Rail considers that because the current track volume projections for CP4 were developed as part of a revised asset policy in consultation with the ORR, compliance with policy demonstrates robustness and sustainability of the programme.

The PR08 determination originally set out an assessed volume of track renewals for CP4 of 10,956 ckm of Plain Line track renewals and 2,249 S&C equivalent units[56] during CP4.[57] Network Rail reports that it reviewed these outputs and the asset policy to assess the extent to which it could deliver CP4 efficiency savings and agreed with the ORR a revision to its track renewals asset policy and associated delivery volumes.

On this basis, "the revised policy reprioritises activity towards the more critical route sections of network, and places greater emphasis on refurbishment..., result[ing] in a reduction of the renewal volumes to 9,455 ckm (PL) and 1,781 equivalent units (S&C) as per the delivery plan"[58]. This revised volume represents the "post-efficient" CP4 volume, on the basis of which Network Rail calculates volume efficiency for each year of the Control Period, with the original PR08 determination values taken as the pre-efficient volume baseline used in Network Rail's calculation of volume efficiency (see above).

7.4.2 Deliverability of CP4 volumes

Network Rail has maintained the policy of re-baselining its volume efficiency calculation. This reflects a pre-determined efficiency level based on an assumed

[56] We note that the PR08 determination called for the delivery of 1,796 S&C equivalent units, as per Table 15, although volumes set out in the PR08 determination are indicative, rather than obligatory under the regulatory settlement. We note slight variation in the delivery plan volumes reported by Network Rail to those printed by the ORR, although these differences are negligible (one ckm of Plain Line track).
[57] Periodic Review 2008 (ORR, October 2008): p.73
[58] Source: Track Renewals Positive Management Actions Analysis, lines 10-11.

reduction in volumes from 10,956 ckm to 9,455 ckm for Plain Line (13.7% efficiency) and from 2,249 equivalent units to 1781 equivalent units for S&C (20.8% efficiency), in line with the approach taken in last year's (2010/11) volume efficiency calculation.

However, in terms of year-on-year delivery, outturn volumes have not always kept pace with the levels set out in successive Delivery Plan updates. We set out in Table 15 a comparison of year-on-year planned and actual volumes for Plain Line and S&C renewals.

Track Renewals Volume	**2009/10**	**2010/11**	**2011/12**	**2012/13**	**2013/14**	**CP4 Total**
Plain Line						
PR08 ORR Assessed Volume	-	-	-	-	-	10,956
CP4 Delivery Plan	1,571	-	-	-	-	-
Delivery Plan update 2011	1,757	1,725	2,074	1,987	1,913	9,456
Delivery Plan update 2012	1,757	1,557	2,056	2,117	1,970	9,457
Actual Outturn	**1,757**	**1,557**	**1,914**	-	-	***9,457***
Actual forecast				***2,117***	***2,111***	
S&C						
PR08 ORR Assessed Volume	-	-	-	-	-	1,796
CP4 Delivery Plan	312	-	-	-	-	-
Delivery Plan update 2011	319	341	361	383	377	1,781
Delivery Plan update 2012	319	347	336	374	405	1,781
Actual Outturn	**319**	**347**	**333**	-	-	***1,781***
Actual forecast				***374***	***408***	

Table 15: Track renewal volumes

7.4.2.1 Plain line volume shortfall

Figure 2 below compares the volume profile for Plain Line renewals set out in successive Delivery Plans with the actual volume profile.

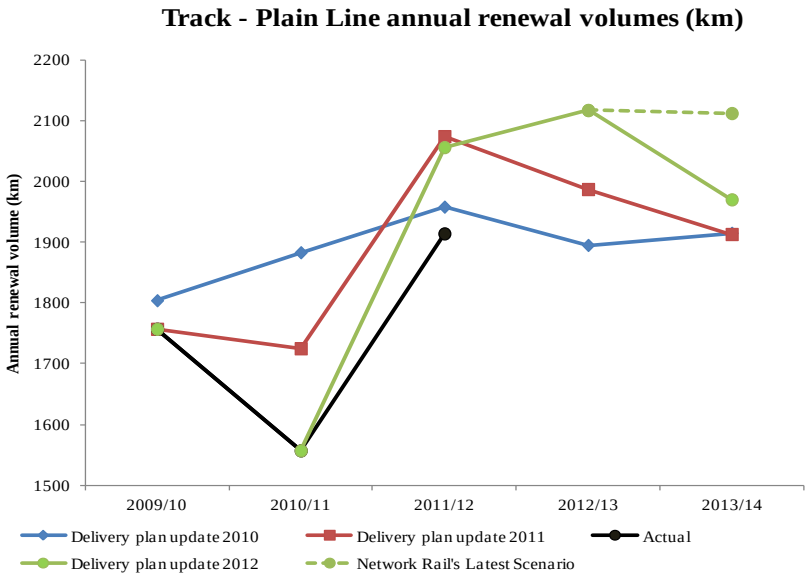


Figure 2: Planned and actual Plain Line volumes

For Plain Line, whilst the 2011/12 volume of 1,914 is 23% higher than the previous year, this is 8% below the budget target for the year of 2,074. Network Rail set out in detail a number of factors and incidents resulting in the volume shortfall including:

- 100 km shortfall for works delivered by IM, caused by derailment of a High Output machine and subsequent suspension of a contractor, mechanical failure, problems with ballast cleaning equipment capacity, operational irregularities such as staff non-availability and possessions set-up issues.
- 60 km shortfall for works delivered by maintenance, attributed to the late allocation of budget cost to Period 7 of the financial year, leaving insufficient time for the works to be programmed and delivered in the remainder of the financial year.

7.4.2.2 S&C volume shortfall

Figure 3 below compares the volume profile for S&C renewals set out in successive Delivery Plans with the actual volume profile.

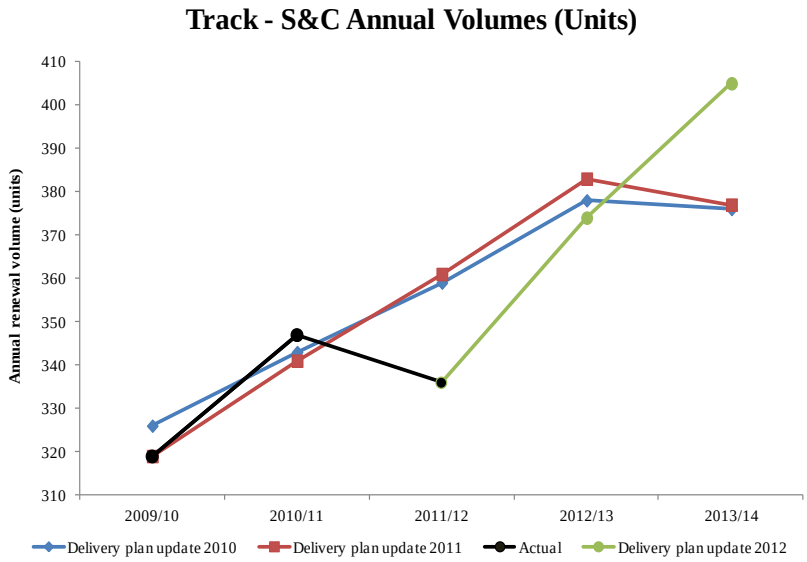


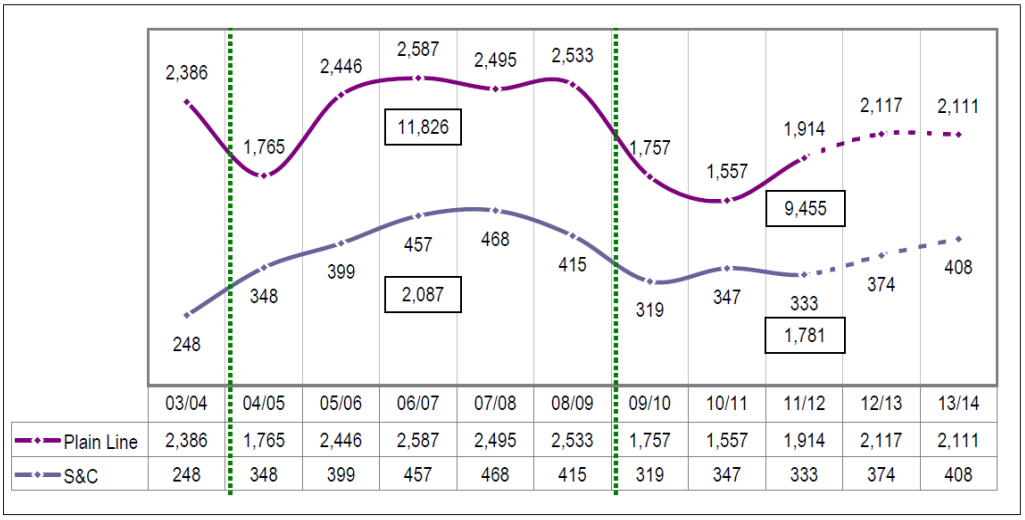
Figure 3: S&C annual renewal volumes

For S&C, the 2011/12 volume of 333 S&C renewals is slightly below the 2010/11 volume of 347 renewals, and 8% below the budget target for the year of 361 items. The majority of the volume shortfall (around 20 of the 28 items not delivered) is attributed to the cancellation of three individual renewals projects. Issues with access restrictions and poor weather are also cited.

7.4.2.3 Ramp up of volumes for the remainder of CP4

Completed volumes

Network Rail considers it will achieve volume targets by the end of the Control Period. To demonstrate its ability to achieve a higher delivery volume for both Plain Line and S&C renewals, Network Rail provided a profile of its renewals volumes delivered during the previous Control Period (CP3), which we reproduce in Figure 4 below. In CP3, Network Rail delivered a volume of Plain Line track renewals 25% higher than the volume of Plain Line track planned during CP4; in CP3, Network Rail delivered a volume of S&C renewals 17% higher than the volume planned for CP4.



	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12	12/13	13/14
Plain Line	2,386	1,765	2,446	2,587	2,495	2,533	1,757	1,557	1,914	2,117	2,111
S&C	248	348	399	457	468	415	319	347	333	374	408

Figure 4: Historical (CP3) track renewals volumes (Source: Network Rail).

Characteristics of the current shortfall

Network Rail has provided several documents detailing the location of completed works and the age and renewal of various track components yet to be renewed. In particular, Network Rail has provided outputs from its Track Renewals System (TRS), a variance analysis by project worksite, and route-level delivery variances.

The TRS outputs show a majority of Plain Line delivery shortfalls have occurred along the LNW North, LNW South and Western West routes. We note that the system, which is the company's only record of track renewals, does not account for all Plain Line and S&C renewals – although we have received assurances that Network Rail is working to include all renewals in the system for future reporting years. We have reviewed this evidence with the Head of Asset Management, Track (HAMT), who has reported:

- On the LNW South route, Network Rail was given funding in 2011/12 to complete re-railing work south of Rugby, given minor voiding and some rail breaks. High priority work had already been completed, leaving lower priority, less critical renewals for the remaining two years of CP4. The HAMT reported similar issues on the LNE route, although Network Rail's data do not show a large number of incomplete works along the route.
- On the Western route, it was reported that the high output machine crashed into a platform. The HAMT reported that works along this route were "strategic" rather than condition-based, meaning that the company has no evidence that failure to complete the works during 2011/12 will impact upon network availability or safety.
- On the LNW North route, the HAMT reported that the high output machine could cause shortfalls in 2013/14, despite planning efforts to ensure access. Network Rail has however stated that it is "working to effectively manage the potential issues that have been highlighted as a potential problem on LNW North in order to plan for any lost volume to be covered elsewhere."

In addition to the volumes reported in the TRS, maintenance-related delivery shortfalls were reported along the LNE route and the Anglia route. Network Rail has reported that these issues relate to drainage and fencing, along with vandalism and theft. The HAMT reported that organisational changes have been made to help manage access and delivery, with more resources allocated to these routes for the remaining two years of CP4.

Over-planning of work

Network Rail has explained that it develops it work banks with room for non-delivery of some renewals. In delivering these renewals, Network Rail does not identify "necessary" and "over-planned" portions of the total planned works, meaning that works not completed should represent a mostly uniform, representative sample of renewals planned along the network. Non-delivered renewals volumes therefore should not affect output requirements. The company has reported that it finds it possible for there to be "neutral" deferral of planned works outside the control period –although at present Network Rail believes all work will be completed prior to the end of CP4.

Non-delivered planned volumes

Network Rail has provided us with charts showing the distribution of planned and actual delivered Plain Line and S&C renewals for 2011/12. These charts show that, although not perfectly uniform, the distribution of volumes Network Rail has not delivered is spread across criticality bands.

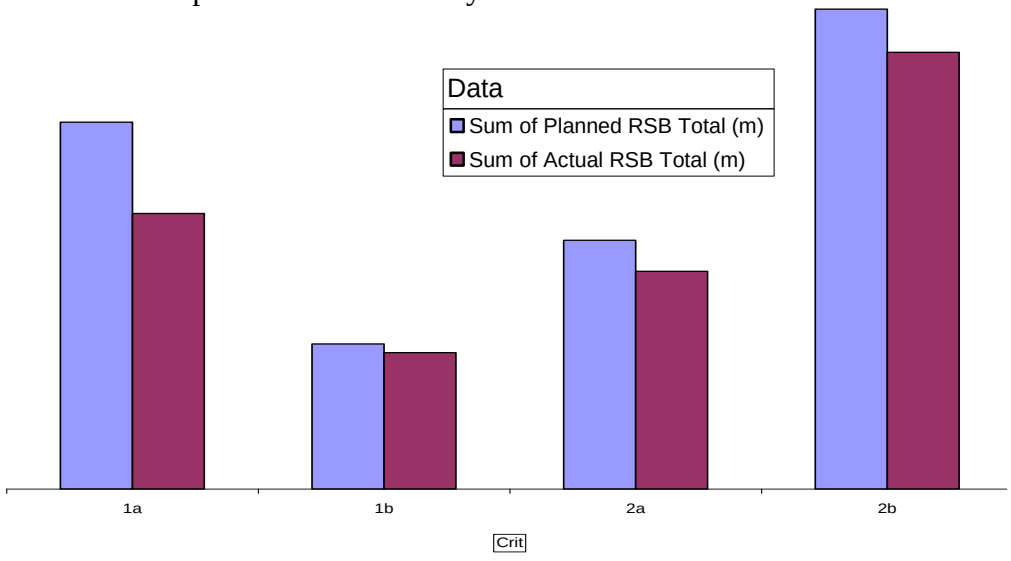


Figure 5: Plain Line volumes by route criticality, planned v. actual (Source: Network Rail).

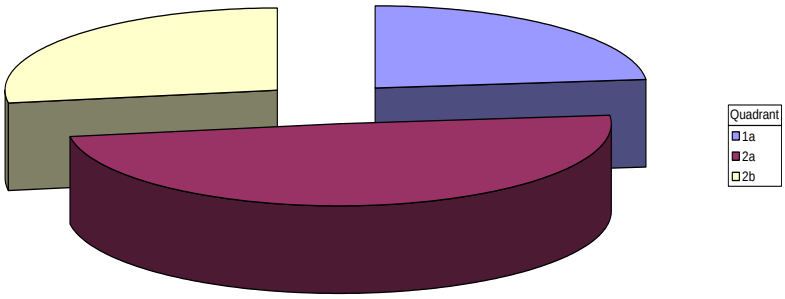


Figure 6: S&C undelivered renewals in 2011/12 (Source: Network Rail).

Network Rail has reported that category 2A make up some 50% of undelivered S&C renewals. The HAMT reported that these renewals are along the Midlands main line, but the volume of work was not concentrated along a single portion of the line.

We comment on this evidence in the next section.

7.4.3 Workbank planning in line with policy

Network Rail reports that it has developed various metrics to assure compliance of its renewals workbank with asset policy, whereby required performance and outputs such as maintaining line speed and track condition are maintained.

To ensure appropriateness of its track renewals work mix to deliver outputs in line with asset policy, Network Rail categorises major routes according to investment priority, grouping them according to criticality. The criticality groupings include:

- "high cost, low frequency" work.
- "high cost, high frequency" work.
- "low cost, low frequency" work.
- "low cost, high frequency" work.

Network Rail's analysis shows that some 40% of Plain Line renewals delivered to date falls into the "high cost, high frequency" category, and some 7% of Plain Line renewals work has fallen into the "high cost, low frequency" category.

Network Rail models the impact of CP4 track renewals activities to understand investment decisions' potential impact on asset sustainability in future control periods. For example, Network Rail's modelling has shown that ballast fouling slightly increases through CP4, based on existing intervention plans. The company also models lifecycle costs to help determine programme and approach, depending on route categorisation.

7.4.3.1 Performance monitoring

Network Rail provided a number of KPIs used to monitor track asset condition and performance, including:

- rail used life fraction by criticality band.

- sleeper used life fraction by criticality band.
- S&C used life fraction by criticality band.
- good track geometry.
- serious defects per 100ckm.
- failure rates.
- poor track geometry.

Network Rail has provided an historical comparison of track and S&C conditions using several KPIs. 2011/12 results indicate that broken rail numbers in 2011/12 were at their lowest level since reporting began in 1992/93. However, the measures also show a decline in track geometry in 2011/12 (following a continual increase in track geometry over previous years). Network Rail has indicated this is due to maintenance reductions rather than renewals works (and cites 'Kepner-Tregoe' analysis is has undertaken to ascertain the cause of the decline). Network Rail has indicated it is now taking measures to rectify this problem, focusing on improvements at the route level, including re-allocating machines to manage volumes of work.

Network Rail has noted that the number of critical failures continued to fall last year, and that performance, for both Plain Line and S&C, has improved relative to 2010/11.

7.4.4 Delays per incident

Information on delay per incident indicated these have increased. Network Rail indicated that the delay per incident has increased due to short-term maintenance failures rather than issues relating to the level or nature of renewals delivery. We consider the issue further in the maintenance review chapter of this report.

7.4.5 Investment control process

As with other asset areas, renewals controls pass through the track management hierarchy. Risk-mitigating change controls are managed at the depot-level, whilst decisions around risk management and intervention are made at the territory level. The track renewals programme is updated each period based on monthly reports. Executive-level reviews also occur each period.

The reports consider volume and unit costs on both financial and management accountancy bases. Network Rail considers that it has improved direct costs visibility with the use of new management software (the Oracle Time & Cost system), and has emphasised that the process emphasises technical input, encouraging sustainability.

Track renewals plans are subject to review at both the territory level, by Project Boards, and at the executive level, as part of the Management Business Review (MBR) process. Network Rail reports that all plans are visible to the Head of Asset Management Track (HAMT) and are discussed upon application for funding, both for refurbishment and for renewals changes. Formal reviews include:

- Annual peer reviews, carried out by the HAMT and the Professional Head of Track (PHT); the purpose of the peer review is to ensure the processes undertaken in formulating plans are in line with policy. As part of these reviews, the heads visit a number of sites on each route to ensure the plans appropriately target condition, timeliness and sustainability.
- Regular data reviews to demonstrate if current plans are compliant with asset policy. Network Rail has provided examples of its basic data analyses in the Track Report (P06).
- Regular "engineering saloon inspections," during which the HAMT and PHT discuss track plans with local engineers.

Network Rail considers that in these processes a "healthy tension" exists, whereby delivery teams are rigorously challenged by the finance function on their delivery volumes and costs.

7.4.6 Robustness and Sustainability: Reporter opinion

We consider the evidence provided by Network Rail of the robustness of its renewals programme, in terms of its ability to deliver required outputs for remainder of CP4, to be reasonable. Whilst we consider that a risk of a volume shortfall by the end of CP4 remains, Network Rail has explained that it "over-plans" work to account for potential slippage within the control period.

Generally, it appears that volume which the company did not deliver in 2011/12, will not impact upon network performance in CP4 (the robustness test). The company has demonstrated that the volumes it has not delivered in 2011/12 are distributed uniformly among track criticality bands. This provides us with comfort that it is not at risk of creating a backlog of work on critical parts of the network.

The company has assured us of its ability to complete the works without deferring volumes into CP5, ensuring long-term sustainability of the expenditure reductions. Because the company has delivered higher volumes of renewals in CP3, we believe it is capable of delivering the renewals volumes planned for CP4.

We believe that risks around the use of the high output machine and access remain. Network Rail has reported that LNW North route access and high output machine use could be problematic. In addition, the company has reported maintenance-related delivery problems, such as issues with drainage or vandalism, along the LNE and Anglia routes. It will be important for Network Rail and ORR to review, in detail, the nature of track works completed and planned leading up to the end of CP4.

We recommend that Network Rail explicitly defines measures and systems that can help mitigate the risk of delaying factors, such as problems with the high output machine, arising again.

8 Signalling renewals efficiency

This section of our report sets out the findings of our review of Network Rail's reported signalling renewals volume and unit cost efficiency. We considered evidence of management actions associated with reported efficiency and evidence of robustness and sustainability.

8.1 Signalling renewals: Volume and expenditure overview

Network Rail reported total signalling expenditure for 2011/12 of approximately £441m (as shown on the following page, at Table 2). Signalling renewals costs represent a significant proportion of costs feeding into Network Rail's efficiency calculations and the second largest renewals expenditure area. Signalling renewals costs accounted for some 19% of total renewals expenditure for 2011/2.

Resignalling - Conventional renewals volumes (Signalling Equivalent Units)	**2009/10**	**2010/11**	**2011/12**	**2012/13**	**2013/14**	**CP4 Total**
CP4 ORR Determination (pre-efficient)	-	-	-	-	-	5,300
CP4 Delivery Plan	604	1,022	905	1,830	962	5,323
Delivery Plan update 2011	813	603	1,031	1,317	1,230	4,994
Delivery Plan update 2012 projection[59]	-	-	-	1,141	1,914	5,510
Actual Outturn[60]	**813**	**601**	**1,055**	**-**	**-**	**-**

Table 16: CP4 signalling renewals volumes

The signalling renewals expenditure for 2011/12 was roughly in line with the CP4 Delivery Plan. Network Rail spent approximately £4m above the CP4 delivery plan reflecting an over expenditure of less than 1%. This is a change on the previous two years where Network Rail reported a reduction in expenditure of 12% and 21% for 2009/10 and 2010/11, respectively.

For the final two years of CP4, the current projection set out in the 2012 Delivery Plan update shows an expenditure increase for 2012/13 of 19% and a reduction for 2013/14 of 7%, in comparison with the initial CP4 Delivery Plan.

According to the present Delivery Plan, Network Rail foresees overall expenditure by the end of the CP4 of £2.2 billion, representing a 24% reduction against the CP4 ORR Determination (Pre-efficient) and 7% reduction against the delivery plan. This represents, however, an increase against the 2011 Delivery Plan of 3%.

In order to achieve the CP4 Delivery Plan target, Network Rail plans to invest £545m in 2012/13 (year 4 of CP4) and £414m in 2013/2014. To achieve the 2012 Delivery Plan targets, Network Rail projects a slight ramp-up in expenditure for

[59] Network Rail presents its Delivery Plan update 2012 expenditure figures in 2012/13 prices. In absence of information regarding Network Rail's inflation assumptions for 2012/13, we have assumed an inflation rate of 5.16% in converting expenditure figures into 2011/12 prices.
[60] Source 2009/10: Delivery Plan update 2009/10
Source 2010/11: Regulatory Financial Statements for year ended 31 March 2011
Source 2011/12: REEM Model.xls provide by Network Rail on 16 April 2012

2012/2013. Through our analysis of historical volumes and our discussion with Network Rail managers, we consider that these targets are achievable.

8.2 Signalling renewals: Efficiency calculations

8.2.1 Results presented

Network Rail records the signalling renewals as volume and non-volume. Volume renewals are measured in Signalling Equivalent Unit (SEU) and accounted for 51% (£224m) whilst Non-volume costs account for the remaining 49% of signalling renewals expenditure.

Table 17 shows the breakdown of volume-based SEU renewals costs (for projects at GRIP stages 1 to 4 and 5 to 8) and the associated REEM efficiency. It shows that Network Rail has reported overall signalling renewals efficiency for 2011/12 of 30% for projects at GRIP stages 5 to 8, 15% for projects at GRIP stages 1 to 4 and 16% for Non-volume costs. In absolute terms, Network Rail is reporting in-year signalling renewals efficiency of approximately £108m, relative to a REEM baseline of £592m. This represents a total efficiency of 25% for this asset area.

Signalling renewals efficiency	REEM baseline (£k)	2011/12 Actual (£k)	2011/12 Efficiency (£k)	% Efficiency
Resignalling - Modelled SEUs GRIP 5-8	156,671	110,250	46,421	29.6%
Resignalling - SEUs GRIP 1-4	133,325	113,750	19,575	14.7%
Non-volume	301,703	217,265	84,439	28.0%
Total	**591,699**	**441,265**	**150,435**	**25.4%**

Table 17: Signalling renewals efficiency

8.2.2 Volume & unit cost efficiency calculations

Table 18 shows a breakdown of volume and unit cost efficiency calculations for Signal Equivalent Units (SEUs). It shows how Network Rail has achieved the volume and unit cost efficiencies, comparing outturn with baseline.

Signalling renewals 2011/12	Volume	Unit cost	Total
Resignalling - Modelled SEU GRIP 5-8			
Baseline	623 SEUs	£251.4 k	£156,671 k
Year-end	602 SEUs	£183.1 k	£110,250 k
Efficiency amount	£5,272 k	£41,149.3 k	£46,421 k
Efficiency percentage	**3.4%**	**26.3%**	**29.6%**
Resignalling - SEUs GRIP 1-4			
Baseline	530 SEUs	£251.4 k	£133,325 k
Year-end	530 SEUs	£214.5 k	£113,750 k
Efficiency amount	£0 k	£19,575 k	£19,575 k
Efficiency percentage	**0.0%**	**14.7%**	**14.7%**

Table 18: Signalling renewals volume and unit cost efficiency

As can be seen from the table, Network Rail has reported volume efficiency for signalling renewals of 3.4% for projects at GRIP stages 5 to 8, but no volume efficiency for projects at GRIP stages 1 to 4. In terms of unit cost efficiency, Network Rail has reported efficiency relative to the baseline of just over 26% for projects at GRIP stages 5 to 8, and just under 15% for projects at GRIP stages 1 to 4. These unit cost efficiencies were achieved with reported unit cost for 2011/12 of £183,100 per SEU for projects at GRIP stages 5 to 8 and £214,500 per SEU for projects at GRIP stages 1 to 4.

We were unable to reconcile some of the figures (e.g. – Volume efficiency amount for GRIP 5-8 between REEM Model and "Signalling PMAs Final v2") for the submission of our draft report. In particular, the amounts provided in the REEM calculation did not match the amounts set out in the efficiency evidence provided. (e.g. GRIP 5-8 project evidence indicates volume efficiency of £21.9m, vs. REEM calculation £5.3m). Network Rail has reported that the "net efficiency reported by the REEM model by year is correct; the distribution between efficiency attributable to volume reduction and to other efficiencies is incorrect and at variance to the figures reported."

Network Rail has explained that differences between the REEM output and PMA submissions are due to accountancy methods and treatment. Network Rail has explained, "the REEM calculation has a limitation in its modelling, namely that volume efficiency is spread proportional to volume delivery across CP4. However, our internal modelling models volume efficiency in the same manner as cost efficiency, i.e. on an earned basis; so a project will report volume efficiency in-line with the phasing of its spend.

The projects delivering volume efficiency in CP4 were spending proportionally more in '11/12 than other years and therefore real '11/12 volume efficiency is higher than the figure reported in the REEM model. The contra to this has been taken from "Non-Volume" efficiencies; in other words, the REEM model understates volume efficiency in '11/12 and overstates this in other years, while overstating "Non-Volume" efficiency in '11/12 and understating this in other years. The net efficiency reported by the REEM model by year is correct; the distribution between efficiency attributable to volume reduction and to other efficiencies is incorrect and at variance to the figures reported."[61]

8.3 Efficiency evidence: Positive Management Actions (PMAs)

8.3.1 PMAs associated with unit cost efficiency and non-volume efficiency

Network Rail reports signalling cost efficiency of £150m, representing efficiency of some 25% relative to the REEM baseline. The efficiencies are attributed to a number of defined PMAs set by Network Rail.

Network Rail reports total unit cost efficiency of £61m (across all projects), representing 41% of total signalling cost savings. Network Rail reports 11 PMAs associated with the unit cost efficiency:

[61] Source: Email from William Hardy, Network Rail Group Investment, "Subject: Issues – 15", 30 May 2012, 18:37.

- *Policy change*: Management has reduced the renewals volumes of signalling assets in accordance with asset policy. Management states that the reduction has not affected asset sustainability (addressed later in this chapter).
- *Remodelling and rationalisation (activity-related)*: Management has worked to rationalise signalling "layout" (planning) and development, reducing project management costs.
- *Use of Solid State Interlocking (SSI) technology*: Network Rail defines SSI as a computerised mechanism in place to prevent an unsafe occurrence. Management reports that SSI efficiencies are generated by reducing design and installation costs, which include risk-related and insurance costs.
- *Security measures*: Management has reduced project construction costs by increasing line-side security, reducing theft and associated replacement costs.
- *Alignment with other assets*: Management has aligned signalling possession schedules, project management and contractor work with other asset areas, improving economies of scale.
- *Recovery of redundant equipment*: Network Rail managers report that no efficiencies are realised on the recovery of redundant equipment; however, Network Rail states that recovery of redundant equipment enables scope efficiencies (when assets are not replaced).
- *Contractor milestone*: Management has awarded contractor discounts retrospectively, according to milestone achievement. Network Rail reports that "achievements" are based on stability of programme and scope, realised through the development of a robust, agreed delivery plan.
- *Use of modular technology & processes*: Management has standardised the design, tests and commissioning processes for new modular technologies.
- *Use of maintenance*: Management has increased use of internal service providers in place of contractors.
- *Work bank and schedule stability*: Management has improved work bank planning, which it associates with reduced project management possession and contractor costs. Network Rail reports that the work bank is stable through the current (CP4) control period.
- *Risk management and risk avoidance*: Management has reduced its draw-down of contingency funds with improved planning and knowledge of signalling projects.

8.3.2 PMAs associated with volume efficiency

Network Rail reports volume-related signalling efficiency of £5.3m, representing some 3.5% of total signalling cost savings.

For the purposes of this review, we have considered the evidence of PMAs relating to volume efficiencies within the context of our underlying assessment of robustness and sustainability. As stated earlier in our report, a key premise of this

approach is that alterations to the volumes feeding directly into volume efficiency calculations must be demonstrated as being robust and sustainable. We analyse the evidence presented on this basis in the next section of this chapter.

8.3.3 PMAs: Reporter opinion

Network Rail has provided a clear and detailed explanation of the PMAs underpinning the reported efficiencies, as detailed above. The information provided attributes the efficiencies on a project-by-project basis for those projects at GRIP stages 5 to 8.

To verify the granularity of information available in relation to other projects and non-volume efficiencies, we have requested further information from Network Rail. In particular, we asked Network Rail to provide a project-based breakdown of signalling efficiencies for GRIP 1-4 projects (on the same basis as details provided for GRIP 5-8 projects). Network Rail reports that GRIP 1-4 efficiencies "are captured in totality from all project costs for those projects within GRIP 1-4; the rationale being all carry the same target rate. As [they are] not calculated against individual projects, rather total spend, this is not modelled by-project."[62]

The evidence provided for GRIP 5-8 demonstrates the efficiencies for signalling assets have been based on a sufficiently documented evidence base. In the future, we recommend that Network Rail expand project-level coverage of the data provided to include GRIP 1-4, as possible.

8.4 Signalling renewals expenditure: Robustness and Sustainability

8.4.1 Asset policy compliance

Network Rail reported that the ORR confirmed the robustness and sustainability of the policy and plans in June 2010. Network Rail considers that, because the policies for these assets have been subject to review by ORR, compliance with policy therefore demonstrates robustness and sustainability. Similar to the policies for other asset groups, Network Rail's policies for these assets focuses on safety compliance and delivery of asset dependability.

8.4.2 Deliverability of CP4 volumes

As shown in Table 19, the PR08 assessment envisaged that Network Rail would deliver 5,300 SEUs during CP4. The number of signalling renewals was revised down to 4,994 SEUs in the 2011 Delivery Plan update. Network Rail reports that it reviewed these outputs and the asset policy and confirmed that in addition to the expected delivery of the CP4 work, it now plans to bring forward some of the work planned for CP5. The current Delivery Plan (2012) reports planned delivery of 5,510 SEUs for CP4. In order to achieve this target, Network Rail will require a significant delivery ramp-up, in particular during the last year of CP4.

[62] Source: Email from William Hardy, Network Rail Group Investment, "Subject: Issues – 15", 30 May 2012, 18:37.

Outturn volumes have varied considerably with the PR08 determination but have been in line with subsequent Delivery Plan updates.

Signalling - Conventional renewals volume (SEUs)	2009/10	2010/11	2011/12	2012/13	2013/14	CP4 Total
CP4 ORR Determination (pre-efficient)	-	-	-	-	-	5,300
CP4 Delivery Plan	604	1,022	905	1,830	962	5,323
Delivery Plan update 2011	813	603	1,031	1,317	1,230	4,994
Delivery Plan update 2012	813	601	1,041	1,141	1,914	5,510
Actual Outturn	**813**	**601**	**1,055**	-	-	-

Table 19: Conventional resignalling renewals volume

During the first three years of the Control Period, Network Rail has completed 49% of the planned SEU renewals planned for CP4 as a whole. In order to achieve the targets set out in the 2011 Delivery Plan update, the company has significantly increased renewal volumes planned for delivery in 2013/14. As shown in Table 18, 2011/12 SEUs renewals volumes increased 75% when compared to 2010/11, and were in line with the 2011 Delivery Plan. For the remaining 2 years of CP4, Network's Delivery Plan now foresees an increase (compared with the 2011/12 Delivery Plan) of some 10% for 2012/13, and 83% for 2013/14.

Network Rail indicated that the increase in reported volumes towards the end of CP4 reflects the completion of a number of long-running projects; the volumes for these projects are reported at the point of commissioning.

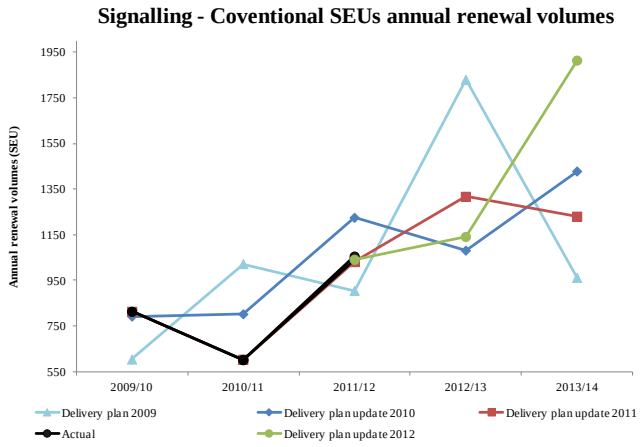


Figure 20: Conventional resignalling annual renewal volumes

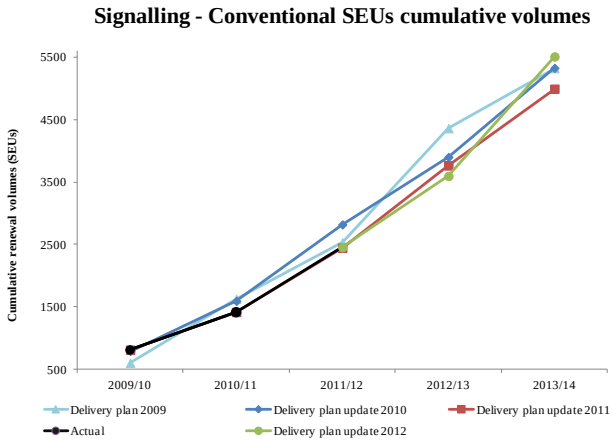


Figure 21: Conventional resignalling cumulative volumes

8.4.3 Performance monitoring

Network Rail monitors two KPIs to verify its continued delivery of outputs. These relate to asset condition and the numbers of signalling-related failures causing delays of greater than ten minutes. We requested additional documentation explaining signalling KPIs. Network Rail provided documents detailing the Signal Asset Condition (SAC) measure, along with other indicators. Network Rail

outlines the SAC KPI in a 'Definitions' manual, as it does for the KPIs used in other asset groups.

The SAC measures, "the number of interlockings that fall into each band of [a] 1-5 condition grading system". Network Rail defines an interlocking as the equipment used to set and release signals in a defined area, and defines condition-ratings based on observations and assumptions about processor unit residual lifetimes. A condition rating of "1" means that an asset has an estimated residual life over 20 years, and a condition rating of "5" means that the asset has reached the end of its useful life. The output score is a weighted average of condition ratings per population of interlockings in a defined area.

Network Rail monitors asset stewardship scores for signalling assets and has provided summaries of KPI performance for 2011/12. Signalling Stewardship Indicator (SSI) scores (per period) show that the indicator has exceeded Network Rail's target for the financial year.

Network Rail supplements these indicators with additional KPIs for certain assets, and these KPIs have informed its shift to a condition-based investment approach. The company reports that the maturity of information within its scoring system has progressed during two decades of reporting. Given the volume of historical data it has gathered, Network Rail is confident in its ability to estimate asset life and move to a 15-year renewals policy.

Network Rail's signalling managers also use SICA, a measure developed over 20 years to check reliability, maintainability, and safety. The SICA measure is a score determined via physical inspection and a standard survey of assets. Completing the surveys, Network Rail focuses on signalling assets of particular importance for renewals investment, rather than surveying its entire asset base.

8.4.3.1 Investment control process

As with other asset areas, Network Rail believes that a hierarchy of reviews assures the robustness and sustainability of the signalling renewals programme. Reviews are conducted based on a change control process. Network Rail maintains a project-level database for each of the assets and control papers for each asset are reviewed locally on a four-weekly basis by the signalling heads.

Regular project reviews are structured to examine cost, schedule, progress, and alignment with business plan and policy. Project-level reviews, undertaken by the heads of asset, feed into executive-level reviews. Finance and engineering reviews are also conducted, independently, to assess risk.

In spite of the lower level of unit cost visibility than we observe in other asset areas, Network Rail has stated that its review process and stakeholder input ensure sustainability. In particular, Network Rail considers that the formal stakeholder engagement via the Network Change process ensures that asset rationalisation has not resulted in a less sustainable asset base or reduced the functionality or resilience of the railway. Network Rail considers that stakeholder interests

emphasize high-levels of investment, renewals and upkeep and that these interests counterbalance inform choices around managing sustainability that asset rationalisation proposals may generate. Network Rail completes pre and post-rationalisation review papers, communicating with stakeholders, including franchisees. These papers present stakeholders with an overview of the renewals investment and the opportunity to influence rationalisation work.

8.5 Robustness and Sustainability: Reporter opinion

We consider that the project-level breakdown of efficiencies presented for "GRIP 5-8" signalling renewals (one of the two volume-based expenditure categories) provides detailed insight into changes to the cost and timing of delivery programme, which support the demonstration of a controlled programme of work that ensures Network Rail robustly delivers required outputs during the Control Period.

For the areas where detailed information has been provided, we find that the control process is supported by a project-by-project cost breakdown. The specificity of the reporting process to demonstrate the robustness and sustainability of management actions, by showing the impact on project cost and the timing of delivery of volumes of such actions.

We note that the reported signalling volumes are projected to increase significantly in the final year of the Control Period to meet the volumes presently included in the Delivery Plan. Network Rail plans these volumes based on an assessment of renewals activity levels required to deliver longer-term network outputs. Network Rail considers that the volumes required are deliverable, indicating that the increase in reported volumes towards the end of CP4 reflects the completion of a number of long-running projects; the volumes for these projects are reported at the point of commissioning.

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On balance, we conclude that Network Rail's reported efficiencies for signalling assets have been based on a sufficiently documented evidence base. The evidence provided for GRIP 5-8 breaks down the claimed efficiency at the project level. In the future, we recommend that Network Rail expand project-level coverage of the data provided to include GRIP 1-4. We consider it will be necessary for Network Rail and the ORR to monitor progress and plans for the remainder of CP4. At this time, we conclude that the ORR's tests of robustness and sustainability have been met.

9 Civils renewals efficiency

9.1 Introduction

This chapter contains details our review of the civils renewals efficiency calculation and underlying evidence, which fed into the previous version of the REEM efficiency numbers provided to support the analysis in earlier versions of this report.

We were recently notified that the ORR and Network Rail have agreed not to include civils renewals expenditure within the 2011/12 REEM efficiency measure and EBSM calculation.[63] Consequently, the REEM figures contained within Statement 12 of the regulatory accounts been recalculated to exclude civils renewals expenditure in its entirety (see Chapter 6).

However, the ORR has instructed us to retain commentary within this report of Civils efficiency evidence supporting earlier versions of the 2011/12 REEM. We therefore retain this analysis in this chapter of our report.

Please note that all references to the "current" / "actual" of "2011/12" REEM calculation contained in the sections that follow in this Chapter relate to Network Rail's previous REEM calculation, prior to exclusion of civils efficiency.

9.2 Civils renewals: CP4 expenditure & efficiency overview

9.2.1 CP4 expenditure profile

Table 22 below provides an overview of the civils expenditure profile for CP4.

Civil and structures renewal expenditure, £m (2011/12 prices)	**2009/10**	**2010/11**	**2011/12**	**2012/13**	**2013/14**	**CP4 Total**
PR08 pre-efficient baseline[64]	-	-	-	-	-	2,248[65]
CP4 Delivery Plan 2009	413	423	375	353	329	1,893
Delivery Plan update 2011 (budget)	381	374	377	333	284	1,748
Actual Outturn	**381**	**374**	**373**	**-**	**-**	***2,095***
Delivery Plan update 2012 projection	**-**	**-**	**-**	***440***	***531***	
- of which, relates to Central Government's Autumn Statement				*48*	*185*	

Table 22: Civils renewal expenditure

[63] As referenced in the Email from Gordon Cole (ORR) to Network Rail, "FW: Draft note for NR: Our approach to civils in our assessment of efficiency", 6th July 2012
[64] Assumed pre-efficient annual baseline equals the 5-year average of CP4 pre-efficient total
[65] Source: ORR PR08 determination, p.99 (inflated to 2011/12 prices). Standard reporting for all asset areas in the determination provides CP4 totals only, not including the breakdown.

Actual civils expenditure during the first two years of CP4 was lower than the levels projected in the original 2009 Network Rail Delivery Plan. 2011/12 expenditure is close to both the 2009 projection and the 2011 budget figure (represented through the 2011 Network Rail Delivery Plan update).

For the final two years of CP4 (2012/13 and 2013/14), there are significant differences between previous and current projections. In the 2011 Network Rail Delivery Plan budget, civils expenditure was projected to decline between 2011/12 and 2012/13 by 12% to £333m, with a further 15% decline to £284m in 2013/13.

The current projection set out in the 2012 Network Rail Delivery Plan now shows significant planned expenditure increases, with a rise of 18% to £440m in 2012/13 and a further 21% increase to £531m in the following year. As a result, total projected CP4 expenditure is now £2.1bn, 10% higher than the original 2009 Network Rail Delivery Plan, and 20% (£347m) more than the 2011 Network Rail Delivery Plan budget level. The majority of this additional expenditure relates to £233m of additional funds provided through the government's Autumn Statement.[66] We understand this will be discounted from the REEM calculation, as it represents expenditure outside the PR08 determination. If this additional Autumn Statement expenditure is netted off, the revised 2012 Network Rail Delivery Plan update projections represent a CP4 total of £1.8bn, £114m additional expenditure vs. budget for the control period as a whole (with an additional £69m during 2012/13 and an additional £62m during 2013/14.)

9.2.2 Actual & projected efficiency

We set out in Table 1 below the current (2011/12) efficiency position, compared to the target "efficient expenditure" set out in the PR08 determination.

Civil and structures renewal expenditure, (2011/12 prices)	**2011/12**	**CP4 Total**
PR08 efficient expenditure projection[67] (£m)	383.4	1,921
PR08 efficiency vs. baseline	14.7%	14.5%
Actual expenditure *(& CP4 projection)* [68]	**373**	***1,862***
Efficiency calculation in previous REEM calculation *(& CP4 projection)*	**16.9%**	***14.8%***

Table 23: Civils renewal expenditure

As indicated above, Network Rail has calculated civils efficiency vs. baseline during 2011/12 at 16.9%, compared to the PR08 year target renewals efficiency of 14.7%.

For the Control Period as a whole, Network Rail is projecting it will achieve a 14.8% efficiency – which is once again ahead of the PR08 target of 14.5%, but below the in-year efficiency for 2011/12. This reflects Network Rail's expectation

[66] £47m of expenditure is expected to fall in 2012/13, and £185m during 2013/14
[67] Source: ORR PR08 determination, p.99 (inflated to 2011/12 prices)
[68] CP4 projection is taken from Delivery Plan update 2012. £233m of expenditure planned for 2012/13 and 2013/14 under the category "Programme following autumn statement", has been discounted from the total.

that year-on-year efficiency gains for civils will be lower for the final two years of CP4.

9.3 Civils renewals: Efficiency calculations

9.3.1 Results presented

We set out in Table 24 the breakdown of civils efficiency by asset category. The first nine categories of expenditure, which account for around two thirds of total civils expenditure (£253m out of £373m) are recorded in volume and unit cost terms. All remaining expenditure is recorded in absolute terms as "non-volume" cost.

The most substantial inefficiency - £21m – is reported for the non-volume category. This is attributed by Network Rail to "additional activities" captured within this category (discussed further below).

For the remaining volume-based categories, only underbridges report an inefficiency. This is offset by positive efficiencies reported for all other expenditure categories, resulting in the overall efficiency sum for all civils renewals activities of £75m, 16.9% below the baseline level.

The degree of efficiency in both percentage and absolute terms varies significantly between the different asset types. This is discussed later in this section.

Civils renewals 2011/12	Baseline (£k)	Actual (£k)	Efficiency amount (£k)	Efficiency %
Overbridges	17,033	13,452	3,580	21.0%
Underbridges	105,168	110,107	-4,939	-4.7%
Overbridges - "Bridgeguard 3"	35,290	24,230	11,060	31.3%
Footbridges	8,768	2,228	6,540	74.6%
Tunnels	38,996	19,284	19,713	50.6%
Culverts	9,688	4,098	5,590	57.7%
Retaining walls	29,330	6,138	23,191	79.1%
Earthworks	105,883	73,505	32,378	30.6%
Non-volume	99,069	120,257	-21,188	-21.4%
Total	**449,225**	**373,300**	**75,925**	**16.9%**

Table 24: Civils renewal efficiency

9.3.2 Volume & unit cost efficiency calculations

We set out in the table below a detailed breakdown of volume and unit cost efficiency for each civils volume-based category.

Civils renewals 2011/12	Volume	Unit cost	Total
Overbridges			
Baseline	8,253 sq m	£2.06 k	£17,033 k
Year-end	7,420 sq m	£1.81 k	£13,452 k
Efficiency amount	£1,720 k	£1,860.2 k	£3,580 k

Civils renewals 2011/12	Volume	Unit cost	Total
Efficiency percentage	**10.1%**	**10.9%**	**21.0%**
Underbridges			
Baseline	62,008 sq m	£1.70 k	£105,168 k
Year-end	71,498 sq m	£1.54 k	£110,107 k
Efficiency amount	-£16,095 k	£11,155.9 k	-£4,939 k
Efficiency percentage	**-15.3%**	**10.6%**	**-4.7%**
Overbridges - "Bridgeguard 3"			
Baseline	8,882 sq m	£3.97 k	£35,290 k
Year-end	8,882 sq m	£2.73 k	£24,230 k
Efficiency amount	£0 k	£11,060.0 k	£11,060 k
Efficiency percentage	**0.0%**	**31.3%**	**31.3%**
Footbridges			
Baseline	2,168 sq m	£4.04 k	£8,768 k
Year-end	1,852 sq m	£1.20 k	£2,228 k
Efficiency amount	£1,278 k	£5,262.2 k	£6,540 k
Efficiency percentage	**14.6%**	**60.0%**	**74.6%**
Tunnels			
Baseline	72,724 sq m	£0.54 k	£38,996 k
Year-end	28,998 sq m	£0.67 k	£19,284 k
Efficiency amount	£23,447 k	-£3,734.3 k	£19,713 k
Efficiency percentage	**60.1%**	**-9.6%**	**50.6%**
Culverts			
Baseline	4,981 sq m	£1.95 k	£9,688 k
Year-end	2,130 sq m	£1.92 k	£4,098 k
Efficiency amount	£5,545 k	£44.9 k	£5,590 k
Efficiency percentage	**57.2%**	**0.5%**	**57.7%**
Retaining Walls			
Baseline	19,320 sq m	£1.52 k	£29,330 k
Year-end	12,451 sq m	£0.49 k	£6,138 k
Efficiency amount	£10,428 k	£12,763.8 k	£23,191 k
Efficiency percentage	**35.6%**	**43.5%**	**79.1%**
Earthworks			
Baseline	546,690 sq m	£0.19 k	£105,883 k
Year-end	493,323 sq m	£0.15 k	£73,505 k
Efficiency amount	£10,336 k	£22,041.5 k	£32,378 k
Efficiency percentage	**9.8%**	**20.8%**	**30.6%**
Total efficiency			
- Volume / unit-cost categories	**£36,659 k**	**£60,454 k**	**£97,113 k**
- Non-volume	**n/a**	**n/a**	**-£21,188 k**
- Total (all Civils)			**£75,925 k**

Table 25: Civils renewal volume and unit cost efficiency

9.3.3 Derivation of baseline values

The baseline volume and unit cost values for each asset category are representative of "pre-efficient" expenditure over the control period.

Although the PR08 determination specified total pre-efficient CP4 expenditure levels for each civils asset category (i.e. levels of expenditure considered representative of an appropriate level of renewals activity, prior to application of year-on-year efficiency gains), [69] explicit volumes associated with given expenditure levels were not detailed.

In order to compare actual vs. baseline expenditure on volume and unit cost terms, Network Rail derived its own baseline values.

Volume baselines have been derived through an analysis, undertaken by Network Rail in 2010, of "FD Equivalent Volume", which Network Rail describes as being "for most assets... derived from the CP3 exit rates." Network Rail goes on to state that "for some assets – namely Tunnels, Major Structures and Other Assets – it was derived from SBPu 'bottom up' estimates."[70]

Whilst in overall terms, Network Rail's total CP4 baseline expenditure for all civils assets broadly equates to the pre-efficient civils expenditure level in the PR08 determination, the proportions of expenditure across the different civils asset types differs significantly. This suggests differing assumptions regarding the mix of activities that fed into Network Rail's "FD Equivalent Volume" analysis, compared to assumptions of activity mix in the PR08 determination.[71]

9.3.4 Volume efficiency calculation

The baseline volumes used in the REEM calculation are based on the "FD-equivalent volumes" described above.

Civils volume efficiency is calculated on the same basis as for track and signalling. The in-year baseline is calculated by applying a pre-determined efficiency percentage, which represents the reduction in forecast CP4 (5-year) volumes against the pre-efficient baseline volume. This means that year-on-year efficiencies are based on volume "re-baselining" in order to ensure that the whole-control period volume efficiency is directly reflected in the in-year figures.

Table 26 below illustrates how the CP4 volume efficiency percentages applied in-year (2011/12) for each civils asset category have been derived.

Civils asset category	CP4 volume projection (current) (sqm)	CP4 baseline volume (sqm)	Volume reduction (%)
Overbridges	39,810	44,281	**10.1%**
Underbridges	423,222	367,049	**-15.3%**
Bridgeguard 3*	22,964	34,247	**32.9%**
Footbridges	8,100	9,482	**14.6%**

[69] PR08 document: p.78
[70] Source: "B&C Asset Management Volume Efficiencies".
[71] Network Rail describes in its letter from 13 May 2011 to the ORR how civils activities and associated expenditures were analysed in detail to support the 2009 CP4 Delivery Plan projections.

Tunnels	28,998	72,724	**60.1%**
Culverts	6,985	16,333	**57.2%**
Retaining Walls	19,405	30,110	**35.6%**
Earthworks	2,445,356	2,709,892	**9.8%**

Table 26: Civils renewal baseline volume calculation

* - Note: For Bridgeguard 3 the volume efficiency calculation Network Rail has been adjusted to zero; Network Rail states the 33% reduction in volume is the result of issues with obtaining the portion of funding from local authorities. This is "considered to be deferral" because, we understand, the work is likely to be delayed until CP5.

As indicated above, whilst volume efficiencies overall contribute £37m efficiency across all civils assets, efficiency levels vary significantly between asset types. This reflects reappraisal and alterations to the profile and the nature of planned civils activities during the Control Period. This is discussed further below.

9.3.5 Unit cost efficiency calculation

For the unit cost efficiency calculation, Network Rail derived baseline "pre-efficient" rates from 2008/09 project data, representative of the CP3 "exit position".[72]

As indicated in Table 25, unit cost savings in overall terms contribute £60.5m the total REEM efficiency amount. However, unit cost efficiencies levels like volume efficiencies, show major variations depending on the asset type, ranging from a inefficiency of -9.6% for tunnels, to an efficiency gain of 60% for footbridges.

We understand that variations in unit rate efficiencies for individual asset types are to a large extent the result of year-on-year variations in the nature of individual projects / work packages delivered for each civils asset type (which also contribute to volume variations discussed in the previous section).

To support the unit cost efficiency in overall terms, Network Rail has provided evidence of positive management actions driving efficiency reductions, which we review in the next section.

9.4 Efficiency evidence: Positive Management Actions (PMAs)

9.4.1 PMAs associated with unit cost efficiency and non-volume efficiency

We reproduce Network Rail's breakdown of individual positive management actions driving unit cost efficiency and non-volume efficiency in Table 26 below.

PMA	Unit cost efficiency (£m)	Non-volume efficiency (£m)
Work bank planning	38.0	10.7

[72] Arup was provided with spreadsheets setting out the workings from which the baseline unit costs were derived during last year's (2010/11) review.

Cost & Modelling	2.4	0.7
Design to Cost	5.7	1.6
Efficient Project Governance	3.3	0.9
Efficient Contract Management	11.1	8.1
Additional activity (non-volume)		-43.0
Total	**60.5**	**-20.9**

Table 27: Civils PMA efficiency breakdown[73]

Network Rail has provided explanations of the efficiencies relating to the five PMAs driving unit cost and non-volume efficiencies. These include:

- Work bank planning (£48.7m combined unit cost / non-vol. efficiency): In particular, Network Rail highlighted awarding contracts at least 12 months in advance, reducing design consultancy costs, tendering competitively and reducing contract changes in civils renewals.
- Cost modelling and investment (£3.1 m combined u/c / non-vol. efficiency): Network Rail has attempted to improve cost modelling, reduce project scope creep and minimise contingency in its investment plans.
- Design to cost (£7.3 m combined u/c / non-vol. efficiency): Network Rail has improved efforts to value engineer its civils renewals projects, emphasising "functionality rather than engineering excellence."
- Efficient project governance (£4.2 m combined u/c / non-vol. efficiency): Network Rail has worked to improve management systems, reducing internal management bureaucracy and associated opex costs.
- Efficient contract management (£19.2m combined u/c / non-vol. efficiency): Network Rail has achieved efficiencies via "pro-active contract management" emphasising cost reduction.

The efficiencies described above are partially offset by a -£43m inefficiency attributed to additional non-volume activity. Network Rail has stated that "this primarily relates to (1) additional inspection/assessment activity to address backlog and compliance issues, and (2) the B&C Transformation Programme, and (3) additional CP5 Development activity over and above what was expected."

Network Rail presented as supporting evidence the following management KPIs relating to planning and timing of its Buildings & Civils workbank planning:

- % of work bank "remitted and locked down";
- % of budget competitively tendered;
- Lead time from award to year of implementation;
- % of budget expended in periods 1-7 of the financial year; and
- % of developed schemes cancelled.

[73] Please note that there are minor discrepancies between the table above and the REEM efficiency calculation; this is being clarified with Network Rail and will be rectified in the final report.

The year-on-year trends for the above KPIs indicate significant improvements in the level of workbank planning and stability since the start of CP4, with further improvements targeted for the remainder of the Control Period.

9.4.2 Civils renewals: PMAs associated with volume efficiency

For the purposes of this review, we have considered the evidence of PMAs relating to volume efficiencies within the context of our underlying assessment of robustness and sustainability. A key premise of this approach is that alterations to the volumes feeding directly into volume efficiency calculations must be demonstrated as being robust and sustainable by the asset, in line with asset policy. We analyse the evidence presented on this basis in the next section of this chapter.

9.4.3 PMAs: Reporter opinion

Please note: this opinion relates to civils efficiency reported within previous versions of Network Rail's REEM efficiency calculation. We note that Network Rail's current REEM calculation (31st July) supporting its final Regulatory Accounts submission excludes civils efficiency entirely from the calculation (see Chapter 6).

We consider that Network Rail's analysis of the PMAs for unit cost and non-volume efficiencies provides a reasonable level of visibility of underlying factors driving efficiencies at the overall level.

We consider Network Rail could provide visibility of cost savings achieved at more granular level to support the high-level amounts attributed to the PMA by employing benchmarking and comparison methods. For example, we consider Network Rail could benchmark competitive tender contracts vs. non-competitive tender contracts at the project level (either within the company or externally) or compare contracts with longer and shorter lead times.

The calculation of civils efficiency on a unit cost basis for the volume categories, provides useful visibility of cost movements within individual civils asset types, and we consider that generally the unit cost efficiencies presented appear plausible. We note, however, that for footbridges the ORR has expressed concerns in relation to "acknowledged errors in double counting station footbridges in the PR08 civils submissions"; given that footbridge volume efficiencies contribute over £5m of efficiency to the overall civils total, we consider that further verification of the volume efficiency calculated for footbridges to be appropriate.

Although not presently captured in volume and unit cost terms, the civils category "major structures" appears as a major expenditure item elsewhere in the regulatory accounts. Given that this category accounts for 9% of expenditure, we consider it would improve the transparency of the "non-volume" efficiency breakdown if efficiency relating to these types of assets were itemised and analysed as a distinct category.

The PMA evidence has not been provided in a format that links directly to unit cost efficiencies for individual asset types. However, unit cost variations at the asset level are likely to be the influenced not only by the PMAs, but to a large extent by year-on-year variations in the nature of individual projects / work packages delivered for each civils asset type (which we discuss later in this

chapter). Therefore, in overall terms we consider Network Rail's approach to demonstrating the impact of positive management actions in terms of the overall impact of specific actions to be reasonable, both for the volume and non-volume civils activities.

9.5 Civils expenditure: Robustness and sustainability

9.5.1 Asset policies

9.5.1.1 Compliance with "ABC" policies

Network Rail reports that the 2010 version of their CP4 civils asset policy was acknowledged by ORR to be robust, but has not been approved by the ORR in line with its "sustainability" requirements.[74] The ORR has reported that if the sustainability of the asset has not been agreed, it is not possible to ascertain whether the annual or whole-of-control-period delivery is robust. A new revised policy is in the process of being developed.

In its letter to the ORR dated 17th April 2012[75], Network Rail has stated that it considers that evidence of compliance with its 2007 'ABC' policies[76] is an appropriate basis on which to underpin civils renewals efficiencies. We understand that because the "ABC" policies formed the basis for Network Rail's SBP proposals, Network Rail considers such policies to have been implicitly accepted by the ORR as the basis for its CP4 programme. Network Rail states *that "the PR08 Determination, is aligned with the application of Civils' pre-2010 'ABC' policy to different route categories in order to maintain the condition of the asset in CP4",* and has therefore based its robustness and sustainability evidence around the demonstration of consistency with the ABC policies.

We understand that the ORR did not formally apply 'robustness' and 'sustainability' tests to the 2007 ABC Policies. In addition, the CP4 civils asset policy dated March 2010[77] has not yet been revised or approved for application in CP4. Civils activities have been subject to significant variations (as discussed previously). Network Rail has consulted closely with the ORR to explain how its business plan for civil structures complies with the 2007 ABC policies. Network Rail has provided minutes of meetings with the ORR, and details of the justification it provided to the ORR to show the robustness and sustainability of the programme alterations it has now currently proposed to support its efficiency calculations and its projections for the remainder of CP4. Consultations are detailed that have taken place within the past year, and which are clearly an ongoing process.

In spite of the provision of this evidence relating to 'ABC' policies, we note that the ORR remains of the view that the asset policy underpinning 2011/12 civils renewals does not comply with its sustainability criterion.

[74] Letter from the ORR to Network Rail, 1 June 2010
[75] Network Rail Letter 'Our suggested basis for the Reporter's audit of Civils' efficiency' dated 17th April 2012
[76] Network Rail October 2007 Strategic Business Plan Supporting document Asset management - Civils (Structures) Policy dated 26 October 2007
[77] Network Rail Asset Management Policy Civil Engineering Policy dated March 2010

9.5.1.2 Demonstration of "ABC" policy compliance

As indicated above, Network Rail has indicated that it considers an appropriate basis for the assessment of sustainability supporting it REEM civils efficiency calculation to be the application of the 2007 SBP "ABC"- policy for Civil Structures (although, as stated above, ORR remains of the view that the asset policy underpinning 2011/12 civils renewals does not comply with its sustainability criterion).

The letter from Network Rail to the ORR dated 17th April 2012 suggests three criteria to demonstrate policy compliance, based *"on the understanding that the PR08 Determination is aligned with the application of Civils' pre-2010 'ABC' policy to different route categories in order to maintain the condition of the asset in CP4."* The three criteria are as follows:

"1. The Civils' Business Plan is evidentially consistent with the ABC policies."

"2. Civils can demonstrate the lineage of changes to the Business Plan back to a volumetric baseline"

"3. The asset condition is being maintained and related performance measures achieved."

To demonstrate consistency with the 2007 ABC policies, Network Rail presented the results of a detailed analysis it has carried out, in which it has related projects in its workbank back to ABC policy definitions. Network Rail's sampling approach found that for the three principal route categories reviewed ("Primary", "Secondary" and "L,S&E") in over 75% of cases the generic "Policy B" approach had been adopted. The study also indicated that in the remaining cases (where "Policy C" had been applied), the variances in approach could be justified as being based on technical judgement and not budgetary constraint.

Network Rail has provided various information in relation to activity volumes and their linkage with business plan and baseline values.

9.6 Review and control processes for delivery of civils programme

An important aspect of our review of robustness and sustainability is the provision of evidence by Network Rail to demonstrate its ability to deliver required CP4 outputs. This includes evidence of processes and controls to ensure volume alterations which feed directly into efficiency calculations are robust and sustainable by the asset, in line with asset policy.

Network Rail has in place investment approval and change control processes (undertaken jointly for civils and buildings asset groups) that involve both Investment Projects and Asset Management teams. We understand that review processes take place at a number of levels, e.g. with change orders are reviewed locally and at the territory level, and local examinations feeding into national assessment data.

Network Rail considers that the hierarchy of internal challenge reviews ensures evidence of buildings and civils asset robustness and sustainability is subject to an appropriate level of scrutiny and challenge. As with all assets, Network Rail has

indicated there is an organisational tendency towards over-engineering, which their internal financial review is intended to counterbalance.

9.6.1 Deliverability of CP4 volumes

9.6.1.1 Assessment of "efficient" CP4 volume vs. baseline

We compare Network Rail's actual CP4 volume projections with its baseline projections in Table 28 below.

Civils asset category	CP4 volume projection (current) (sqm)	CP4 baseline volume (sqm)	Variation (actual vs. baseline)
Overbridges	39,810	44,281	**-4,471**
Underbridges	423,222	367,049	**+56,173**
Bridgeguard 3	22,964	34,247	**-11,283**
Footbridges	8,100	9,482	**-1,382**
Tunnels	71,034	246,671	**-175,637**
Culverts	6,985	16,333	**-9,348**
Retaining Walls	19,405	30,110	**-10,705**
Earthworks	2,445,356	2,709,892	**-264,536**

Table 28: Comparison of actual vs. baseline CP4 civils volume projection

As indicated above, a number of asset categories show significant variations in actual CP4 volume projections compared to the CP4 baseline. In the document "B&C Asset Management Volume Efficiencies", Network Rail states that the variations have *"come about through: the application of asset policy by route classification; the better targeting of funds to meet emerging needs and; as a result of emerging knowledge."*[78]

However, Network Rail also indicates that the "the emerging need to invest more on delivering volume for Underbridges to maintain their condition led to reduced funding being available to deliver volumes across a number of the other assets."

The document also summarises volume variations on an asset-specific basis for the following:

- **Underbridges:** increased volume *"due to the reprioritisation of activity to address a number of emerging critical issues including: capability; post-Stewarton hidden detail issues and; spandrel wall separation."*
- **Overbridges:** reduced volumes due to *"reprioritisation of budget to deal with increased risk within Underbridges whilst maintaining the condition of the asset."*
- **Overbridges Bridgeguard 3**: reduced volume *"considered to be deferral (as it depends upon Local Authority funding that may become available in a future control period) and has not been claimed as efficiency".*

[78] Source: B&C Asset Management Volume Efficiencies.

- **Tunnels:** significant volume reduction *"due to the following improved management techniques resulting from emerging knowledge (from TCMI)"*
- **Earthworks:** reduced volumes *"due to a small reduction in embankments schemes where outputs were considered marginal."*
- **Other Assets (Culverts, Retaining walls, Footbridges, 'Other' assets):** *"forecast to deliver less volume whilst continuing to maintain condition."*

As noted above, Network Rail has highlighted the fact that the alterations in volume have been subject to detailed discussion and review with the ORR, as reflected in correspondence between Network Rail and the ORR provided for review.[79] However, the ORR has pointed out that its involvement in these reviews does not in itself imply acceptance or endorsement of the civils programme .

Volume efficiencies overall contribute £41m efficiency across all civils assets, although efficiency levels vary significantly between asset types. This reflects reappraisal and alterations to the profile and nature of planned civils activities during the Control Period. This is discussed further below.

9.6.1.2 CP current volume profile vs. budget

Table 29 sets out the current year-on-year civils profile, with actual volumes up to 2011/12 and current projections for the remainder of CP4, alongside a comparison with 2011/12 volumes within the 2011 Delivery Plan update that reflect the budgeted expenditure for the year .

Completed Volumes (sqm)	2009/10 (actual)	2010/11 (actual)	**2011/12 (actual)**	***2012/13 (proj.)***	***2013/14 (proj.)***	**2011/12 (forecast)**	**2011/12 variation (actual vs. forecast) %**
Overbridges	5,235	11,866	**7,420**	6,769	8,520	**9,667**	**-30.3%**
Underbridges	75,298	87,914	**71,498**	97,646	90,866	**64,712**	**+9.5%**
Bridgeguard 3	2,985	6,276	**8,882**	1,984	2,837	**6,709**	**+24.5%**
Footbridges	1,271	1,224	**1,852**	2,990	763	**2,036**	**-9.9%**
Tunnels	11,664	19,721	**28,998**	5,390	5,261	**25,712**	**+11.3%**
Culverts	1,416	2,340	**2,130**	473	626	**1,963**	**+7.8%**
Retaining Walls	2,153	2,609	**12,451**	1,287	905	**7,503**	**+39.7%**
Earthworks	400,540	386,749	**493,323**	601,321	563,423	**528,653**	**-7.2%**

Table 29: Current CP4 year-on-year civils volumes (actual and forecast)

Comparing 2011/12 actual volumes with forecast, there is a significant degree of variation across a number of asset categories. For the majority, outturn volumes are higher than those forecasted. Network Rail provided an extract from its "B&C Asset Management Executive Review Meeting" document, which details for each asset category the key projects causing the volume alterations – including both the

[79] See for example the letter from Network Rail to ORR relating to "Cost / Volume Reporting", from 13th May 2011.

increases from additional projects or extensions to scope, and decreases from scope reductions, delays and deferrals.

For the remainder of CP4, Network Rail is forecasting significant increases in delivery volumes for the two highest expenditure categories, underbridges and earthworks, which show increases between 2011/12 and 2012/13 of 37% and 21% respectively. Increased underbridge volumes reflect the reprioritisation of activities to this asset type discussed in earlier sections, whilst the increasing earthworks volume reflects the higher levels of activity planned for the latter part of CP4.

In contrast, volumes for both tunnels and Bridgeguard 3 overbridges are set to fall, to around one quarter of the current levels for both assets. We understand that for Bridgeguard 3 work which is jointly funded with local authorities, uncertainty regarding the availability of local authority funding may mean a proportion of these works may be deferred into CP5.

We also note that reference is made in the civils challenge meeting note that a proportion of tunnel works may be deferred. We consider that this probably requires clarification, as Network Rail is not reflecting any civils deferrals within its current efficiency calculations.

Significant reductions are also forecast for culverts and retaining walls, although these are lower spend categories. Overbridge volumes show an initial fall in 2012/13, before rising the following year.

It is notable that the above volumes do not encompass activities that relate to the additional £233m of expenditure from the Autumn Statement for 2012/13 - 2013/14, for which no explicit volume projections appear to have been provided.

9.6.1.3 Asset condition monitoring

To demonstrate asset condition is being maintained, Network Rail has provided Building and Civils Output summary tables setting out the key civils output performance measures.

These tables present 2011/12 condition scores with previous years in the Control Period (2009/10 and 2010 /11) and the CP4 target level.

For structures the following indices are pertinent,

- Condition - the key index is ‘SCMI’ (Structures Condition Marking Index), this is shown to be static for 2009/10 and 2010/11, but no score is provided for 2011/12.
- Additional Examinations: - The number of civil structures subject to additional examinations has progressively reduced during the Control Period.
- Track Speed Restrictions: - Whilst the number of planned TSRs has reduced – there is a notable increase in unplanned TSRs from 11 (in 2010/11) to 48 in 2011/12.

Overall it is difficult to assess whether or not structures condition is being maintained.

For Tunnels and Retaining Walls, no condition related measures have been provided, so it is not possible to comment as to whether or not condition is being maintained.

For Earthworks we note that there has been a significant increase in both planned and unplanned TSRs from 18 (in 2010/11) to 86 in 2011/12 and from 38 (in 2010/11) to 95 in 2011/12 respectively. This contrasts with the reduction of earthworks failures from 41 (2010/11) to 20 (2011/12). Again it is difficult to assess whether or not Earthworks condition is being maintained.

9.6.2 Civils robustness and sustainability: reporter opinion

Please note: this opinion relates to civils efficiency reported within previous versions of Network Rail's REEM efficiency calculation. We note that Network Rail's current REEM calculation (31st July) supporting its final Regulatory Accounts submission excludes civils efficiency entirely from the calculation (see Chapter 6).

We have reviewed in high level terms the evidence presented by Network Rail of robustness and sustainability, as summarised above.

We have assessed the transparency and traceability of the volumes underpinning Network Rail's volume efficiency calculation. More information has been available than in last year's audit to explain changes to the volume. This includes greater degree of visibility of delivery levels during the year (2011/12), and changes to the profile of activity more generally over the whole of CP4.

Details provided of the discussions between Network Rail and the ORR provide assurance that the planning and re-prioritisation of civils work programme forms part of a controlled process. Much of the information is from within the last 12 months – indicative of the recent nature of the improvements to reporting transparency – and we note in many areas consultations are ongoing.

Network Rail has indicated that the forecast work bank is now expected to stabilize. We consider further assurance of the stability and deliverability of volumes should be provided going forward, particularly in light of the significant ramp-up in volumes in many asset categories for the remainder of CP4. We also consider further details are required regarding the additional activities relating to the £233m of Autumn Statement expenditure, including the nature of works, how these will be resourced, and how any potential conflicts with the existing works programmes or risks of resourcing shortfalls are to be mitigated. We note that this is future expenditure that Network Rail has stated will not impact on delivery of the company's core work bank (or 2011/12 reported efficiency).

- In spite of Network Rail's provision of evidence of compliance with "ABC" policies as the basis for demonstrating robustness and sustainability, the ORR remains of the view that the civils asset policy covering activities in 2011/12 does not meet its requirements for sustainability.

Under the RAGs, we understand that all of the volume efficiencies for 2011/12 will therefore need to be disallowed. As with last year, it is our opinion that that a proportion of Network Rail's unit cost efficiencies may still be valid. This is

because a proportion of the works delivered in 2011/12 is likely to have been undertaken if a sustainable asset policy were in place.

On this basis, we consider that have estimated that the £36.7m of civils renewals efficiency relating to volume savings may be overstated. We also consider that £12.1m of civils unit cost efficiency (representing 20% of the total unit cost efficiency) may also have been overstated. We provide a breakdown of the calculations underpinning our estimation of civils uncertainty in Appendix G.

10 Buildings renewals efficiency

This chapter contains our review of the buildings renewals efficiency calculation and underlying evidence, which feeds into the REEM efficiency measure presented in Statement 12 of the Regulatory Accounts.

Buildings renewals expenditure in 2011/12 totalled £267m, which represents 11.5% of total renewals expenditure for the year.

10.1 Buildings renewals: CP4 expenditure & efficiency overview

10.1.1 CP4 expenditure profile

Table 30 below provides an overview of the buildings expenditure profile for CP4.

Buildings renewal expenditure, £m (2011/12 prices)	2009/10	**2010/11**	**2011/12**	**2012/13**	**2013/14**	CP4 Total
CP4 ORR Determination (pre-efficient)	-	-	-	-	-	1,755
CP4 Delivery Plan	302	301	285	254	187	1,329
Delivery Plan update 2011	244	279	301	260	210	1,294
Delivery Plan update 2012 projection[80]	--	-	-	252	197	1,256
Actual Outturn[81]	244	286	267	-	-	-

Table 30: Buildings renewal expenditure

Buildings renewals expenditure during the first three years of CP4 has in overall terms been around 10% lower than the levels planned in the original 2009 Delivery Plan, with 2011/12 outturn expenditure of £267m around 11% below the 2011/12 budget figure (represented through the 2011 Delivery Plan update).

For the final two years of CP4 (2012/13 and 2013/14), the current projection set out in the 2012 Delivery Plan now shows falling expenditure levels, similar to both the 2009 Delivery Plan and the budget. Total buildings expenditure by the end of CP4 is now projected at £1.26bn – around 2.5% below the year's budget forecast and 5% below CP4 Delivery Plan levels.

10.1.2 Actual & projected efficiency

We set out in Table 31 below the current (2011/12) efficiency position, compared to the target "efficient expenditure" set out in the PR08 determination.

[80] Network Rail presents its Delivery Plan update 2012 expenditure figures in 2012/13 prices. In absence of information regarding Network Rail's inflation assumptions for 2012/13, we have assumed an inflation rate of 5.16% in converting expenditure figures into 2011/12 prices.
[81] Source 2009/10: Delivery Plan update 2009/10
Source 2010/11: Regulatory Financial Statements for year ended 31 March 2011
Source 2011/12: REEM Model.xls provide by Network Rail on 16 April 2012

Buildings renewal expenditure, (2011/12 prices)	**2011/12**	**CP4 Total**
PR08 efficient expenditure projection[82] (£m)	299.4	1,500
PR08 efficiency vs. baseline	14.7%	14.5%
Actual expenditure (& CP4 projection) [83]	267	1,262
Actual efficiency (& CP4 projection)	20.9%	28.1%

Table 31: Buildings renewal expenditure

As indicated above, buildings efficiency vs. baseline during 2011/12 was calculated at 20.9%, compared to the PR08 year target renewals efficiency for year 3 of CP4 of 14.7%.

For the Control Period as a whole, Network Rail is projecting it will achieve a 28.1% efficiency– significantly ahead of the PR08 target of 14.5%. This reflects the expectation that year-on-year expenditure for buildings will decrease further during the final two years of CP4.

10.2 Buildings renewals: Efficiency calculations

10.2.1 Buildings renewals: expenditure overview

We set out in Table 32 the buildings efficiency calculation.

Buildings renewals 2011/12	Baseline (£k)	Actual (£k)	Efficiency amount (£k)	Efficiency %
Operational property	337,630	267,000	70,630	20.9%

Table 32: Buildings renewal efficiency

Buildings is the highest-spend "non-volume" asset group for which a volume and unit cost breakdown is not provided. As a result, REEM efficiency is measured on the basis of a total expenditure comparison vs. the pre-efficient total expenditure baseline. Efficiency evidence provided correlates to the total sum of cost reductions feeding into the above calculation (as reviewed in the next chapter), and robustness and sustainability evidence is provided based on asset policy compliance and delivery, without explicit reference to volumes.

The ORR has stated that a volume measure for buildings investment is needed.

10.2.2 Derivation of baseline values

The baseline expenditure value is representative of "pre-efficient" expenditure over the Control Period. In overall terms, the pre-efficient baseline expenditure for buildings should correlate to the PR08 "pre-efficient" expenditure level (as referenced in Table 22). We are still clarifying with Network Rail the basis by which the year-on-year baseline profile has been derived.

[82] Source: ORR PR08 determination, p.99
[83] CP4 projection is taken from Delivery Plan update 2012. £233m of expenditure planned for 2012/13 and 2013/14 under the category "Programme following autumn statement", has been discounted from the total.

10.3 Efficiency evidence: Positive Management Actions (PMAs)

10.3.1 PMA evidence and quantification provided by Network Rail

The PMA evidence provided by Network Rail for buildings follows a similar format for civils assets.

Network Rail has indicated that the nature of buildings renewals, emphasising a high volume of low-value work, makes tracking volume-specific costs problematic. Instead, Network Rail reports that it defines and estimates the impact of buildings-related PMAs across the whole renewals programme.

Network Rail focuses on the importance of cost savings related to launching building renewals tender processes a year or more in advance of the works being undertaken. We understand that buildings cost efficiency has been estimated by modelling and breaking down the work bank, then assessing how much of the cost base can be eliminated. Given this approach, it is unlikely to specify project-level cost savings based on specific management actions.

We reproduce Network Rail's breakdown of individual positive management actions driving Buildings efficiencies in Table 33 below.

PMA	Non-volume efficiency (£m)
Work bank planning	36.6
Cost & Modelling	2.3
Design to Cost	5.5
Efficient Project Governance	3.2
Efficient Contract Management	23.0
Total	-70.6

Table 33: Buildings PMA efficiency breakdown

The five PMAs listed above are the same factors that Network Rail also attributes to the efficiencies reported for civils unit cost and non-volume efficiencies. These are reviewed in the previous chapter of this report.

10.3.2 PMAs: Reporter opinion

We consider that Network Rail's analysis of the PMAs for buildings efficiencies provides a reasonable level of visibility of underlying factors driving efficiencies at the overall level.

Network Rail could provide visibility of cost savings achieved in buildings renewals at more granular level to support the high-level amounts attributed to each PMA. This is in part because buildings renewals account for significant annual expenditure, and a high level of reported efficiency (£70.6m) contributing 14% of overall renewals efficiencies.

In the absence of volume and unit cost measures, or a feasible basis for providing project-level efficiency breakdown, we consider an alternative analysis or

breakdown should be provided to give greater quantified detail of savings achieved. This could entail an analysis of impact of the PMAs on different types of activities and / or buildings or asset types within the buildings asset portfolio.

As with civils PMA evidence, we also consider that employing benchmarking and comparison methods could support this process.

10.4 Buildings expenditure: Robustness and sustainability

10.4.1 Asset policies

Network Rail's updated buildings asset policy was accepted by ORR as robust and sustainable in 2010. Network Rail has stated that it has confirmed with the ORR that the buildings work bank is aligned with the revised asset policy. The ORR has reported that it is not aware it has confirmed a work bank.

Network Rail has provided a brief summary of buildings renewals policy, which is based around the following three policy definitions that are used to inform the group's investment decisions:

"Policy A:" Return and maintain the stock to steady state by the use of maintenance activities that will improve performance levels and the remaining life of existing assets.

"Policy B:" Allow structures to deteriorate until repairs or replacement are essential to maintain operational requirements. At the time of intervention, carry out interventions that achieve lowest long-term costs for assets.

"Policy C:" Allow assets to deteriorate until intervention is essential to maintain safety standards or raise performance levels to an acceptable level.

The general principle is maintenance to maintain safety and asset condition. Of particular relevance to renewals expenditure, the policy specifies a methodology for assessing assets, targeting intervention and maintaining asset performance. Network Rail has determined eight specific buildings policy statements, two of which focus specifically on examination methodology for the buildings asset base, the purpose of which is to define a trigger for renewals intervention. Network Rail has cited the following key factors assessed through these examinations:

- Safety impact.
- Performance impact.
- Fabric/structure and M&E.
- Likelihood of impact according.
- Asset remaining life (ARL).
- Volume information.
- Defect information and details of any work needed.

Network Rail considers that compliance with policy forms the basis for ensuring sustainability of buildings policy.

10.4.2 Evidence of policy compliance

Network Rail considers that because the asset policy has been subject to review by ORR, compliance with policy implies sustainability.

As evidence of compliance, Network Rail states in its document, "Buildings and Civils Asset Policy Compliance", that "buildings were able to confirm the range of factors that, at the outset of the CP, provided sufficient confidence that the planned level of activity would not result in activity levels in future Control Periods exceeding the SBPu forecast. These included:

"The Station Stewardship Measure was forecast to be maintained over CP4

"A detailed review of the CP4 Workbank had not resulted in the identification of work that should be carried out in CP4 being deferred to later Control Periods

"Buildings' plans have not resulted in any increase in faults or customer complaints."

To demonstrate asset condition is being maintained, Network Rail has provided charts setting out the buildings output performance measures on a similar basis to civils. These compare 2011/12 condition scores with previous years in the Control Period and the CP4 target level. For stations, the "SSM" measures list 7 individual metrics, whilst for light depots the "LMDSM" (Light Maintenance and Depot Stewardship Measure) is given as a further single metric. For every one of these eight metrics, the results indicate an improvement in score for 2011/12 compared to previous years, with all measures ahead of the "CP4 target."

10.4.3 Deliverability of CP4 workbank

Network Rail has indicated that, based on the workbank that has been developed in line with asset policy, it remains on-track to deliver the required renewals programme planned for the remainder of CP4.

Our previous review of the change control log documents suggested a reasonable checking mechanism is in place that ensures changes to the workbank are justified. A one-line justification has been provided for each proposed change in workbank and clarifications were sought where justifications are deemed insufficient.

Network Rail has provided the details of the forward-looking workbank, for this asset group, setting out the individual projects to be delivered and the anticipated timing and cost of such works, for the remainder of the Control Period.

10.4.4 Buildings robustness and sustainability: reporter opinion

We consider the information showing compliance of buildings work bank with asset policy appears to be reasonable basis for demonstrating robustness and sustainability. We do not consider there to be risks relating to the deliverability of the buildings programme. We consider that the falling levels buildings renewal expenditure projected for the remainder of CP4 are likely to lower the risks relating to resourcing, capacity or deliverability of activities.

We note that SSM and LMSM asset condition measures are indicating continuing improvements in buildings asset condition. The KPIs used for measurement of buildings asset performance and condition are subject to a separate review by Arup (as independent Reporter) relating to the quality and reliability of these indicators.[84]

We have concluded that Network Rail's reported efficiencies for building assets have been based on a sufficiently detailed and documented evidence base and appear to satisfy the ORR's tests of robustness and sustainability.

[84] We make reference to the ORR mandate Independent Reporter Part A –" Data assurance 2011-2012, Asset Management (station stewardship)", dated 2nd December 2011.

11 Telecoms and FTN renewals efficiency

This Chapter sets out the findings of our review of the Telecoms efficiencies reported through the REEM efficiency measure, including those relating to the Fixed Telecoms Network (FTN). We note that Telecoms and FTN are treated as two separate renewals expenditure categories under the REEM, although both categories relate to telecoms-based assets that fall under Network Rail's telecoms asset management policy. We set out an overview of the costs and efficiencies reported by Network Rail and consider the evidence presented in relation to the management actions supporting the efficiencies, as well as evidence relating to the sustainability of the cost reductions reported.

11.1 Telecoms and FTN renewals: Expenditure overview

Table 34 shows a summary of the telecoms and FTN costs reported by Network Rail, compared to the CP4 determination, the CP4 Delivery Plan and the latter's 2011 update.

Telecoms and FTN renewal expenditure, £m (2011/12 prices)	**2009/10**	**2010/11**	**2011/12**	**2012/13**	**2013/14**	**CP4 Total**
CP4 ORR Determination (pre-efficient)	-	-	-	-	-	1,142
CP4 Delivery Plan	359	352	172	95	81	1,060
Delivery Plan update 2011	226	248	262	203	142	1,081
Delivery Plan update 2012 projection[85]	-	-	-	180	168	1,037
Actual Outturn[86]	**226**	**261**	**207**	**-**	**-**	**-**

Table 34: Telecoms and FTN renewal expenditure

The CP4 delivery plan allocated some £1.06 billion of telecoms and FTN expenditure during the Control Period. Based on the pre-efficient expenditure determination of £1.14 billion, Network Rail has planned to remove seven per cent of renewals capital expenditure from these investment areas. Delivery plan updates have increased total planned expenditure, reducing the implied efficiency relative to the PR08 determination.

Actual telecoms and FTN renewals expenditure has totalled some £694 million during the first three years of the Control Period. The 2011 delivery plan update allocated some £736 million of expenditure prior to the end of 2011/12, and actual outturn is some six per cent less than planned.

Unlike other asset areas, however, Network Rail has planned to reduce expenditure in the final two years of CP4. The company's 2011 delivery plan allocates some £200 million and £140 million for telecoms and FTN renewals in

[85] Network Rail presents its Delivery Plan update 2012 expenditure figures in 2012/13 prices. In absence of information regarding Network Rail's inflation assumptions for 2012/13, we have assumed an inflation rate of 5.16% in converting expenditure figures into 2011/12 prices.
[86] Source 2009/10: Delivery Plan update 2009/10
Source 2010/11: Regulatory Financial Statements for year ended 31 March 2011
Source 2011/12: REEM Model.xls provide by Network Rail on 16 April 2012

2012/13 and 2013/14, respectively. Actual outturn has exceeded these amounts in all years prior within CP4.

11.2 Telecoms and FTN renewals: Efficiency calculations

Table 35 sets out the current (2011/12) efficiency calculation for Telecoms and FTN renewals (which are treated as two distinct renewals expenditure categories under the REEM calculation).

Telecoms and FTN renewals 2011/12	Baseline (£k)	Actual (£k)	Efficiency amount (£k)	Efficiency %
Telecoms	53,915	40,200	13,715	25.4%
FTN	161,762	167,000	-5,238	-3.2%
Telecoms and FTN Total	**215,677**	**207,200**	**8,477**	**3.9%**

Table 35: Telecoms and FTN renewals efficiency

As indicated above, 2011/12 combined telecoms and FTN renewals costs were £207 million during 2011/12, around 5% of the total Operations, Maintenance and Renewals expenditure subject to review within the present report.

For 2011/12, Network Rail is reporting efficiency in this area of 3.9% against the baseline. This is driven by a significant efficiency (25% in telecoms renewals), partially offset by an inefficiency of 3% within the FTN renewals programme.

Network Rail continues to present telecoms and FTN renewals as non-volume expenditure items. However, the company has developed a method of reporting telecoms volume-related efficiency, although it reports none of the efficiency in volume-related terms for 2011/12.

11.2.1 Results presented: Positive Management Actions (PMAs)Telecoms and FTN renewals: PMAs reported

Telecoms policy / workbank efficiency

Network Rail does not break down its REEM efficiency calculations for telecoms renewals of on the basis of volume and unit costs.

However, as an important part of its PMA evidence for telecoms efficiency, Network Rail has provided information setting out in qualitative terms the efficiencies it has made in the overall scope of activity, which it calculates as contributing £3.8m in absolute terms – around 28% of total telecoms efficiencies.

A paper provided to us by Network Rail, 'Telecoms Volumes Efficiency Analysis for Control Period 4: Volumes Summary Report', explains in qualitative terms the changes in levels of telecoms renewal activities since the 2008 determination. The paper states that there were significant changes in planned levels of renewals between the 2008 determination and the 2010 Delivery Plan. It attributes those changes to an amended asset policy and improved asset information and asset condition. The information contained within that paper is consistent with the quantified information contained within Network Rail's PMA *proforma* for this

area of the business (e.g. both focus on the importance of the change in asset policy relating to concentrators). However, as indicated previously, the measurement of the efficiency saving is captured as a cost reduction in absolute terms without a breakdown of volume and unit cost.

The paper also sets out further details of changes in planned renewals volumes between the 2010 Delivery Plan and the 2011 Annual Return, including:

- Concentrators – Network Rail makes reference to changes in asset policy, delivering some renewals which had been deferred from earlier years, and slippage attributed to dependency on other assets (e.g. FTN infrastructure).
- Public Emergency Telephone System (PETS) - Significant reduction in PETS delivery is due to supplier and technical related issues associated with the introduction of replacement technology for obsolete equipment. We understand that all required renewals have been re-planned for delivery within the Control Period.

Telecoms volume reporting uncertainty

We note that issues relating to the reporting of telecoms volumes were identified by Arup in our review of volumes reporting (mandate AO/025). That report has assessed the company's telecoms reporting as meriting an accuracy grading of "5" (outside +/- 25%). Network Rail has informed us that the high level of inaccuracy was due to reporting problems particular to the accounting Period in question, and that anomalies giving rise to the low accuracy score have been rectified.

As indicated above, the reporting of telecoms volumes itself does not factor in to the REEM telecoms efficiency calculation. Although volume reporting uncertainty may be indicative of wider shortcomings in telecoms renewals reporting processes, Network Rail was able to provide evidence of cost savings at an individual project level to substantiate the efficiencies reported. On this basis, we do not consider uncertainty relating specifically to volume reporting is likely to materially impact the reported telecoms efficiency level in REEM.

Telecoms activity based efficiency

Network Rail attributes £9.9m of the total £13.7m telecoms efficiency to "activity efficiency". A quantified breakdown of efficiencies for the nine telecoms asset sub-categories was provided:

- Customer information system (CIS)
- Driver only operation (DOO) system
- Large concentrator
- Public address system
- Public emergency telephone (PET) system
- Small concentrator
- Station clocks
- Telecom CCTV

- Voice recorder

We note that although this includes a nominal volume and unit cost breakdown, the baseline volume values in the table provided were matched to actual since Network Rail stated it is not possible to derive a pre-efficient baseline volume. This means the savings can be viewed only in absolute terms, rather than the "unit cost" basis to which they are attributed, since the impact of volume and unit cost efficiency differentiation is effectively factored out of the efficiency equation.

However, Network Rail has provided a detailed spreadsheet which shows the telecoms project cost savings on an individual project-by-project basis. This enables the savings across the 76 individual projects to be related back to the activity-based total efficiency amount indicated above.

FTN efficiency evidence

As indicated in Table 35 Network Rail is reporting an inefficiency of £5.2m in relation to FTN renewals during 2011/12. Network Rail attributes the inefficiency to additional programme scope, resulting in increased cost, in the following areas of additional scope:

- Additional asset testing;
- Impacts of cell planning (i.e. additional infrastructure sites);
- Trespass & vandalism measures; and
- Additional routeworks.

Network Rail attributes a total of £40m additional (inefficient) expenditure over the whole of CP4 to the additional programme scope (of which the £5.2m inefficiency during 2011/12 is a part).[87]

11.2.2 PMAs: Reporter opinion

Network Rail has presented the telecoms efficiencies reported on a project-by-project basis, providing an auditable record of where and how efficiencies have been delivered. Volume-related efficiencies are detailed at a project level (without narrative), with commentary provided separately to describe and quantify other efficiencies reported (e.g. those relating to changes in asset policy), although all efficiencies are captured under REEM as absolute cost savings, without a breakdown of volume and unit costs within the REEM calculation.

In the PMA *pro forma* provided to us by Network Rail, the impact of the various volume and non-volume PMAs is estimated, with references provided to the details provided in relation to project-level efficiency savings included in the reporting sheet. Specific information is provided to explain how changes in asset policy have led to cost reductions (e.g. reducing the frequency of concentrator renewals from 10 to 15 years).

We consider that the PMAs presented to us by Network Rail comprise a reasonable explanation of how telecoms costs have been reduced.

[87] Source: Breakdown of FTN/GSM-R efficiency schedule ("FTN GSM-R Efficiency.pdf")

11.3 Telecoms and FTN: robustness and sustainability

11.3.1 Asset policy compliance

For telecoms renewals Network Rail and the ORR have an agreed asset policy. In the course of our discussions with Network Rail staff, the company's managers confirmed to us that they undertook an internal review of compliance with that policy, and confirmed that activities undertaken are consistent with the agreed policy.

FTN assets, although reported as a standalone renewals expenditure category under the REEM, are also captured within Network Rail's telecoms asset management policy. However, the telecoms asset policy makes limited reference to FTN asset management. Network Rail has reported that "FTN programme itself does not have an asset policy but is a programme of work more akin to enhancements." FTN funding requirements specify a level of national GSMR coverage. Network Rail reports that it will have allocated a majority of FTN expenditure by 31 December 2012, and Network Rail has reported that it plans to spend the remainder of funds on FTN assets in the North, in early 2013.

Network Rail has provided us with FTN authority papers, which demonstrate compliance with programme controls To demonstrate the robustness and sustainability of the FTN/GSM-R infrastructure, Network Rail also provided the following documents:

- Functional Requirements Specification; and
- Business Requirements Specification.

These documents contain a range of requirements and specifications relating to the functional and performance requirements, system interfaces, scope, and technical characteristics, as well as the requirements for compliance with the general telecoms policy.

11.3.2 Deliverability of CP4 programme

Our analysis of robustness and sustainability seeks to identify any risks relating to the deliverability of Network Rail's planned programme of renewals to sustain and deliver required outputs during CP4 and beyond. Table 36 below shows the projected cumulative expenditure in this area during CP4

CP4 cumulative Telecoms and FTN renewal expenditure, £m (2011/12 prices)	**2009/10**	**2010/11**	**2011/12**	**2012/13**	**2013/14**
CP4 Delivery Plan	359	711	883	978	1,059
Delivery Plan update 2011	226	474	736	939	1,081
Actual Outturn	**226**	**487**	**694**		

Table 36: Telecoms and FTN renewals – Projected and actual CP4 expenditure (cumulative)

The expenditure data in Table 36 indicate that Network rail is behind schedule in delivering its planned programme. The company has spent £694m at the end of the third year of the Control Period, having projected expenditure by this time of £883m in its initial CP4 Delivery Plan and £736m in its 2011 Delivery plan update. To deliver the planned investment programme within CP4, Network Rail would have to spend around £194m in each of the final two years of the Control Period.

Although progress to date has not been in line with the company's plans, we do not consider that this presents an insurmountable challenge in terms of the company's capacity to manage delivery, noting that Network Rail has spent more than that figure in each of the first three years of the present Control Period.

Network Rail informed us that they presently expect £21m of the FTN installation programme to be deferred from CP4 to CP5. Network Rail has stated that the slippage within CP4 (and deferral into the next Control Period) relates to fitting cabs for the GSM-R switch, and the company currently is exploring the potential to bring the planned installation and construction work back within current Control Period. Network Rail attributes potential deferral to delays in closing commercial agreements with Train Operating Companies (TOCs).

To date, Network Rail has not recognised this deferral as an inefficiency within its reporting, but has "re-baselined" the numbers to account for decreased activity within CP4.

11.3.3 Asset performance monitoring

Network Rail's Key Performance Indicator (KPI) in relation to the condition and performance of its telecoms assets is the Telecoms Stewardship Indicator (TSI). The TSI draws on measurements of asset condition through the Asset Condition Index (ACI), as well as reliability measured as the number of failures causing delays of greater than ten minutes.

At the time of our Interim Review, Network Rail reported that, during the first six Periods of the year, it had fallen short of its target in relation to the TSI and expected to remain below target for the rest of the reporting year. At that point, Network Rail stated that the number of incidents of telecoms equipment failing had been the cause of the company's failure to meet the target.

In Network Rail and the ORR's joint definition of "success in Control Period 4", the company and the regulator agreed a target ACI of 0.89 and target number of telecoms failures of 721 for 2011/12. These targets are not binding regulatory outputs. Nevertheless, Network Rail appears to have surpassed these targets in aggregate and across most routes.

Network Rail reports a total ACI score at 2011/12 year-end of 0.95, averaged across 10 routes. This includes an ACI score for Wessex of 0.67 and 0.93 for London and North West routes; all other route-level ACI scores exceed average for 2011/12, with four routes achieving an ACI of 1.0.

For telecoms failures, Network Rail reports 633 failures causing delays greater than 10 minutes. This represents a 12% improvement relative to the non-binding CP4 target.

Network Rail also has shown us a chart to indicate that the number of telecoms failures causing delays in excess of ten minutes was 632 during 2011/12, considerably lower (i.e. better) than the original CP4 Delivery plan target (943) or the 2011 updated Delivery Plan target (721). These data are shown in the chart at Figure 37. They indicate significant progress against this measure since the end of Control Period 3.

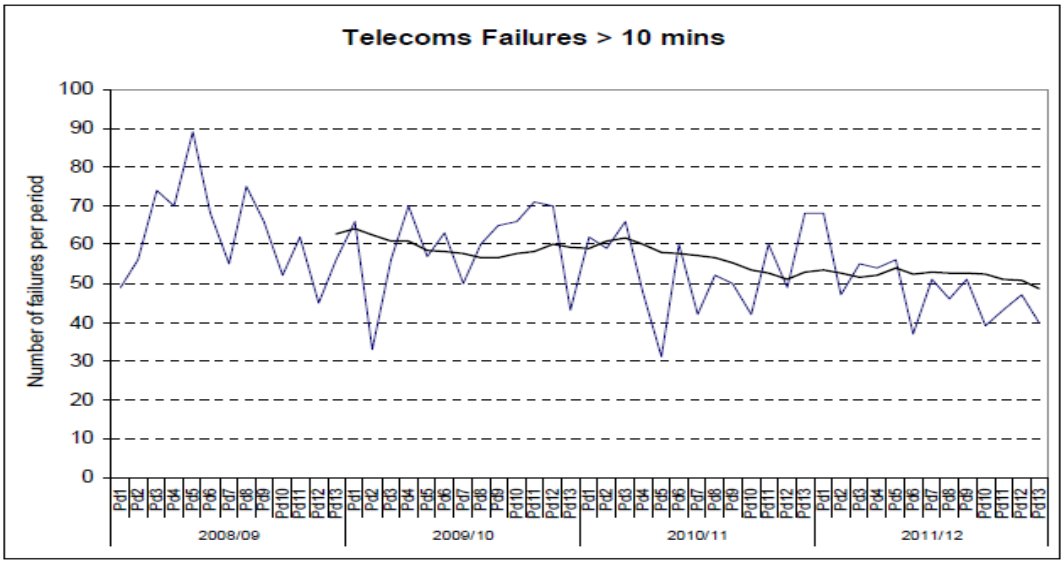


Figure 37: Telecoms failures > 10 minutes (source: Network Rail)

11.3.3.1 Robustness and sustainability: Reporter opinion

Based on the evidence provided by Network Rail, we have been able to conclude that telecoms efficiencies are robust and sustainable.

With respect to FTN assets, the asset management policy relating to telecoms assets is also applied by Network Rail to FTN assets (even though FTN is treated as a distinct expenditure category within the REEM efficiency calculation). Although the telecoms asset policy makes limited reference specifically to FTN asset management, we consider that the evidence provided of functional and business specifications which form the basis for planning and delivery of the FTN infrastructure give a reasonable indication of the robustness and sustainability of the proposed infrastructure expenditure.

Currently, there is some £21 million of investment presently at risk of deferral. It will be important for Network Rail and ORR to review, in detail, the nature of telecoms works completed and planned leading up to the end of CP4.

12 Electrification & Fixed Plant renewals efficiency

This section of our report relates to the Electrification and Fixed Plant (E&P) efficiencies that Network Rail has reported. We consider the calculated efficiency in the context of Network Rail's planned and actual expenditure during CP4, and we review and assess evidence of Positive Management Actions (PMAs), delivery robustness and delivery sustainability in relation to the data reported.

12.1 E&P renewals: Expenditure overview

Network Rail has reported total E&P expenditure of £103m for 2011/12, representing some four per cent of total renewals expenditure in year.

Electrification renewal expenditure, £m (2011/12 prices)	**2009/10**	**2010/11**	**2011/12**	**2012/13**	**2013/14**	**CP4 Total**
CP4 ORR Determination (pre-efficient)	-	-	-	-	-	798
CP4 Delivery Plan	132	166	148	120	109	676
Delivery Plan update 2011	83	72	108	165	168	596
Delivery Plan update 2012[88]	83	81	102	181	223	668
Actual Outturn[89]	**83**	**82**	**103**	**-**	**-**	**-**

Table 38: E&P renewals expenditure

In its 2011 Delivery Plan, Network Rail stated that E&P expenditure would total some £596 million during CP4, resulting in a 25% efficiency relative to the PR08 determination. As shown in the table above, the 2011 update reduced planned expenditure to a level below that of the CP4 Delivery Plan.

In 2011/12, E&P renewals expenditure was roughly in line with the 2011 Delivery Plan update, with expenditure some five per cent lower than planned for the year. Expenditure was some 30% less than the amount allocated in the original CP4 Delivery Plan.

Management reports that it has changed from an aged-based to a condition-based renewals policy. Network Rail has reported that this change lengthens E&P asset life and reduces its estimate of the volume of renewals works required within the current Control Period.

During the first three years of this Control Period, E&P expenditure has totalled some £268m. The updated delivery plan allocated E&P expenditure of some £263m during the period, meaning that capital expenditure has outpaced plans for this asset area. Network Rail plans to increase expenditure significantly in final two years of CP4, with plans for annual E&P expenditure to increase by 55%, compared with 2011/12 levels.

[88] Network Rail presents its Delivery Plan update 2012 expenditure figures in 2012/13 prices. In absence of information regarding Network Rail's inflation assumptions for 2012/13, we have assumed an inflation rate of 5.16% in converting expenditure figures into 2011/12 prices.
[89] Source 2009/10: Delivery Plan update 2009/10
Source 2010/11: Regulatory Financial Statements for year ended 31 March 2011
Source 2011/12: REEM Model.xls provide by Network Rail on 16 April 2012

We consider the expenditure profile in relation to asset policy, deferral and robustness later in this chapter, noting some risk around the significant increase in expenditure planned for the remaining two years of the Control Period.

12.2 E&P renewals: Efficiency calculations

12.2.1 Results presented

Network Rail has declared E&P efficiency of some 14%, relative to its baseline, based on expenditure of some £103m. Network Rail reports E&P expenditure as a single category ("Electrification"). The company has declared some £17m of efficiency savings in the 2011/12 financial year.

Electrification renewals 2011/12	REEM Baseline (£k)	Actual (£k)	Efficiency amount (£k)	Efficiency %
Electrification	119,636	102,719	16,916	14.1%

Table 39: E&P renewals efficiency

Network Rail reports all E&P expenditure within the single non-volume category.

12.3 Efficiency evidence: Positive Management Actions (PMAs)

12.3.1 E&P renewals: PMAs reported

As stated above, Network Rail reports E&P efficiencies of £17m, representing savings of some 14% relative to the REEM baseline. Although the REEM efficiency calculations for E&P renewals is not broken down on the basis of volume and unit costs, Network Rail attributes the E&P cost savings in their entirety to scope efficiency, whereby an improved understanding of the asset conditions has led to a lower number of electrification asset renewals during CP4.[90]

As the company has reduced renewals volumes planned during CP4, it calculates efficiency based upon cost savings from works originally planned during the period - Network Rail provided a quantified breakdown of efficiencies for the following six E&P renewals programme categories:

- DC Switchgear Renewal
- SEA - Conductor Rail Renewal
- Booster Transformer Renewal
- DC HV Cables - HV Route Part Renewal - (LV Cables)
- OLE Structure Painting
- OLE Rewire - OLE Contract Wire Renewal

[90] Although Network Rail has described its E&P work in terms of a volume of work, it has not reported efficiency on a volume (or unit) basis for this renewals expenditure area.

We note that although the spreadsheets includes nominal volume and unit cost breakdown, the baseline unit cost value is equated to actual unit cost within in the current expenditure figure. This means with the entire quantum of efficiency is reflected in terms of the differences in the nominal baseline vs. current volume projection (with DP10 volumes as the baseline and DP11 as actual). Since no baseline vs. actual differential is provided, this means the savings can be viewed only in absolute terms, rather than the "volume" basis to which they are attributed, since the impact of volume and unit cost efficiency differentiation is effectively factored out of the efficiency equation.

However, since the spreadsheet shows the E&P project cost savings on an individual programme area basis, savings can be related back to different activity types, each of which contains an explanation of the savings achieved.

Network Rail has identified the following PMAs associated with overall scope efficiency:

- Policy change: Management has reduced the renewals volumes of E&P assets in accordance with a new asset policy. As reported at the time of our Interim Review, Network Rail moved from an age-based renewals policy to a conditions-based renewals policy during the current reporting year. The change in policy has led the company to reduce capital expenditure on E&P renewals during CP4. Management states that the reduction has not affected asset sustainability (addressed later in this section).
- Remodelling and rationalisation: Management has worked to rationalise E&P works, either by repacking works of the work bank or by avoiding renewal of equipment.

Network Rail also reported increasing use of internal service providers for E&P maintenance, in place of contractors, reducing costs.

12.3.1.1 E&P volume reporting uncertainty

We note that issues relating to the reporting of E&P volumes were identified by Arup in our review of volumes reporting (mandate AO/025). That report has assessed the company's telecoms reporting as meriting an accuracy grading of "4" (up to +/- 25% inaccurate).

As indicated above, the reporting of E&P volumes itself does not factor in to the REEM E&P efficiency calculation. Although volume reporting uncertainty may be indicative of wider shortcomings in E&P renewals reporting processes, detailed of cost savings at individual programme level, with savings listed for the six major programme renewal areas provided to substantiate the efficiencies reported. On this basis, we do not consider uncertainty relating specifically to volume reporting is likely to materially impact the reported E&P efficiency level in REEM.

12.3.2 PMAs: Reporter opinion

We consider Network Rail's explanation of the PMAs and associated cost savings to be reasonable. The information provided had sufficient granularity to allow us to trace back the efficiencies achieved per project to the implemented PMAs.

Network Rail reported that the company agreed a new policy with the ORR underpinning the development of the 2010 Delivery Plan update, changing from an aged-based policy to a conditions-based policy. Network rail has reduced volumes on the basis of this new condition-based asset policy. The ORR has questioned this stating that its most recent statement on asset policies, (the 1st June 2010 letter from Michael Lee), does not comment on a revised electrification policy.

We consider, in principle, that it is acceptable for Network Rail to claim cost efficiency based on the revision of the asset policy, provided that the robustness and sustainability of the asset are appropriately considered when reducing capital expenditure, and that the policy change has been agreed with the ORR.

12.4 E&P renewals expenditure: Robustness and sustainability

12.4.1 Change to a condition-based asset policy

Network Rail considers that the principal focus of its evidence to demonstrate robustness and sustainability relates to compliance with asset policy and delivery of outputs. Similar to the policies for other asset groups, Network Rail's policies for these assets focuses on safety and asset dependability.

Network Rail reports that it based its original CP4 renewals plan upon a policy of aged-based renewals, along with infrastructure cost modelling. Network Rail managers stated that the company agreed a new policy with the ORR underpinning the development of the 2010 Delivery Plan update, changing from an aged-based policy to a conditions-based policy. Network Rail reports that the new policy allows for an efficient, sustainable reduction in volumes during the current control period, and for the deferral of some volumes into CP5.

However, the ORR has stated that its most recent statement on asset policies, (the 1st June 2010 letter from Michael Lee), does not comment on a revised electrification policy. We recommend that the ORR and Network Rail clarify this issue.

Network Rail states, in a paper entitled E&P Sustainability, that the condition-based policy relies upon "continual condition assessments," which have demonstrated that "a number of assets are in a good enough condition not to require renewal". The company has reported that it remains focused on maintaining the condition of assets by conducting mid-life refurbishments.

Network Rail has focused on maintaining asset sustainability, reliability and safety as management moves to conditions-based modelling of renewals investments.

12.4.2 Deliverability of CP4 programme

Given an overall reduction in planned volumes, Network Rail reports no slippage of E&P renewals within the Control Period. Network Rail Asset Management has not confirmed the scale of renewals variance from the 2011 delivery plan. Network Rail has reported that some volume will slip into CP5, but reports that "future change papers have consistently shown volumes in CP5," and the

company believes this deferral to be sustainable, i.e. that it is in line with the claimed scope efficiency achieved from the transition to a condition-based asset policy.

In section 12.1, we show that Network Rail's total 2011/12 E&P expenditure is in line with the delivery plan update. However, visibility of the renewals volumes actually delivered is limited, because the company reports all E&P expenditure on a non-volume basis.

The potential for slippage within CP4, and for unsustainable deferral into CP5,[91] is apparent. E&P renewals expenditure has exceeded planned totals during the first three years of the Control Period. Network Rail plans to increase significantly E&P expenditure, by around 50% relative to 2011/12, for both 2012/13 and 2013/14. The company has reported that it considers this to be deliverable.

Network Rail has provided additional information about its ability to deliver the work bank, in the document, "Electrification CP4 Deliverability". This presentation does not detail the work bank, nor does it appear to provide full details of the delivery schedule. Instead, the document provides questions and answers from the results of an internal investment process audit of the Wessex, Sussex and Kent routes. We believe that Network Rail intends this particular audit to convey a sense of the E&P renewals management across the network.

The paper provided relates Network Rail management's confidence in its ability to deliver the CP4 work bank. Network Rail reports that "the ramp up in spend and volume in the last two years of the control period will be underpinned by [the] launch of framework agreements in autumn 2011" (pp. 9). Network Rail reports that possession management is carried out by two dedicated possession planners within the E&P team; the company reports that is "only using contractors with a proven track record of delivery over the last two years" (pp. 3).

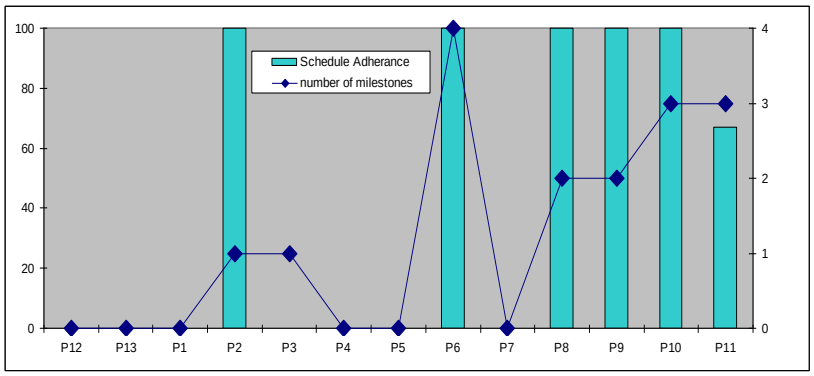
Network Rail reports that the process is in place for reporting and controlling the delivery of volumes to ensure compliance with output requirements. Network Rail has reported that it revised the planned work volumes following the change to a conditions-based renewals policy, and that delivery is in line with targets agreed with the ORR.

The documents provided to us convey a potential risk around delivery, whether by Network Rail or by its contractors. Network Rail provided Figure 7, overleaf, which summarises the company's 2011/12 performance adhering to delivery schedules along the Wessex, Sussex and Kent routes. The chart shows full adherence in periods two, six, eight, nine and ten. The chart shows incomplete adherence in the remaining two months during which a deadline occurred, periods three and 11. Based on this extremely limited sample, the number of projects reaching milestones appears not affect schedule adherence, and other factors, such as access, location or difficulty, could affect the company's ability to deliver the work.

[91] I.e. deferral/non-completion of work unrelated to the change in asset policy

Electrification

	P12	P13	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11
Schedule Adherance				100	0			100		100	100	100	67
number of milestones	0	0	0	1	1	0	0	4	0	2	2	3	3



Note: Schedule Adherence was 33% in 09/10, 555 in 10/11 and FYF for 11/12 is 70%. This will improve further as new starters continue to apply the new P90 baseline policy

Figure 7: 2011/12 schedule adherence along the Wessex, Sussex and Kent routes. (Source: Network Rail)

More generally, Network Rail has identified several risks that could affect deliverability in the final two years of the current Control Period. These include:

- Possession bookings being denied or cancelled after booking;
- 'Hot sites' issue affecting a number of the feeder projects;
- Rejection of planned outages due to adjacent infrastructure failures; and
- Earth cable thefts preventing safe entry to site.

Network Rail reports that reduced team sizes could increase the risk of delivery shortfalls, but that the use of agency staff helps to mitigate the potential for staffing problems.

Evidence provided for the Wessex, Sussex and Kent routes shows that the company adhered to slightly less than 60% of deadlines planned in 2011/12. As Network Rail increases the volume of work planned, there is some risk work will not be completed within the time allocated. Nonetheless, there is evidence that Network Rail has planned for increased delivery and for deferral, appropriately allocating financial and staffing resources to deliver the volumes. The control process, and in particular the use of dedicated possession managers, appears likely to aid the delivery process.

ORR and Network are likely to consider E&P volumes in greater detail at future reviews. In particular, plans specifying the volume of E&P renewals required along various routes and Network Rail's previous ability to achieve planned volumes will provide assurance that no work will slip into the final year of the Control Period, and that no unplanned deferral to CP5 is likely to occur.

12.4.3 Performance monitoring

Network Rail reports the use of several KPIs to assess asset performance, which inform the planning of its workbanks in accordance with asset policy. The company has reported use of the E&P Stewardship Indicator (E&PSI) to monitor asset condition and network reliability. Network Rail defines the E&PSI as combination of two indicators: "electric power condition" and "the number of traction supply failures causing delay in excess of 10 minutes".

Network Rail sets increasingly challenging targets for these two indicators, along with the E&PSI. Network Rail reports that it has exceeded (i.e. performed better than) the target measure for all periods in 2011/12, excluding P01, when traction power supply failures caused the E&PSI to fall below target (i.e. poor performance relative to target). Management reports increasing the E&PSI score necessary to surpass target on a monthly basis within the year. Network Rail has not reported how it developed the target, or whether target scores have been agreed with the ORR.

Network Rail has also provided explanations of the AC Traction Feeder Station, (AC) Track Sectioning Point Condition and DC Substation Condition KPIs. These documents outline the principle, scope, method and data necessary for each measure. Network Rail uses these KPIs to monitor the sustainability of its E&P asset decisions.

Management reports that the maturity of information within its scoring system has progressed in the two decades of gathering data. Given the volume of historical data it has gathered, Network Rail is confident in its ability to estimate asset life and move to a 15-year renewals policy.

12.4.3.1 Investment control and review process

As with other asset areas, Network Rail believes that a hierarchy of reviews helps ensure the robustness and sustainability of the E&P renewals programme. In a manner similar to other assets, reviews are conducted based on a change control process. Network Rail maintains a project-level database for E&P assets and control papers for each project are reviewed locally on a four-weekly basis by the E&P asset heads.

Arup requested examples of the change review process, and Network Rail has provided project panel and change panel meeting minutes for the three most recent periods. In addition, Network Rail has provided detailed investment panel notes for 13 territories. The meeting notes indicate that project-level expenditure reviews took place.

Regular project reviews are structured to examine cost, schedule, progress, alignment with business plan and alignment with policy. Project-level reviews by the asset heads feed into executive-level reviews, and finance and engineering reviews are conducted independently to assess risk. Whilst Network Rail has a high visibility of unit costs for other assets, volume-related measures remain unavailable for E&P assets. E&P management have stated that Network Rail may be able to develop a similar measure for E&P assets.

Network Rail engages with stakeholders to ensure that reduced asset renewals volumes do not affect network availability or reliability. Network Rail completes

pre and post-rationalisation review papers, communicating with stakeholders, including franchisees. These papers present stakeholders with an overview of the renewals investment and the opportunity to influence rationalisation work.

Because stakeholder interests emphasize high-levels of investment, renewals and upkeep, it is believed these interests counterbalance threats to sustainability posed by asset rationalisation. In spite of the lower level of unit cost visibility than in other asset areas, Network Rail has stated that its review process and stakeholder input process ensure sustainability.

12.4.4 Robustness and Sustainability: Reporter opinion

Based on the evidence provided, we consider that the control process described – including the utilisation of KPIs – combined with the clear visibility of costs and delivery timescales provided by the project-by-project breakdown of expenditure, represents reasonable evidence of the sustainability and robustness of Network Rail's renewals activities in this area, upon which its REEM efficiency calculation is based.

The project-level breakdown of efficiencies is indicative of a controlled process around changes to the scope and timing of activities that affect the delivery of outputs. This also improves transparency, making the reported efficiencies traceable at individual project level.

Network Rail reports delivery of outputs is in line with targets agreed with the ORR, based on the revised asset policy involving the move to condition-based renewal. We have found no evidence, to date, of any slippage activity within the present Control Period following revision of work banks based on the new asset policy – although we note that the lack of reported baseline volume measures limits visibility of year-on-year volumes.

We note that Network Rail plans to increase significantly E&P capital expenditure in the final two years of the Control Period. Risk around the delivery of volumes planned for the final two years of the control period remains. For example evidence provided for the Wessex, Sussex and Kent routes shows that the company adhered to slightly less than 60% of deadlines planned in 2011/12. As Network Rail increases the volume of work planned, there is some risk work will not be completed within the time allocated. Nevertheless, there is evidence that Network Rail has planned for increased delivery and for deferral within CP4, allocating financial and staffing resources to deliver the volumes.

ORR and Network are likely to consider E&P volumes in greater detail at future reviews. In particular, plans specifying the volume of E&P renewals required along various routes and Network Rail's previous ability to achieve planned volumes will provide assurance that no work will slip into the final year of the Control Period, and that no unplanned deferral to CP5 is likely to occur.

On the basis of our analysis for 2011/12 and assuming ORR is content with the change to Network Rail's E&P asset policy, we consider efficiencies for this asset type can be considered to have met robustness and sustainability requirements.

13 Plant & Machinery renewals efficiency

This section sets out the findings of our review of Network Rail's reported efficiencies for the Plant and Machinery (P&M) renewals category. We consider evidence of management action associated with reported efficiency and evidence of asset sustainability.

We note that we have not met with the team responsible for NDS-related expenditure and efficiency feeding into the P&M REEM calculation.

13.1 Plant & machinery renewals: Expenditure overview

Plant & Machinery renewal expenditure, £m (2011/12 prices)	2009/10	2010/11	2011/12	2012/13	2013/14	CP4 Total
CP4 ORR Determination (pre-efficient)	-	-	-	-	-	496
CP4 Delivery Plan	155	96	61	62	59	433
Delivery Plan update 2011	65	61	98	91	70	385
Delivery Plan update 2012[92]	67	96	116	98	65	441
Actual Outturn[93]	**65**	**104**	**117**	**-**	**-**	**-**

Table 40: Plant & machinery renewals expenditure

Network Rail's PR08 determination declared a pre-efficient expenditure level of just under £500m for CP4. The CP4 delivery plan allocated some £433m of PM renewals expenditure, and the 2011 update reduced this amount to £385m.

Network Rail's actual expenditure has exceeded delivery plan allocations for the previous two years. In 2011/12, actual outturn was £117m, almost double the level originally anticipated in the 2009 Delivery Plan, and 20% higher than the 2011/12 budget (represented in the Delivery Plan update 2011).

Network Rail has reported significant expenditure inefficiency, reflecting expenditure levels far higher than the originally planned levels in the 2009 CP4 Delivery Plan.

13.2 Plant & machinery renewals: Efficiency calculations

As shown in Table 41, Network Rail is reporting PM inefficiency of £54m, or -85%, relative to the REEM baseline. This inefficiency has the effect of reducing the overall REEM efficiency value for all renewals activities by around 10%, and represents an even greater inefficiency value than the 37% inefficiency reported during our Interim Review.

[92] Network Rail presents its Delivery Plan update 2012 expenditure figures in 2012/13 prices. In absence of information regarding Network Rail's inflation assumptions for 2012/13, we have assumed an inflation rate of 5.16% in converting expenditure figures into 2011/12 prices.
[93] Source 2009/10: Delivery Plan update 2009/10
Source 2010/11: Regulatory Financial Statements for year ended 31 March 2011
Source 2011/12: REEM Model.xls provide by Network Rail on 16 April 2012

Plant & machinery renewals 2011/12	Baseline (£k)	Actual (£k)	Efficiency amount (£k)	Efficiency %
Plant & Machinery	62,862	116,565	-53,703	-85.4%

Table 41: Total plant & machinery renewals efficiency

Network Rail divides PM expenditure according to asset area. PM expenditure is allocated between signalling, power and communications renewals; civils renewals; and mobile plant (NDS). As Table 42, below, shows, Network Rail is reporting significant efficiency, between 20% and 40% related to SP&C and civils PM expenditure. Network Rail is reporting significant inefficiency of some 305% related to NDS PM expenditure.

Plant & machinery renewals 2011/12	Baseline (£k)	Actual (£k)	Efficiency amount (£k)	Efficiency %
SP&C PM	33,554	26,500	7,054	21.0%
Civils PM	8,302	5,000	3,302	39.8%
NDS PM	21,006	85,065	-64,059	-305.0%
Plant & Machinery total	62,862	116,565	-53,703	-85.4%

Table 42: Plant and machinery renewals efficiency by expenditure area

In its 'consolidated template' of renewals expenditure, Network Rail declares all P&M costs as non-volume related expenditure. Network Rail as provided a breakdown of elements of additional expenditure by NDS (based around specific types of plant and machinery).

13.3 Efficiency evidence: Positive Management Actions (PMAs)

Network Rail has reported that the significant NDS inefficiency, related to the one-off purchase of fleet vehicles, will yield long-term cost savings. A breakdown of elements of additional expenditure by NDS (based around specific types of plant and machinery) has been provided.

Network Rail also provided a breakdown of P&M expenditure relating to P&M renewals associated with signalling, power and communications and civils.

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13.3.1 PMAs: Reporter opinion

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We consider the evidence provided by Network Rail of PMAs underpinning its P&M expenditure and efficiency calculation is reasonable.

13.4 Plant & Machinery renewals expenditure: Robustness and sustainability

For the year-end review of P&M efficiency, Network Rail has provided evidence of robustness and sustainability principally in relation to NDS expenditure and associated inefficiency that results from above-baseline expenditure levels.

Network Rail has reported that the significant NDS inefficiency, related to the one-off purchase of fleet vehicles, will yield long-term cost savings. These savings appear sustainable, as the company finds that current purchases will reduce long-term lease-related costs. Network Rail has not provided us with the financial analysis that guided this decision. However, the company is reporting the cost as inefficiency in 2011/12, rather than claiming it as an efficiency based on future cost reductions, which appears to demonstrate a reasonably prudent accounting approach.

Network Rail reported at P06 that all delivery, with the exception of High Output, was completed in accordance with CP4 delivery plans. Network Rail declared that it has not completed some S&C grinding, but that the Company is "reviewing and prioritising" work sites to compensate for the small backlog in 2012. Network Rail also indicated it expected the delivery of the "UK6" rail grinding machinery by the end of 2011/12, and it planned to use this new machine to recover the minimal backlog of S&C grinding that has developed. Based on the efficiency declared, it appears that Network Rail has completed this work, although the company has not commented specifically on the sustainability of all its PM investment decisions.

We note that at P06 Network Rail reported slippage amounting to £13.2m during CP4 up to that time, relating to High Output overhauls, seasonal treatment of vehicles and delays in the replacement of the rail grinder. Network has not indicated that this slippage has materialized at year end.

We have concluded that Network Rail's efficiencies for this area are appropriate.

14 Information Technology (IT) renewals efficiency

This section sets out the findings of our review of Network Rail's reported efficiencies for the Information Technology (IT) category. Network Rail has reported that it refers to this expenditure area as Information Management (IM). We consider evidence of management action associated with reported efficiency and evidence of asset sustainability.

We note that Network Rail reports IT renewals and corporate office renewals together under this expenditure category.

14.1 IT renewals: Expenditure overview

IT renewal expenditure, £m (2011/12 prices)	2009/10	2010/11	2011/12	2012/13	2013/14	CP4 Total
CP4 Determination (pre-efficient)	-	-	-	-	-	515
CP4 Delivery Plan	132	75	79	76	70	432
Delivery Plan update 2011	94	88	82	74	75	414
Delivery Plan update 2012	94	89	87	91	93	455
Actual Outturn	**94**	**89**	**104**	**-**	**-**	**-**

The PR08 determination allocated £515m for IT renewals.

We note that Network Rail has reported total IT expenditure of some £100m each year of the Control Period thus far. The expenditure trend observed appears to demonstrate that IT expenditure will total some £500m at the end of CP4, unless the company decreases spending during the final two years of the Control Period. In 2011/12, total IT renewals expenditure was some £104 million.

14.2 IT renewals: Efficiency calculations

Network Rail reports a total net efficiency for IT renewals of 2.5% at 2011/12 year-end, based on £104m of total expenditure. IT expenditure accounts for 4.5% of total renewals expenditure in 2011/12.

IT renewals 2011/12	Baseline (£k)	Actual (£k)	Efficiency amount (£k)	Efficiency %
IT	106,874	104,187	2,687	2.5%

Table 43: IT renewals efficiency

Previously, Network Rail reported IT and Corporate Offices as a single renewals category. At P06, Network Rail reported IT renewals expenditure efficiency of 6.5%, based on actual expenditure of some £37m. Corporate office expenditure, which totalled some £10m at P06, offset IT-related savings, as Network Rail declared an inefficiency of some -£39m (-34%) for this category.

Network Rail is reporting 100% of these costs as non-volume related expenditure.

14.3 Efficiency evidence: Positive Management Actions (PMAs)

Network Rail has reported the following three PMAs associated with IT efficiency:

- Hardware efficiencies: Network Rail has reported savings from its Central Infrastructure Delivery (CID) programme. The company reports: "The CID Programme was established to stop the purchasing of point infrastructure solutions for individual projects. As part of IM's Quarterly Rolling Forecast, the requirement for infrastructure solutions are captured, which facilitates planning. A scalable infrastructure is then developed which can be expanded as and when required, moving the organisation towards a "just-in-time-service".
- Software efficiencies: Network Rail "has established strategic licence contracts that cover Network Rail in its entirety. Improved contract negotiation has enabled Network Rail to achieve efficiencies, including consolidation of licences for Oracle software and reducing VM ware supplier costs.
- System integrator efficiencies: Network Rail reports that "efficiencies gained under this category are broadly through contract negotiations or through the smarter sourcing for packages of work (e.g. by programmes not projects)."

Network Rail has detailed saving achieved through several other programmes, including changes to its Blackberry wireless supplier and outsourcing of its GIS technologies.

14.3.1 PMAs: Reporter opinion

We find that the evidence Network Rail has provided to us related to positive management actions appear credible and transparent.

14.4 IT renewals expenditure: Robustness and sustainability

At P06, our desk-based review found that although Network Rail had reduced IT capital expenditure over CP4 up to that point, we did not consider the reductions would be likely to have a negative effect on asset sustainability. The management actions cited included extending the capacity of IM assets or bulk-purchase negotiations.

The PMA descriptions provided to us convey a sense that the cost reductions continue to be sensible. These IT cost reductions appear unrelated to the long-term sustainability of the rail network.

15 Analysis of Network Rail licence breach in the context of efficiency reporting

Our mandate requested that we review Network Rail's assessment of whether the reduction in expenditure claimed as efficiency might have contributed to any breach of licence during 2011/12. We have interpreted this to mean an assessment of reduced expenditure during 2011/12 both with regard to the company's actual licence breach relating to freight performance, [94] and its likely licence breach during 2013/14 in relation to the PPM measure relating to the long-distance passenger sector. [95] To remediate below-target performance, the ORR proposed two enforcement orders requiring the company to "develop new robust plans to help recover performance".

At that time, the ORR identified that freight delays and long distance passenger services had not reached targets. Freight delays were 32%, behind end-of-previous-year targets; long-distance punctuality was 87.1%, compared to a regulatory target of 90.9%.

15.1 Licence breach analysis: Reports received

Network Rail initially provided two documents analysing its delay performance. The first, "The Infrastructure Condition Report", is a nine-page sample from a larger document. It contains quantitative data the company has collected to analyse several KPIs associated with train delays. These KPIs include:

- *Track failures* causing more than 10 minutes train delay.
- *Signalling failures* causing more than 10 minutes train delay.
- *Signalling power supply failures* causing more than 10 minutes train delay.
- *Electrification failures* causing more than 10 minutes train delay.
- *Telecoms failures* causing more than 10 minutes train delay.
- *Signalling power supply incidents* causing "significant" delay.
- Traction power supply incidents causing "significant" delay.

The report also includes one other summary metric. The data focuses on P13 of the 2011/12 financial year.

Network Rail also provided a four-page snapshot of its performance dashboard. The performance dashboard, which is used by asset managers, tracks KPI performance. The sample provided includes such KPIs as "Delay per Incident (non-track assets)" and "Incidents (non-track assets)" and shows several overall performance metrics, including:

[94] As notified in the ORR press notice: "Network Rail in breach of licence for declining performance": ORR website, 19th December 2011
[95] As notified in the letter from ORR (Richard Price) to Network Rail (David Higgins), "ORR Board decision on Network Rail's performance in the long distance sector in 2012-13 and 2013-14.", 29th May 2012

- Public Performance Measure (PPM).
- Cancellations and Significant Lateness (CaSL).
- Right time.
- Delay minutes.

The dashboard compares current performance with data from previous years, as does "The Infrastructure Condition Report".

Each of the two documents received presents a sample of total incidents and associated delay. The two documents present different KPIs measuring similar faults and issues, such as track failures. For example, the dashboard reports delay related to KPI 104B, "Track Faults Including Broken Rails", whilst the "...Report" contains information related to KPI s6.5, "Track Failures casing more than 10 minutes delay", related to PfPI codes 104A-C.

Following our initial report, Network Rail has subsequently provided additional correspondence and analysis relating to maintenance activities and efficiencies and how these link to performance shortfalls that have culminated in the licence breach.

These have been analysed in within our wider analysis of maintenance efficiency evidence contained within Chapter 4.

15.2 Licence breach: Reporter opinion

Network Rail has missed some of its targets in relation to train performance, as set out in the PR08 determination. There has been a licence breach notified by the ORR in December 2011 in relation to freight performance, and a likely breach during 2013/14 in relation to long-distance passenger services notified by the ORR in May 2012. Analysis provided by Network Rail to ORR that we have reviewed indicates a number of contributory factors. These include a decline in track quality and reduced productivity benefits in maintenance activities.

Network Rail and ORR have concluded that a proportion of these problems are in turn linked maintenance volume/quality (which is in turn affected by productivity and access). In addition, ORR has indicated that it considers that maintenance restructuring and operating cost reductions may have led to cuts being made too soon, and that Network Rail accepted this;[96] however, we note that in response, Network Rail has written to the ORR stating that it does not accept this interpretation.[97]

We have reviewed in detail the material provided. Specifically we consider reductions in On-Track Machinery (OTM) activity (including tamping and stoneblowing) and vegetation control are relevant. Of the total £27.3m efficiencies calculated for these activities, we estimate that £21.8m cannot therefore be considered to have met the robustness criteria for efficiencies. this represents the proportion of efficiency relating to the Long Distance, London &

[96] Letter from ORR (Richard Price) to Network Rail (David Higgins), 29th May 2012 "ORR Board decision on Network Rail's performance in the long-distance sector in 2012-13 and 2013-14"
[97] Letter from Network Rail (David Higgins) to ORR (Richard Price), 22 July 2012: "ORR Board decision on Network Rail's performance in the long-distance sector in 2012-13 and 2013-14"

SE and Scotland passenger sectors, plus freight, each of which has experienced shortfalls in required performance levels.[98][99]

Further details of this analysis and the conclusions drawn are provided in Chapter 4.

[98] In the absence of information to allow us to apportion efficiencies by a distribution of assets according to train service category, the proportion has been estimated on the basis of 2011/12 train km.

[99] For details of the calculations underpinning our estimation of uncertainty see Appendix G.

16 Assessment of the retrospective applicability of PMA evidence to 2010/11 efficiencies to support EBSM assessment

16.1 EBSM: Overview

16.1.1 Background: 2010/11 EBSM assessment

As part of this mandate, the ORR requested that the Reporter assess the nature of the evidence supporting Positive Management Actions (PMAs) provided cumulatively for 2011/12, and the extent to which such evidence may plausibly apply to 2010/11 efficiency calculations. The ORR established an efficiency benefit sharing mechanism (EBSM) in the PR08 determination to incentivise train and freight operating companies to support Network Rail's efforts to improve efficiency.100 Under the EBSM, train and freight operators share 25% of Network Rail's cumulative outperformance for a number of expenditure and revenue components (compared to ORR's PR08 determination).

In 2010/11, the ORR reported that, given uncertainties in Network Rail's reporting of renewals efficiencies, it "did not think that it is appropriate to sanction any EBSM payments" until it had "sufficient confidence in the efficiencies that Network Rail reports" (Annual efficiency and finance assessment of Network Rail 2010-11, pp. 10). The ORR has indicated its intention to revisit its decision not to sanction EBSM payments in 2010/11, in light of new efficiency evidence since been provided by Network Rail to support 2011/12 reported efficiencies.

16.1.2 Approach to 2010/11 EBSM assessment in 2011/12 review

We have discussed the applicability of PMAs to 2010/11 efficiency calculations with Network Rail in all asset and expenditure area meetings. Network Rail stated that it is not proposing to provide a detailed analysis of this issue, but agreed to provide an indication as to which of the PMAs reported for 2011/12 it considers were also relevant to the efficiencies reported in 2010/11. We report these findings below.

16.2 EBSM: evidence presented of the applicability of PMAs to 2010/11 efficiencies

16.2.1 Operations efficiencies

As reported in chapter [4], Network Rail has detailed which PMAs it associates with 2010/11 efficiency. Network Rail associates most, but not all, PMAs reported in 2011/12 with cost savings achieved in 2010/11. Of the 22 PMAs the company has reported, Network Rail has said that seven are not associated with

[100] PR08 Determination: p.385

the previous reporting year's calculated efficiency. Network Rail has reported that the following PMAs are not associated with 2010/11 savings:

- Rostering effectiveness (£0.4m million of savings attributed to volume and non-volume efficiency, each, in the current year);
- Rationalisation of operations control (£0.4 million of savings in current year); and
- Re-negotiation of station contracts (£1.1 million of savings in the current year).

Network Rail also reports that all savings associated with "other" volume, unit cost and non-volume savings are not applicable to the previous reporting year's savings.

16.2.2 Track

Network Rail indicated in the review meetings that it considers all PMAs associated with efficiencies claimed in 2011/12 also apply to 2010/11. Network Rail reports that management initiated efficiency-oriented interventions, before the start of the current financial year. Network Rail has noted that it also provided evidence in support of the 2011/12 PMAs was also provided last year. For example, Network Rail provided detailed explanations of amending its contracting strategy.

16.2.3 Civils and Buildings

In our meetings, Network Rail indicated that it is confident it can retrospectively apply both civils and buildings PMAs to 2010/11 efficiency numbers. It has assumed that PMAs relate to the entire control period and has pro-rated associated savings. In 2010/11, ORR highlighted its concerns with respect to level of uncertainty of civils efficiencies being reported by Network Rail. Agreement is still outstanding between Network Rail and ORR as to whether civils work can be considered sustainable (as defined by the regulator). Under the ORR's guidance, positive evidence of sustainability is a pre-requisite of efficiencies being allowable. Until agreement has been reached between Network Rail and ORR on this matter, it is not possible to say whether civils efficiencies can be classed as efficient for 2010/11 or indeed any year where the issue of civils sustainability uncertainty exists.

16.2.4 Telecoms and Fixed Telecom Network (FTN)

Network Rail indicated in the review meetings that it considers that whilst in essence many PMAs apply retrospectively in their nature, they are analysed and collated on an individual project-specific basis. Telecoms projects are typically shorter in duration than, say, signalling projects, therefore it may not be feasible to correlate the measures identified this year back to last year's reported efficiency in quantified terms.

Network Rail indicated that some IM opex efficiencies reported in 2010/11 may be supported by the same PMAs as those reported in 2011/12/ However, Network

Rail's views was that IM renewals efficiencies reported for those two financial years were likely to relate to different sets of initiatives.

16.2.5 Other renewals categories and maintenance

For all other renewals categories (signalling, electrification, IT & Other), together with maintenance, we would need to receive written information from Network Rail regarding the applicability of 2011/12 PMAs to the 2010/11 claimed efficiency prior to completion of the final report. This would be necessary to enable us to form an opinion in this regard.

16.3 EBSM: Reporter opinion

Due to the limited information provided to support this assessment, we are unable to comment conclusively on the application of PMAs to 2010/11 reported efficiency. With the exception of telecoms management, Network Rail has indicated that the PMAs it has reported are likely to apply to some degree to the 2010/11 reported efficiency. However, we would need to receive further written evidence from Network Rail to clarify the position for most expenditure categories.

17 Audit of renewal volumes data in the context of REEM efficiency reporting

17.1 Background

In Arup's 2010/11 Regulatory Accounts review (AO/011), we highlighted a risk that renewal volumes for some categories might be over or understated. We concluded that there was a risk that renewals efficiency savings may be £50m higher or lower than reported by Network Rail.101 We considered this was a material uncertainty. This opinion was based on an analysis of the accuracy of Network Rail's volume reporting process, based on the results of an audit undertaken by Arup under a separate mandate. (AO/017).

Arup has recently completed a further assessment (AO/025: Audit Of Renewal Volumes Data). A draft report has been issued. The report covers:

- Track.
- Signalling.
- Telecoms.
- E&P.
- Civils assets.

17.2 Draft findings of volume reporting audit

We summarise the principal findings from the draft report(14th May 2012) under mandate AO/025 below.

Track was found to have a robust reporting process that produced accurate volumes for plain line renewals. Maintenance delivered jobs were found to report volumes accurately. S&C units were found to have been correctly reported. However the small proportion of plain line renewed with them contained some errors. Arup concluded that the reporting process has a minor shortcoming for these latter jobs (a B grade) but overall volumes were reported accurately (a 1 grade).

Signalling reporting continues to be subject to a well defined change control process. This year's audit reviewed project histories in much more detail than last year. Some mistakes were found in the volumes quoted through the various changes of scope of a project's history. Late changes of scope prior to commissioning appear to be particularly susceptible to error. Six of the 10 signalling renewal projects which make up the 2011/2 volumes report had some documentation weaknesses and three of them reported inaccurate volumes. That said, the total volumes reported in Period 10 were within the 1% error band.

[101] See letter from Arup to Network Rail, dated 22nd July 2011

Telecoms - errors were identified in the reporting of several of the jobs, but more significantly in the amalgamation of volumes by sub-category for reporting in the Finance Pack.

E&P - a number of weaknesses exist, for example in the reporting of volumes delivered by Maintenance and by one of the routes. Reporting errors were found on several jobs.

Civils Structures - no errors were identified in the jobs sampled. The one area of concern was an error identified by an internal audit carried out by one of the routes.

The Confidence Grades for the reported volumes of each asset in the 2011/12 Period 10 Finance Pack have been reproduced below and compared with the grades given last year. No systematic bias was detected in the audit, with instances found of both under- and over-reporting. The only possible exception is Telecoms where the central compilation of volumes tended to over-state the volumes. The ORR has set a benchmark of A1 for each asset which we believe should be achievable.

17.3 Reliability and accuracy of renewal volumes reported to ORR

Asset	Last year's Confidence Grade	This year's Confidence Grade
Track	B2	B1
Signalling	B2	B1
Telecoms	B3	C5
E&P	-	C4
Civils Structures	C2	B1

Table 44: Reliability and accuracy gradings

We set out above in Table 44 above the grades assigned this year for the actual volumes reported as delivered in the 2011/12 Period 10 Finance Pack. The report noted that some of the errors had subsequently been corrected in later periods of the Finance Pack. It was also highlighted that there are additional year-end checking processes. The review conclude that the total year volumes reported for 2011/12 should be more accurate than at Period 10.

17.4 Reporter Opinion

In the context of efficiency reporting, volume-based efficiencies are captured within the REEM efficiency calculation in 2011/12 for Track, Signalling and Civils assets. On the basis of the findings noted above, it would appear that there

is no material risk of volumes of work being over or understated. Subject to the findings of any P13-based review, we consider it is possible to conclude that there is no material risk of 2011/12 in-year efficiencies for these asset groups being over or understated as a result of volume reporting uncertainty.

In the case of telecoms and E&P assets, whilst Network Rail is in the process of developing volume-based assessment of efficiencies, and makes reference to efficiencies relating to volume savings efficiency in the evidence for both asset categories. However, Network Rail does not break down its REEM efficiency calculations into volumes and unit costs for either category. Although volume reporting uncertainty may be indicative of wider shortcomings in renewals reporting processes, Network Rail was able to provide evidence of cost savings at a detailed level for both telecoms (with a breakdown of cost savings by individual project), and for E&P (with programme level savings listed for the six major programme renewal areas). On this basis, we do not consider uncertainty relating specifically to volume reporting is likely to materially impact the reported efficiency levels in REEM for either telecoms or E&P renewals.

18 Regulatory Accounts Statements Data Review

18.1 Introduction

We set out in this chapter our review of the following specific statements within the Regulatory Accounts:

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

Statement 15 - Renewals unit costs and coverage

18.2 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 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. Network Rail indicates that expenditures presented in this statement only include direct maintenance costs. 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. We are not able to relate the 'Centrally managed' and 'Other' maintenance expenditures in this statement to any specific line items presented in Network Rail's REEM calculation. These expenditures appear to have been included as 'indirect' maintenance expenditures in REEM efficiency calculations.
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.
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 45: Review of Statement 8b (parts 1 & 2)

18.3 Statement 9b - Detailed analysis of renewals expenditure

We summarise our review of Statement 9b in line with mandate requirements 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, Signalling, Civils and Electrification are broadly consistent with relevant figures found in REEM efficiency calculations[102] and Statement 15 (where applicable). Actual renewals spending figure for Telecoms in this Statement is consistent with that shown on Statement 15 but higher than in the REEM calculation. This is due to FTN being treated as a separate asset in REEM calculations whilst it is included as part of Telecoms renewals in Statement 15. There are also some discrepancies between the ways in which renewals costs for Plant & Machinery, Operational Property 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[103] than the total figure seen in REEM efficiency calculation. Reconciliation between the two figures provided by Network Rail shows that expenditures excluded from REEM calculations include schemes previously classified as enhancements, expenditures that were not funded in PR08 and works that were deferred from CP3[104]. 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> Actual spending figures for individual RWIs shown in this statement are not consistent with those shown on Statement 15 and used for REEM efficiency calculation. This is due to the difference between the ways in which costs are accounted in Statement 9b and Statement 15. Whilst costs for RWIs shown in Statement 9b includes 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

[102] As seen in REEM Model.xls provided by Network Rail on 16 April 2012.
[103] Renewals expenditure in REEM Model is £2.32 versus £2.45 billion as shown in this statement.
[104] According to Reconciliation of 9b to REEM.xls provided by Network Rail, the £124 million variance between the two renewals expenditure figures include:

- Renewals schemes previously classified as enhancements £2.6 million
- Milton Keynes project – not funded in PR08 £91.5 million
- ORBIS project – not funded in PR08 £5.3 million
- Additional funding from the Treasury's Autumn Statement – not funded in PR08 £2.0 million
- Deferrals from CP3 £20.3 million
- Rounding £2.0 million

Review Area	Arup Assessment
	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.
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[105], which we understand to contain cost figures taken directly from Network Rail's General Ledger. We have not been able to relate some of the cost lines captured under 'Other renewals' in this statement with entries seen in the Investment Expenditure Report. These costs represent 1.5% of the total renewals spending for the financial year. Year-end Investment Expenditure Report only provide expenditure figures at asset level and does not show breakdown of spending at sub-asset or RWI level for some asset categories. With the information provided by Network Rail to date, we are not able to verify the detailed breakdown of renewals expenditures to sub-asset levels as seen in this statement.
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 financial controller of the asset team based on expenditures reported in the General Ledger.
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. 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 may be due to the absence of detailed expenditure forecast when PR08 numbers were produced.
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.

[105] Delcap_P13.xls provided by Network Rail on 3 May 2012

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	Network Rail's commentaries on this statement are reasonable and generally reflect the figures presented in this statement. We are however unable to assess accuracy of specific comments regarding comparisons to PR08 planned expenditures at this point as we have not been able to relate the 'PR08' numbers in this statement with those that we have seen in the PR08 Determination document. We have identified some minor inconsistencies between expenditure figures presented in this statement and the commentaries given[106].

Table 46: Review of Statement 9b

[106] Examples of some of the inconsistencies identified include:
- Comment (2): *Total track expenditure was in line with the Delivery Plan update 2011*
  - £728 million was planned for track renewals in Delivery Plan update 2011 whilst actual expenditure at year end was £702 million, 4% lower than planned.
- Comment (3): *Overall civils expenditure was in line with the prior year (despite unit cost reductions across much of the portfolio)*
  - Unit cost reductions relative to the previous FY are only seen in Overbridges and Underbridges, which cover only half of all volume-related costs.

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

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

Review Area	Arup Assessment
The policies and processes for calculating efficiencies are the same as assessed at the interim review	Network Rail's calculation of efficiency generally adheres to processes described in the Efficiency Handbook, which was made available to us at the interim review. Network Rail has built a new REEM Model for efficiency calculation since the interim review. Efficiencies are now calculated centrally by Group Finance based on asset financial controllers' submissions, in the form of standard templates containing actual and baseline expenditure for the asset category. We confirm that we have reviewed the calculations underpinning the revised REEM efficiency calculations, provided for review prior to Network Rail's publication of its Regulatory Accounts statements on 31st July 2012. The revised numbers were based on the exclusion of expenditure relating to civils renewals from the REEM, following agreement between Network Rail and the ORR. [107] Following this review, we confirm the statements made in the remainder of this chapter remain valid.
The breakdown of variances between actual and PR08 assumed renewals expenditure between deferral and efficiency is reasonable	Refer to Chapters 6 to 13 of this report.
Efficiency savings that have been recognised and achieved on a sustainable basis	Refer to Chapters 6 to 13 of this report.
Network Rail's explanations of the positive management actions which have resulted in efficiencies, and explanation of changes to calculated efficiencies since period six are reasonable	The headline REEM efficiencies calculated are adequately supported by PMA pro formas submitted for the main operations, maintenance and renewals asset categories. Detailed discussions on PMAs for each spending category can be found in Chapters 6 to 13 of this report.
The amounts of expenditure used in the efficiency calculation have been correctly extracted and agree	Efficiencies shown in this statement have been calculated using the REEM Model, which was compiled by Network Rail's Group Finance based on data submission from financial controllers for individual asset teams and maintenance functions. We were able to

[107] As referenced in the Email from Gordon Cole (ORR) to Network Rail, "FW: Draft note for NR: Our approach to civils in our assessment of efficiency", 6th July 2012

Review Area	Arup Assessment
to the underlying accounting records	trace actual expenditure data used in this calculation back to data submission spreadsheets provided by asset teams for most renewals asset categories. Data submitted by asset teams and maintenance functions have been extracted correctly from underlying accounting systems.
The baselines used are the ones agreed by the ORR	**Baseline Unit Costs** Track Renewals Unit cost baselines used appear to be slightly different from those used for 2010/11 (inflation adjusted)[108]. Detailed calculations provided by Network Rail confirms that unit cost baseline used for 2010/11 have been derived from expenditure figures including enhancement works. Enhancement-related costs have now been taken out of the 2008/09 exit rates to derive baseline unit costs used for REEM calculation this year. Signalling Renewals Unit cost baselines for re-signalling appear to be slightly higher[109] than the baseline used for the 2010/11 efficiency calculations (inflation-adjusted). We have not been able to establish the cause of this variance. Maintenance Baseline unit costs used for calculating unit cost efficiencies for maintenance[110] appear to be 5% higher than those used in FY 2010/11[111], adjusted for inflation. Network Rail has not provided explanations on this variance. **Baseline Volumes** Track Baseline volumes used for efficiency calculations for plain line and S&C agree to assessed volumes published in PR08 Determination. Signalling We are unable to relate baseline volumes used for re-signalling GRIP 1-4 and re-signalling GRIP 5-8 with the PR08 assessed volumes for Conventional Re-signalling and ERTMS. Baseline for Other Non-volume Assets. We have not been able to reconcile baseline expenditures used for non-volume assets[112] with the ORR-assessed pre-efficient expenditures published in the PR08 Determination document. Network Rail has not provided details of the adjustments applied to the PR08 pre-efficient expenditures in deriving REEM baseline

[108] Unit cost baselines for plain line and S&C used for 2011/12 efficiency calculation is are 0.9% and 0.2% higher than those used for the 2010/11 calculations (adjusted for inflation). Cumulative REEM renewals efficiency for track would be 23.7% instead of 24.3% if inflation-adjusted unit cost baselines for 2010/11 were used in the 2011/12 calculation.
[109] Baseline unit cost used for this year is 5.4% above that used for 2010/11, whilst the inflation assumption for 2011/12 used by Network Rail for efficiency calculation purposes is 5.16%.
[110] As seen in REEM Model 070612.xls
[111] As seen in Yearly MUC Analysis.xls provided to us by Network Rail for Regulatory Accounts Review 2010/11
[112] Including FTN, telecoms, operational property, electrification, plant & machinery and IT.

Review Area	Arup Assessment
	renewals expenditures for non-volume assets.
The sub-totals and totals in the table down cast and cross cast	Efficiency amounts for controllable opex, maintenance and renewals add up to total efficiency.
The disaggregated amounts for England and Wales and Scotland add up to the Great Britain amounts	Efficiency amounts for England and Wales and Scotland add up to the efficiency amount for Great Britain.
Network Rail's narrative within the statement is reasonable and agree the details set out in the narrative to the underlying supporting documentation	Network Rail's narrative on this statement provides high-level descriptions of the positive management actions that led to the efficiency figures reported. These descriptions are consistent with the PMA submissions provided to us. Detailed discussions on PMAs for each spending category can be found in Chapters 6 to 13 of this report.

Table 47: Review of Statement 12

18.5 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	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[113]. 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.
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 48: Review of Statement 13

[113] 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

18.6 Statement 14 – Maintenance Unit Costs

We summarise our review of Statement 14 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	It appears that unit costs have been calculated in accordance with the company's unit cost handbook. We discuss this review area in detail in chapter 19 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 information to calculate the unit costs has been correctly extracted from the underlying accounting records and that any estimates used are reasonable. We discuss this review area in detail in chapter 19 of this report.
Where applicable the sub-totals and totals in the table down cast and cross cast	Total costs for individual MNT codes sum correctly to the total maintenance costs shown.
Where applicable the disaggregated amounts for England and Wales and Scotland add up to the Great Britain amounts	Disaggregated total maintenance expenditures for England and Wales and Scotland broadly add up to the Great Britain amounts with some immaterial discrepancies, possibly caused by rounding.
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 discuss this review area in detail in chapter 19 of this report.

Table 49: Review of Statement 14

18.7 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	Track Calculation of the current year unit costs appears to have been performed in accordance to Network Rail's Renewals Unit Cost Handbook. Civils Larger civils projects may span multiple financial years. Volumes and anticipated final costs may be split across financial years on a pro-rata basis for the purpose of calculating unit costs for these larger projects. Signalling Due to the nature of signalling renewal works, volumes and expenditures used for calculating re-signalling and level crossing unit costs are derived on an 'earned-value' basis depending on the actual costs incurred within the financial year. Calculation method used in the samples of earned-value calculations provided to us is consistent to the method described in Network Rail's Renewal Unit Costs Handbook. Telecoms The principle for telecoms unit rate calculations is the same as signalling. We discuss this review area in detail in chapter 20 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	This review area forms the basis of our discussion in chapter 20 of this report.
Where applicable the sub-totals and totals in the table down cast and cross cast	Total cost for individual sub-asset / RWI items generally add up to the subtotal for each asset category. The sum of costs for reportable volume items and non-volume items also add up to the total renewals cost shown for each asset category.
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 and 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 discuss this review area in detail in chapter 20 of this report.

Table 50: Review of Statement 15

19 MUC (Maintenance Unit Cost) Confidence Grading Analysis

19.1 Introduction

We set out in this chapter our Confidence Grading Analysis of Maintenance Unit Costs (MUCs) included in the FY11/12 Regulatory Accounts.

Network Rail's MUC reporting codes have changed since the previous reporting year. Statement 14 of the FY11/12 Regulatory Accounts provides an overview of MUCs from both FY10/11 and FY11/12. Network Rail used 47 MNT Codes, defined in FRM702 – Reporting of Maintenance Unit Costs (Version 11.1), for routine internal reporting during FY2010/11. The company officially reported 22 of these codes in the FY10/11 Regulatory Accounts. For FY11/12, Network Rail updated FRM702 (Version 12) to include 104[114] MNT Codes. Of these codes, 82 align with the 22 MNT Codes reported in FY10/11 and 26 MNT Codes have been included in the FY11/12 Regulatory Accounts.

Although the number of MNT Codes reported has changed, the 22 MUCs initially reported in the 2009/10 Annual Return have been included in each year's submission. We reproduce the MUCs provided in Statement 14 of the Regulatory Accounts in

Total Expenditure	350,219,846

Table 51 below.

[114] During the meeting with Network Rail on 07/06/2012 it was communicated that there are currently 107 MNT Codes in use.

Statement 14: Maintenance unit costs, GB
in £m 2011-12 prices unless stated

A) Expenditure that is part of the unit cost framework, 2011-12

Ref	Description	Unit of Measure (unit)	Unit cost £000/unit	Volume unit	Unit cost x volume £000/unit	Other non-volume costs £000s	Total Cost £000s
MNT001	Manual Ultrasonic Inspection of Rail	Rail Mile	246	78,567	19,322,643		19,322,643
MNT002	Rail Changing	Rail Yard	167	176,489	29,540,866		29,540,866
MNT003	Manual Spot Re-sleepering	No. of Sleepers	213	34,988	7,446,199		7,446,199
MNT004	Plain Line Tamping	Track Mile	5,165	3,512	18,140,534		18,140,534
MNT005	Stoneblowing	Track Mile	4,876	1,349	6,577,638		6,577,638
MNT006	Manual Wet Bed Removal	No. of Bays	170	28,363	4,808,783		4,808,783
MNT008	S&C Unit Renewal	No. of S&C units	14,935	1,141	17,041,262		17,041,262
MNT010	Replacement of S&C Bearers	No. of S&C Bearers	488	7,202	3,517,860		3,517,860
MNT011	S&C Arc Weld Repair	No. of Repairs	539	7,289	3,928,292		3,928,292
MNT013	Level 1 Patrolling Track Inspection	Track Mile	76	717,079	54,571,685		54,571,685
MNT015	Weld Repair of Defective Rail	No. of Repairs (weld)	428	8,007	3,425,946		3,425,946
MNT016	Installation of Pre-Fabricated IRJs	No. of Joints	2,450	1,272	3,116,858		3,116,858
MNT019	Manual Correction of Plain Line Track Geometry	Track Yards	14	2,288,397	32,424,262		32,424,262
MNT020	Manual Reprofiling of Ballast	Rail Yards	5	3,352,441	15,269,158		15,269,158
MNT026	Replenishment of Ballast Train	Tonnes	18	343,608	6,198,032		6,198,032
MNT027	Maintenance of Rail Lubricators	Each	126	115,701	14,594,682		14,594,682
MNT029	Replacement of Pads & Insulators	Sleepers	16	570,971	9,094,985		9,094,985
MNT032	CWR - Stressing	Yard	11	608,333	6,520,807		6,520,807
MNT050	Point End Routine Maintenance	Services	86	566,753	48,640,186		48,640,186
MNT051	Signals Routine Maintenance	Services	68	251,258	17,122,338		17,122,338
MNT052	Train Detection	Services	89	274,088	24,334,042		24,334,042
MNT073	Drainage	Yards	12	395,803	4,582,789		4,582,789
MNT077	Signs	Track Miles Inspections	0	0	0		0
MNT122	S&C Maintenance (Other)	Point Ends	45	472,530	21,324,298		21,324,298
MNT125	Track Inspection (Other)	Track Mile	37	358,478	13,172,787		13,172,787
MNT211	Maintain OHL Components	Services	123	233,944	28,830,919		28,830,919
Total					#########		**350,219,846**

Expenditure without a unit cost, 2011-12

	[1]
	[2]
	[3]
Total	**0**
Total Expenditure	**350,219,846**

Table 51: MUCs as presented in Statement 14 of the Regulatory Accounts

19.2 Results of previous Confidence Grading analysis

Arup completed data quality and confidence grading analyses of MUC unit costs in September 2010[115] and in September 2011[116]. These reviews focused on input data quality and accuracy, and the robustness of underlying processes and systems from which Network Rail calculated its MUC figures.

Our analysis resulted in the assignment of a Confidence Grading of C4 in 2010 and C2 in 2001; generally, reliability band "C" conveys some significant shortcomings in the process in need of urgent attention. Our findings included:

Year	Confidence Grading	Reliability Grading	Accuracy Grading
2009/10	C4	C – Some significant shortcomings in the process which require urgent attention.	4 – Accuracy level outside ±10% but within ±25%
2010/11	C2	C – Some significant shortcomings in the process which require urgent attention.	2 – Accuracy level outside ±1% but within ±5%

Table 52: Previous years' Confidence Grading

[115] Arup Independent Reporter (part A) mandate AO/003: Network Rail Annual Return Audit 2009/10
[116] Arup Independent Reporter (part A) mandate AO/011: Network Rail Regulatory Accounts Data Assurance

Our report also highlighted key areas for improvement and provided recommendations on this basis. We review progress made against recommendations below.

19.3 Key developments and outstanding issues

19.3.1 Summary and timeline of key MUC developments

This section reviews key developments during FY11/12, assessing Network Rail's progress against previous recommendations. As such, this review builds upon Arup's work under mandates AO/003 and AO/11. We review how improvements have been implemented to address issues we identified, and we assess how these changes are likely to impact on data quality and reliability.

Network Rail has demonstrated that considerable effort has been channelled intoto improving the processes for collecting data and calculating the MUCs during the last year. A plan showing the improvements implemented can be seen in Appendix E.

A number of key measures have been implemented over the course of FY 11/12 which are in line with previous recommendations made. These include:

- **Expanding MUC coverage**. Network Rail now captures 78%[117] of maintenance expenditure in its new MUC framework. If applied to the 2011/12 period, the old 2010/11 MUC framework, would have provided 69% coverage.
- **Moving from OTL to Ellipse for time recording**. One of the biggest improvements is the removal of the OTL system from the MUC calculation process. Time spent on maintenance activities is now taken directly from the Work Order relating to the activity. Each Work Order is assigned a Standard Job which in turn maps to the MNT Codes. However, time is converted to cost by applying national OTL rates based on discipline and skill which may introduce distortions.
- **Handling of non-productive time**. Non-productive time, such as travel time, is now proportionally allocated to all of the activities that were undertaken during a given day.
- **Materials costs**. Theoretical unit rates are calculated using the rate in the procurement system NDS at P06. These rates are then used to calculate the cost of materials used.
- **Introduction of Business Objects and Hyperion**. Network Rail previously used a "macro"-enabled spreadsheet to calculate the MUCs. It has replaced this system with the Business Objects (BO) system, a much more stable and reliable platform for carrying out such reporting. BO and Hyperion allow users to specify high levels of detail, making the dual system accessible and useable. Hyperion modules are auditable and contain snapshots of week 1 and week 3 data from BO.

We take the above developments into account in our updated Confidence Grading assessment.

[117] Recorded against the new MUC codes not the 22 reported codes.

19.3.2 Progress in relation to previous recommendations

We set out in Table 53 overleaf Arup's recommendations from our previous reviews of September 2010[118] and September 2011[119], together with progress made by Network Rail in response to these recommendations.

Ref.	Recommendation	Progress	Arup comment
2010. MUC. 8	We recommend that a comprehensive and detailed MUC handbook is produced, that encompasses as a minimum:		The MUC Handbook has been changed to reflect the updated processes but the items previously identified have not been adequately addressed. The content of the handbook remains similar to the version reviewed during the 2010/11 review with the major difference being the addition of appendices which have not been referenced in the body of the handbook. Therefore, the comments below taken from last years audit are still relevant. The Maintenance Unit Cost Process has been written in a format which assists employees involved in the day to day management of systems to ensure consistency in approach and application across Network Rail. This forms a useful guide that can be referred to each month by parties involved in the MUC process.
	• A system and data process map.	• A very high level map has been produced, but this does not contain the level of detail expected.	
	• A data dictionary describing the relevant fields from the source systems.	• This has not been included in the new process.	
	• A register of documents and standards supporting both the MUC process and the source systems.	• This has not been included in the new process, although some other documents are referred to.	
	• Instructions for the correct entry and processing of relevant data through the Ellipse, OTL and BMIS systems. (This should include data validation checks.)	• The process contains information on what needs to be done and highlights what to do when a situation outside of the norm occurs. Other processes are referred to, relating to how to use the systems.	
	• A process overview documenting the extraction of data from source systems through to formulation of MUC figures.	• The process focuses on the entry of data into the source systems. There is no mention how this data are extracted or how the MUC figures are calculated.	

[118] Arup Independent Reporter (part A) mandate AO/003: NR Annual Return Audit 2009/10
[119] Arup Independent Reporter (part A) mandate AO/011: NR Annual Return Audit 2010/11

Ref.	Recommendation	Progress	Arup comment
	• A list of data validation reports, with brief details of the content and purpose of each report.	• Fully implemented.	Whilst this is part of what was recommended, there is still a lack of detail and documentation surrounding the design of the source data systems and the mechanisms of how these feed the MUC calculations. This may make it difficult to achieve robust change management, assess the implications of changes and carry out comparisons between years.
	• Definition of responsibilities for each action.	• Fully implemented.	
	• Timeline(s) showing when each of the above process steps should be carried out.	• Fully implemented. Also includes day by day breakdown of responsibilities by role.	
	• Change control on each of the above documents.	• Steering Group and Working Groups are mentioned but there is no mention of change control governing the process, calculations or systems contributing to the MUC calculations.	
2010. MUC. 10	We recommend an alteration of the data inputting fields in the NROL system (which feeds into the General Ledger) to enable the manual inputting / amendment of the MNT code allocated to a given material order (presently this is fixed for the given material type and cannot be altered by the user).	Standard Jobs are now reviewed each year to ascertain the materials requirements and Theoretical Unit Rates produced. Each material is given a fixed rate taken from NDS at period 6. As units of work are recorded against Standard Jobs this allows a calculated materials cost to be produced. The issue of incorrect input of MNT code to material order is therefore no longer relevant.	This recommendation is now obsolete due to the change in the way in which materials costs are estimated.

Ref.	Recommendation	Progress	Arup comment
2010. MUC. 11	We recommend reconfiguration of data fields attached to materials orders held within the NROL system, so that the Work Order that the materials are being used for is entered as a mandatory field at the point of order placement. This would enable the materials order to map directly to the Work Order and its associated MNT code, thereby avoiding the misallocation of materials costs to the incorrect MNT code in the General Ledger.	See 2010.MUC.10	This recommendation is now obsolete due to the change in the way in which materials costs are estimated.
2010. MUC. 12	Development of an IT application that enables the full range of relevant materials data from the General Ledger feeding the MUC calculations to be controlled, before the data are posted at the end of each period. This should be configured to enable Section Management to perform quality checks for the relevant data fields more robustly, and to provide an auditable record of any input adjustments / corrections made in the General Ledger following completion of the checks. This should improve the reliability and robustness of the input data entering the MUC calculations	See 2010.MUC.10	This recommendation is now obsolete due to the change in the way in which materials costs are estimated.

Ref.	Recommendation	Progress	Arup comment
2010. MUC. 2	Current initiatives for improving efficiency are largely focused on improving productivity at MDU level. In line with reporting of efficiencies in other sectors (such as the water industry), Network Rail may want to consider development of reports for ORR on key initiatives during CP4 that are driving efficiencies These positive management actions, could then be used to support evidence of delivery of improvements reflected in MUC outputs. The ownership, progress and results from these initiatives could be reviewed to provide status reports. The outputs could provide some form of visualisation of the "glide-path" to meeting efficiency targets for CP4	Route teams are now completing efficiency trackers aimed at tracking local and national efficiencies on a periodic basis. These are reported in route MBR packs for review at the monthly business review.	
2010. MUC. 3	We recommend that MUCs are changed so that only time on tools is recorded -as stated in Network Rail's Annual Return for 2009, "... to improve data quality".	Time on tools is recorded on Work Orders; non-time on tools is proportionally allocated across all Work Orders delivered by a given maintenance staff team during the day in question.	This rectifies the issues previously identified.

Ref.	Recommendation	Progress	Arup comment
2010. MUC. 4	Our review of Network Rail Standard FRM702 (which provides guidance on MUC definitions) found that the document provides a coherent and consistent description of activities and processes. We would recommend that Network Rail continues to review FRM702 to improve its understanding and consistency of reported unit costs.	A new version of FRM702 (V12.0) has been produced which includes significant development in the MNT codes being reported.	This recommendation is still being met.
2010. MUC. 5	Network Rail should present a business case which demonstrates the potential costs and benefits of linking the current work allocation (Ellipse) and cost recording (Oracle) to reduce the potential for mis-coding of timesheets and to reduce the scale of the requirement for manual data processing and checking.	Time is no longer included in the MUC calculations using timesheets and Oracle. Instead, time is recorded directly against Work Orders in Ellipse and this is used in the MUC calculations.	This recommendation is now obsolete as all previously identified issues have been rectified due to the solution employed.
2010. MUC. 6	Network Rail should continue developing econometric approaches to maintenance cost analysis at MDU level. This may provide a useful "compensating measure" (i.e. complement MUC data) for the PR13 process.	Initiatives to compare overall expenditure and unit cost rates are under way. Initially looking at rail changing and rail defect repair. The MUC league table has incorporated the current econometrics and developed these further. The introduction of section manager MUCs produced from business objects, combined with the section manager budgets in Hyperion will enable better	

Ref.	Recommendation	Progress	Arup comment
		comparison of MUC data, drive further improvements to understanding our cost base thus supporting the PR13 process.	
2010. MUC. 7	Network Rail should focus on moving costs out of general codes (MNT022 etc) and develop further MUCs to improve coverage.	The 47 previously defined MNT Codes has been increased to 104 codes. 26 new codes have been developed; 13 of the old MNT Codes are now represented by 44 new MNT Codes.	Significant work has gone in to improving the MNT Codes whilst retaining historical continuity.
2010. MUC. 8	Network Rail could develop a programme for improving the coverage of MUCs which should include the reduction in the use of "general" MNT codes and the allocation of indirect head-office costs to MUCs	See 2010.MUC.7. MNT coverage has increased to 78%. HQ costs are now factored in to the MUC calculations	

Ref.	Recommendation	Progress	Arup comment
2010. MUC. 9	As part of Network Rails business case for linkage of key MUC input systems, we would recommend that time recorded in OTL is linked bank to the level of individual work order number (as it is in ELLIPSE). This would provide a full audit trail for labour costs booked, ensures consistency, and makes the correction of mis-allocated time easier. This also enables costs to be reallocated if the definition or mapping of standard number to a particular MUC changes.	See 2010.MUC.5	This recommendation is now obsolete.

Table 53: Arup's recommendations from previous review of September 2010 (AO/003)

Ref.	Recommendation	Progress	Arup comment
2011. MUC. 1	We recommend that documentation is developed through which the design of the MUC source data systems and the mechanisms of how these feed the MUC calculations is clearly defined. This should enable robust change management processes to be implemented, and enable the implications of changes to be assessed, and comparisons between years to be carried out.	A change request process has been developed. However, this process has only been included as an appendix in the MUC Handbook and is not referred to in the handbook. There has been no evidence of documentation detailing the design of the source data systems and the mechanisms of how these feed the MUC calculations.	This recommendation is still valid. Limited evidence has been viewed to suggest progress has been made against this recommendation.

Table 54: Arup's recommendations from previous review of September 2011 (AO/011)

19.4 Approach to updated Confidence Grading analysis

19.4.1 Scope

Whilst Arup's previous Confidence Grading analysis (AO/003) provided a single overall Confidence Grading figure, applicable to all MUCs included within the Annual Return, the mandate for the 2010/11 (AO/011) and 2011/12 reviews have required individual Confidence Grading scores to be assigned for each of the 22 MUCs (i.e. each MNT code) presented within the Regulatory Accounts.

19.4.2 Approach to reliability grading

Our approach to the development of a reliability grading for the MUC figures builds upon our existing knowledge and analysis of the MUC process. We gained this knowledge through a previous Confidence Grading review (AO/003), and analysis of improvements and developments implemented by Network Rail since that time, which we discuss in Table 53 and Table 54.

19.4.3 Approach to accuracy grading

Our accuracy grading approach combines a number of analytical calculations.

We have employed the same approach to grading 2011/12 returns as we used for the 2010/11 grading. Due to changes that Network Rail has made to the MUC reporting process during the 2011/12 period, the inputs to this analysis have changed.

During the 2010/11 assessment, independent verification of the Unit Costs was undertaken using the source data from Ellipse, BMIS and OTL. However, no source data has been received from Network Rail during this audit and an equivalent verification has not been possible.

We have analysed all Business Objects files containing week 1 and week 3 data for periods 6 to 13 during 2011/12. Because year-to-date data were not available from Business Objects for periods 1 to 5, we have taken year-to-date cost and volume figures for these periods from the "MtceCEPeriod 13 Template 19Apr MUC updates" file. We also have used this file as our source of year-to-date baseline figures. We have "mapped" all figures to the old MUC codes, using the links supplied in the file "2A) Old Mucs – New Mucs Conversion Table (ARUP 12.6.12)".

We have made the following calculations as indicators of the accuracy level of the MUC data for each respective MNT code:

- **YTD variance** – variance between Year To Date (YTD) and baseline unit cost values. The level of variability has been reviewed for each route and for each period and an accuracy score allocated. The analysis allows for the significant differences in MUC cost levels that will inevitably arise as a result of structural factors affecting cost levels for a given activity; hence the allocation of a variability score is based on an order of magnitude that we consider should discount structural variations for a particular MUC code, but which should identify outliers and inaccuracies.

- **Period variance** – variance between Period and baseline unit cost values for each route for each period, allocation of a variability score following the same approach as for YTD variance.
- **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. "1" represents the highest level of accuracy (within +/-1%), and "5" the lowest (outside 25% accuracy band).

We have then averaged the above indicators, applying a rounding formula. The rounding formula rounds any average score that is not a whole number to the next integer (e.g. an average score of 2.0 will result in an overall Accuracy Grading of 2, but an average score of 2.1 will result in an overall Accuracy Grading of 3). This is in line with the general premise for allocating accuracy grades: an inaccuracy beyond a given threshold results in the movement to the *lower* accuracy category, which is represented by a higher number. Full details of our MUC Confidence Grading methodology are set out in Appendix D.

We note that we have not completed full analysis of the reporting system, as we were not provided as complete a dataset as last year. Previously, we received the full source data from Ellipse, BMIS and OTL that feeds in to the MUC Macro spreadsheet used for calculating the unit costs. We used this source data to calculate the unit costs ourselves and then compare the calculation to the MUC Macro output.

Previously, we found a high level of correlation between our calculated unit cost and the MUC Macro unit costs: only 3% of the calculated unit costs differed from the MUC Macro unit costs by more than 1% at delivery unit level. We believed that this small difference was due to the mapping that we have used to allocate cost centres to delivery units where work is completed by one area on behalf of another. We did not investigated this discrepancy further, as we believe it would take a disproportionate amount of time to fully resolve this difference. For the purposes of this report, the above findings are sufficient to satisfy us that there is a negligible impact upon accuracy associated with the processing of data from source systems into the MUC figure.

We have not received the source data to replicate this for the new process.

19.5 MUC confidence grading – results

19.5.1 Reliability

We set out in this section our Reliability Grading for the MUCs presented in the 2011/12 Regulatory Accounts. Taking into account our understanding of the

current MUC calculation process, building upon our reviews completed in September 2010 and September 2011, and analysing progress and developments since that time (see Section 19.3), we make the following general observations:

- There has been significant progress towards improving the reliability of the MUCs during the 2010/11 period. The extended use of Ellipse as source system and the elimination of OTL and GL has addressed many of our previous recommendations.
- We consider there has not been sufficient improvement in the MUC Handbook since last year. The current handbook appears user-focused and does not contain enough detail on the design, configuration and change control/documentation of the MUC system. This is of particular concern given the level of development that has occurred during the last year.

We set out in Table 55 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.	MUC process is not documented to a satisfactory level. There are still improvements that could be made to the process or alternatively, properly documented and reasoned justification to support the current methods before accepting that the best method of assessment is being used.
B	**As A, but with minor shortcomings. Examples include old assessment, some missing documentation, insufficient internal verification, undocumented reliance on third-party data.**	The previously identified significant shortcomings in the process have been addressed, however minor shortcomings remain. An example of a minor shortcoming would be the use of standard labour rates based on discipline and skill rather than actual labour rates for the individuals that have carried out the work. There are still concerns remaining over the lack of design documentation; however, the simplification of the process and the use of more stable systems such as Business Objects and Hyperion reduces the seriousness of this from a significant shortcoming to missing documentation. **Therefore we consider this to be the level at which Network Rail is operating.**

C	Some significant shortcomings in the process which need urgent attention.	Significant shortcomings in the process have been addressed with the introduction of time recording in Ellipse and materials costing based on standard rates. We believe that many of the concerns previously identified have been adequately addressed, and that the remaining concerns no longer fall in to this category.
D	Major shortcomings in all aspects of KPI: process unfit for purpose	The activities described give us confidence that the MUC figure produced is calculated in a consistent manner.

Table 55: MUC Reliability Grading results

19.5.2 Accuracy

We set out in the Table 56 below the results of our Confidence Grading analysis on an individual MNT-code level, with assignment of the Accuracy Grading based on the methodology described in Section 19.4.3.

(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 D).

MUC code	Activity Description	Reliability Score	Accuracy Score
MNT001	Manual Ultrasonic Inspection of Rail	B	2
MNT002	Rail Changing	B	2
MNT003	Manual Spot Re-sleepering	B	2
MNT004	Plain Line Tamping	B	2
MNT005	Stoneblowing	B	2
MNT006	Manual Wet Bed removal	B	2
MNT008	S&C Unit Renewal	B	2
MNT010	Replacement of S&C bearers	B	2
MNT011	S&C weld repairs	B	2
MNT013	Level 1 Track Inspections	B	2
MNT015	Weld Repairs of Defective Rails	B	2
MNT016	Installation of pre fabricated IRJs	B	2
MNT019	Manual correction of plain line track geometry	B	3
MNT020	Manual reprofiling of ballast	B	2
MNT026	Replenish Ballast Manual (train)	B	2
MNT027	Maintenance of Rail Lubricators	B	2
MNT029	Replacement of Pads & Insulators	B	3
MNT050	Point End Routine Maintenance	B	2
MNT051	Signals Routine Maintenance	B	2

MNT052	Track Circuits / Train Detection Services	B	2
MNT077	Signs	B	2
MNT073	Drainage	B	3

Table 56: MUC Confidence Gradings by MNT code

As shown in the table above, accuracy scores for individual MNT codes vary from "2" (accuracy of ±5%) to "3" (accuracy of ±10%) for the MUCs shown in Statement 14, although for a few MUCs not published in Statement 14, the accuracy score is "4" (accuracy of ±25%): see Appendix D for details .[120]

The distribution of Accuracy grades has changed between 2010/11 and 2011/12 as shown in ***Table 57*** below:

Accuracy Band	FY 2010/11	FY 2011/12
1	5	2
2	19	28
3	21	18
4	5	2

Table 57: Distribution of Accuracy Grades

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 also provided a summary accuracy grading for the MUC figures, based on our overall assessment of MUC accuracy. This is set out in ***Table 58*** overleaf.

[120] As a means of illustration, certain MNT codes were able to achieve an accuracy 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 below the 1% accuracy threshold).

Accuracy Band	Description	But outside +/-
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 but there are too many opportunities for error due to manual entry of data and differences between source systems.
2	**[see note below]: KPIs expected to be accurate to within ±5%.**	**The accuracy analysis puts Network Rail close to the boundary between a score of 2 and 3. We consider the accuracy analysis to be an indicator of accuracy and not a definitive answer. Taking into account the work that Network Rail has carried out over the last year and considering that the analysis above gives an indication of accuracy, not a definitive figure, we consider that it is appropriate to allocate an accuracy score of 2; accurate to within 5%.**
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%.	Our analysis of the MUC Macro data suggests that there has been a shift in accuracy whereby 60% of all recorded MUCs and 86% of reported MUCs should be considered as a level 2 or above. Therefore, we do not consider that a score of 3 would be appropriate.
4	[see note below]: KPIs expected to be accurate to within ±25%.	See above.
5	Calculation processes largely manual with significant errors; data inconsistently reported and unverified; KPI based on small data sample or cursory inspections and verbal reports. KPIs unlikely to be accurate to less than ±25%.	
X1	KPI is calculated on a very small sample of data.	
X2	Accuracy cannot be assessed for some other reason (to be qualified in text of report).	

Table 58: Summary accuracy grading for MUC data

20 RUC (Renewal Unit Cost) Confidence Grading Analysis

20.1 Introduction and scope

This chapter of the report sets out our assessment of the reliability and accuracy of Renewals Unit Costs (RUCs) presented in Statement 15 of the regulatory accounts in accordance with the confidence grading approach.[121]

The review focuses on the following asset categories presented within Statement 15:

- Track
- Civils
- Signalling
- Telecoms

To undertake the above, our initial steps involved gathering all the relevant information which included:

- Copy of the Renewals Unit Cost Handbook (RUC)
- Copy of the regulatory financial statements for Great Britain, England & Wales and Scotland
- Copies of underlying accounting records

The initial part of this chapter addresses RUC governance, systems and reporting process. Further on, a summary of the numbers from sample projects that feed into the RUC calculations presented in Statement 15 is provided, with observations and summary of checks undertaken. On this basis we provide an assessment of unit cost reliability.

We follow this with a review of a sample of underlying accounting records to provide a basis for the assessment of unit cost accuracy in line with the confidence grading system.

20.2 Approach

During the Reporter's review, a number of meetings were held with Network Rail staff from the asset categories included within Statement 15 of the Regulatory Accounts. The objective of these meetings was:

- To gain a general insight into how the numbers have been generated.

[121] We note that this year's scope of the independent Reporter's review is different from last year's (2010/11) regulatory accounts review (mandate AO/011). There is no requirement to review CAF returns this year, as the focus is on the Renewals Unit Costs reported with Statement 15 only.

- For each asset team to explain the process, systems and governance in place for processing the numbers through to end of process.
- To establish sources of raw data which is input at first point of entry into the system and responsibilities through the process.
- To ensure that the asset teams are clear on the information and evidence the Reporter may request as part of the review and validation process.

Based on the above an overview of the feedback relating to the RUC governance and systems from each asset team is set out below.

We have sought to undertake an assessment of data accuracy to inform our accuracy grading assessment, on the basis of a sample of renewals projects from each asset type.

20.3 RUC Governance and Systems

20.3.1 RUC Handbook

To ensure consistency in the methodology applied in the derivation of unit costs and volumes across all Network Rail business units, Network Rail has developed a Renewals Unit Cost Handbook (RUC Handbook). This sets out the process undertaken in the processing of data (volumes and cost) from point of entry into the system. This sets out the basis of RUC calculation under each asset category.[122]

The RUC Handbook defines a number of systems and processes to be applied in the processes of calculating renewals unit costs through each asset category.

A summary overview of the system and process as set out with the RUC Handbook for each asset area, clarified by asset teams during the review meetings, is summarised in the sections below.

We note that, whilst the RUC handbook sets out the processes and systems by which costs and volumes for renewals delivery in the respective asset areas are captured, there is limited information regarding the process by which project level data are centrally adjusted, to derive the accruals-based adjustments, i.e. how project-based cost figures are collated and reconciled overall to the period to which they relate for the RUC.

The RUC Handbook states that the "General Ledger (GL) is finalised through postings from various ERP systems, and other manual accruals and journals (RUC Handbook, p.5)", but no further details are provided of the exact nature of adjustment process and applicable accounting policy are provided.

We note that the original project cost data provided for our review of data accuracy did not match the figures feeding into the RUC calculations (see Appendix H). This was due to centrally applied adjustments for accruals not included within the original data sample (see 20.3.2.3). As a result, our

[122] It is noted that the copy of RUC handbook reviewed was still in draft form, this was dated March 12. Network Rail subsequently confirmed at a meeting with the Reporter on 3rd July 2012 that the final version of the Handbook has now been produced (although this was not provided for review).

subsequent analysis of data to complete the accuracy grading from the correct source dataset was restricted to four sample projects (see Section 20.5.2).

20.3.2 Systems used for RUC calculation

The main systems outlined within the RUC Handbook include the following:

- **P3e**
- Planning tool used for recording and planning the anticipated delivery of volumes. It consolidates all data associated with the business plan and is utilised by all major assets.
- Extracts from P3e are reviewed, updated every period with final sign off by the programme controller within each asset at year end.

- **Oracle Projects (OP)**
- Accounting system for cost capturing.
- An important component of OP is the General Ledger (GL). This is finalised through postings from various Enterprise Resource Planning (ERP) systems and other manual accruals and journals.
- Each period Actual Billings and Cost of Work Done (COWD) are reconciled to the General Ledger within OP.
- OP holds details of COWD, Anticipated Final Cost (AFC), Actual Expenditure and Authority.

- **Business Objects**
- This is used to report volumes and costs in IMT delivered works. This system interacts with both P3e and OP to provide the forecast of volume activity, total costs and unit rates.

- **Unit Rate Reports**
- The central finance team within each asset category publishes the unit rates for their asset which will then be consolidated by Group Finance.

20.4 RUC calculation processes for each asset area

20.4.1 Introduction

We summarise in this section, the RUC calculation processes for each asset area, drawing upon information provided in the RUC handbook, together with feedback and explanations provided in the meetings with each asset team.

20.4.2 Track RUC calculations

The Track renewals unit cost process involves calculation of the Cost of Work Done (COWD) and Anticipated Final Cost (AFC) by the Commercial Managers. Initial estimates are based on Contractor's negotiated rates and final COWD and AFC are based on delivered volumes reported by site teams through GEOGIS forms. This information is then passed to the Planners who update P3e which is interfaced with OP and updates the COWD and AFC in OP every period.

The track team indicated that the South East territory uses a spreadsheet based process for recording costs which automatically interfaces with P3e whilst other territories use core data spreadsheet from which planners input data manually into P3e.

Non volume work, which includes drainage and fencing, is not included in the RUC calculation; only associated non volumes are included. Associated non volumes include costs for activities deemed essential to support the delivery of planned volumes.

Track renewals also include renewals works delivered by the maintenance function. The COWD for these are provided by the maintenance team via a spreadsheet which is a direct manual input into OP by central finance. Maintenance volumes are recorded through GEOGIS forms but not inputted into P3e.

Where there is a change from original project plan this is addressed through the change order process and all changes are recorded in Authority papers.

Payments are tracked through OP and GL; purchase orders for a project are set up within OP. When payments are made, billings are posted into OP and GL simultaneously. At each period end OP will calculate accruals for each project (COWD less Billings) which are then posted into GL.

Track renewals works mainly comprise Plain Line and S&C. Network Rail anticipates that moving into CP5 there will be scope for reporting unit rates and volumes for fencing and drainage works.

The following is a summary of the track RUC definitions.

Type	Unit
Plain Line Conventional	ckm
Plain Line HO	ckm
S&C	equ (equivalent units)
Non volume – Fencing & Drainage	✓

Table 59: Track RUC definitions

There are a number of unit rates utilised, Network Rail anticipate that the following rates will be used most frequently for aligning with business planning and ORR determination:

- Blended Unit Rate (PL and S&C)
- Core Business (IMT and Maintenance delivered)
- Site Specific.

20.4.3 Civils RUC calculations

A number of meetings were held between Network Rail and the Reporter to understand the process and systems employed by Network Rail in processing the numbers which subsequently feed into the RUC calculation.

Network Rail confirmed that original budgets are established by the commercial team in conjunction with project managers. The commercial teams build up budgets from suppliers' quotations and estimates using excel estimating template. The overall budget includes budgets for GRIP 1-4 stage (Design), GRIP 5-8 stage (Implementation) and contingency allowance. The budget is then submitted to the authority panel for approval and input into OP. Once approval is obtained from authority panel this becomes the authority. Network Rail indicated that in the past authority for schemes less than £1m was recorded on a spreadsheet while any schemes over £1m would have an authority paper. This has now changed and all projects irrespective of value must have an authority paper.

Orders are then placed against the Authority; this then sets the original AFC. Any changes/variations issued are initially drawn against the contingency. The AFC gets updated as variations are implemented. If the limit of the contingency is reached subsequent variations go through the same authority process as the original budget for approval prior to implementation. The original authority is subsequently updated along with the AFC.

Figures on OP are updated every period with COWD, revised budgets, updated AFC and actual expenditure. The update is undertaken using a spreadsheet based application, MORE4APPS; this involves a download from OP, then a manual update of the figures and uploaded back onto OP. The commercial team verifies these processes to ensure accuracy in the figures.

The following is a summary of the civils RUC definitions.

Type	Unit
Over bridges	m^2
Under bridges	m^2
Over bridge BG3	m^2
Tunnels	lm
Culverts	km
Foot bridges	m^2
Coastal Estuarial Defences*	✓
Retaining Walls	m^2
Earthworks	m^3
Major Structures*	m^2

**Not included in the CEM and REEM calculation as they do not have baseline to measure against.*

Table 60: Civils RUC definitions

Civil volumes include all direct costs as well as indirect costs. A proportion of indirect costs are allocated by the Business and Central finance team to each repeatable work item categories on a percentage basis. Network Rail indicated

that for civils, 4% adjustment is applied to represent the indirect costs (Network Rail project management costs). This is based on assessment/analysis of previous costs against the overall expenditure. Network Rail indicated that this process is changing going forward and that these costs will be captured and reported in the same way as all other projects costs.

20.4.4 Signalling

Network Rail provided an overview of the process for RUC calculation during meetings with signalling team.

GRIP 1 – 4 Target estimates in the form of Bill of Quantities/Activities are produced based on scope to be delivered. Costs are based on internal cost for design and administration resources. Cost baseline is established at Business planning stage pre GRIP 1-4 based on known scope, volume and target unit rates.

Project Managers Budget (PMB) is produced by Project Control, validated by Commercial Manager and accepted by the Project Manager. Costs are based on previous projects. PMB is then fed into P3e by Project Control.

At the end of GRIP4 CAF4's are produced which effectively establishes the final account, and the RUC for GRIP 1-4 signalling is ascertained on this basis.

GRIP 5-8, involves Contractor's plan and costs, tendered costs based on validated volumes through form A and B.

The Contractor submits a resource/cost loaded programme which is fed into P3e by Planners. The programme is kept updated and interfaced with P3e every period. Contractors submit applications for payment every period which are validated by the Commercial Manager and certified by the Project Manager for payment.

The Commercial Manager updates the cost loaded programme based on earned volumes which then updates P3e. Contractors and Network Rail costs in P3e are interfaced with OP every period.

Stage 6 is commissioning, whereby a completion certificate (CC1) is issued and snagging list is produced.

Authority is held in OP and is updated through change order process. Authority provides a control mechanism and all changes must have an authority paper. AFC is established through COWD and forecasts. Volumes are reported for GRIP 5-8 renewals only when the SEU is commissioned.

Earned volume is calculated on the basis of COWD and AFC multiplied by total volume; EV = (COWD/AFC) x Total Volume. This is consistent with the process set out within the RUC Handbook.

Network Rail confirmed that volumes reported in Statement 15 are actual commissioned volumes as per agreement between Network Rail and ORR. Unit Rates reported in Statement 15 calculation are based on earned volumes.

The following is a summary of the signalling RUC definitions.

Type	Unit

Signalling Equivalent Units (SEUs)	SEU
Level Crossing Equivalent Units (LXEU)	LXEU
European Rail Traffic Management System (ERTMS SEU)	SEU
Modular Signalling	n/a

Table 61: Signalling RUC definitions

20.4.5 Telecoms

Meetings with the telecoms team have not materialised despite requests by the Reporter's team. However on discussions with the Signalling team, the Reporter was informed that the process for Telecoms is similar to signalling. A similar statement is also noted within the RUC Handbook that, '*The basis of calculation for the final unit rate for each volume type is similar to the approach taken in signalling'.*

The following is a summary of the telecoms RUC definitions.

Reportable Volume	Unit
Customer Information System (CIS)	Nr
Driver Only Operation (DOO) CCTV System	Nr
Public Emergency Tel (PET) System	Nr
Small Concentrator	Nr
Station Clocks	Nr
Telecom CCTV	Nr
Voice Recorder	Nr

Table 62: Telecoms RUC definitions

20.5 RUC Confidence Grading Approach

20.5.1 Approach to Reliability Grading

Our approach to the development of a reliability grading for the RUCs is based on our existing knowledge of Network Rail's cost capture and unit cost calculation process based on review of the RUC Handbook, our review of sample data (also feeding into our accuracy grading review – see below), and discussions with teams from Network Rail's business units. Where relevant, measures taken to address issues highlighted in our previous reviews have also been taken into account.

20.5.2 Approach to Accuracy Grading

20.5.2.1 Analysis process

Our approach to determining accuracy of RUC is based on an analysis of a sample of schemes from each asset category for a selected region. The analysis process follows a similar approach to our previous reviews and is as follows:

- Meetings with finance teams for each asset type: These were aimed at gaining an initial understanding of numbers presented within the statements and REEM efficiency calculations. These also provided an insight into systems and processes used in the calculation of the unit rates, what underlying accounting data was utilised in the process.
- Quantitative check: Anticipated Final Cost (AFC) and Cost of Work Done to date (COWD) figures from OP, GL and P3e were reviewed against similar figures from commercial records utilised to feed these figures into the systems in the case of Civils. Review of data provided further to the draft report included OP and GL transactions listings.
- Review of records from various systems containing cost information to identify any gaps/discrepancies.
- Review of approach taken by each asset category to establish the basis of unit rate calculation, and to determine whether this is in line with the RUC Handbook.
- Determine accuracy and corresponding Confidence Grading based on the results of our analysis.

It should be noted that the focus of our accuracy grading approach is on the expenditure-related component of the RUC calculation formulae. The review of volumes presented within the REEM and Statement 15 and their accuracy was undertaken through a separate Independent Reporter mandate. We reproduce the results of this audit in chapter 17.

20.5.2.2 Original sample project data

Table 69 below presents the final sample of projects for which cost data originally provided for our accuracy analysis. The data provided comprised transactions listings for each project; these comprised individual line items that make up the total cost number presented within the cost lines (for sample projects) presented in Statement 15.

LNW	LNW	VARIOUS	VARIOUS
Track Project ID	**Civils Project ID**	**Signalling Project ID**	**Telecoms Project ID**
PL	106837	107075	106656
122687	107783	107071	106683
122691	115937	112195	112228
122684	115951	107136	112230
122714	119726	101923	112256
122841	106894	107072	

122850	114914	100396
122853	115616	106714
122854	115630	116587
118338	116468	112201
118734	117082	
S&C	121878	
112824	102338	
112831	115192	
118624	115596	
Mtce		
123366		
126521		

Table 63: original sample projects selected for RUC accuracy grading assessment

20.5.2.3 Subsequent assessment based on limited data sample

When reviewing the data provided for the projects listed above, it was found that the total sum of the transactions listed did not tally with the numbers presented within Statement 15. On clarifying this with Network Rail, they confirmed that the data provided were from listings of OP transactions which do not include accruals-based adjustments applied to figures informing the RUC calculations, and therefore will not add up to the numbers being presented in the RUC tables. We provide an overview of our original data sample and the results obtained through our original accuracy assessment in Appendix H to this document.

Network Rail indicated that transactions listings from the GL would be more appropriate as these include accruals-based adjustments. Due to time constraints it was not possible to repeat the review process for the whole sample of projects reviewed from OP listings for GL listings. Therefore, GL transactions listings for a single project per asset category were provided by Network Rail as the basis for a revised assessment of RUC data accuracy.

This revised sample comprised, in total, the following four projects:

Asset group	Project ID
Track	122687
Civils	102338
Signalling	116587
Telecoms	112230

Table 64: sample projects for accuracy analysis

The results of this assessment based on the limited data sample are provided in section 20.6.2 of this chapter.

20.6 Results of RUC Confidence Grading

20.6.1 Reliability grading

We present the results of our assessment of RUC data reliability in the table below.

Reliability Band	Description	Comments
B	**As A[123], but with minor shortcomings. Examples include old assessment, some missing documentation, insufficient internal verification, undocumented reliance on third-party data.**	Based on the process and systems combined with the numbers contained within the limited sample data provided, we have drawn the following conclusions: • The systems in place to capture project-level cost data appear to be robust, with some manual data handling in some areas. • The process for capturing cost data at the project level is well documented and feedback from the various asset categories appears to be generally consistent with the outlined process within the RUC Handbook. • There is a lack of clarity with regard to the process by which project level data are centrally adjusted, and additional accruals adjustments made by the HQ Finance Team (see Section 20.3.1). Further clarification of the treatment of costs and accruals-based adjustments feeding into the central RUC calculations is required within the process documentation, as this impacts the levels of reported project costs feeding into the RUC calculations .

20.6.2 Accuracy grading

20.6.2.1 Sample project data (GL transactions)

To conclude our assessment of accuracy Network Rail provided data from General Ledger transactions listing to enable a like-for-like comparison with the relevant OP project data. As indicated above, data for one project per asset category were provided to undertake the final review. The table below summarises the results of this exercise.

[123] We note that reliability grading "A" is defined as follows: "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."

Project ID	Asset	GL Transactions	P13-12 COWD	Variance
122687	Track	7,412,167	7,412,167	0%
102338	Civils	1,853,769	1,853,769	0%
116587	Signalling	1,446,233	1,446,233	0%
112230	Telecoms	1,212,130	1,212,130	0%

Table 65: Sample RUC projects – GL Transactions costs and variances

As indicated in the table above, none of the four projects showed any discrepancy.

20.6.2.2 Accuracy grading assigned

The data provided for review comprise a limited set of sample data, on the basis of which we have made a judgement of accuracy. We set out the results of our accuracy grading in the table below.

Accuracy Band	Description	But outside +/-
2	**KPIs expected to be accurate to within ±5%.**	**Our analysis of the very limited set of sample data (four selected sample projects in total) identified no errors. We consider a more representative data sample, showing a minimal frequency of >1% errors would be necessary in order for Network Rail to achieve a higher accuracy grading for this analysis.**

20.6.3 Conclusion

On this basis we believe a Confidence Grading of **B2** is applicable across the board, based on our review of reporting systems and the sample data provided.

We consider Network Rail is likely to be able to achieve an improved reliability grading**,** if it is able to clarify the process by which project level data are centrally adjusted, and additional accruals adjustments made by the HQ Finance Team.

We consider Network Rail may be able to achieve an improved accuracy grading**,** if a more representative set of data can be provided that demonstrate the necessary level of numerical consistency across a representative spread of projects.

At a joint ORR, Network Rail, Independent Reporter meeting held on 6th September 2012, the depth of scrutiny for the cost-related component of RUC calculations undertaken by the Independent Reporter was discussed. The allocation of expenditure (to renewal) activities within Network Rail's regulatory accounts is already subject to statutory audit. Guidance will be provided to the Independent Reporter to ensure the level of detail and granularity for sampling source cost data for future reviews is reflective of this.

20.7 Recommendations

On the basis of the review undertaken as outlined above and the Reporter's observations during the review process, the following recommendations are made:

- Clarification of the process by which project-level cost data are centrally collated and adjusted to produce accruals-based costs feeding into the RUC calculations. This should be fully documented within the RUC handbook.
- Minimisation of manual data processing through the systems, Civils appear to be using automated data to download and upload data off and onto OP using MORE4APPS as indicated above and this could be adopted as a standard approach across asset categories where practical.
- Clear documentation and annotation of data processing should be produced.
- A more standardised approach for data handling and processing should be implemented within each asset category, with common processes (as far as practicable) identified and defined across asset categories. Track indicated that the South East territory uses automated data processing approach whilst other Track teams in other territories uses a manual approach through the use of core data spreadsheet.
- Less use of Excel spreadsheets where possible to avoid inherent errors within data presented on this basis. Where Excel spreadsheets are deemed unavoidable, the use of standardised templates with clear User Guidance Notes should be considered.

21 Network Rail's progress made since our previous reports and our current recommendations

In this chapter, we summarise Network Rail's progress relative to the recommendations made in our previous reports.

We note, in relation to the previous paragraph, the following comment from Network Rail:

"In relation to the report for 2010/11, NR responded in a letter dated 4 August 2011:

> '…the length of the report is such that it does not make sense for us to respond in detail to every recommendation or finding and we could not do so within a reasonable timescale. We would prefer to focus on completing and delivering our improvement plan, which should address the key issues raised by you… Please note that the absence of a detailed response does not imply acceptance or otherwise of any of the points raised or validation of any of the content and as you know there are areas which we still have concerns…'

"In this context NR has not explicitly agreed with any of the recommendations contained in last year's report and in certain cases has intentionally not taken any action in response to recommendations from Arup." (Comment received 5th July 2012).

At our interim review, we observed that Network Rail has made significant progress since our last report. Specifically, Network Rail has made significant progress:

- Creating a reporting handbook;
- Simplifying the accounting model used to report efficiencies;
- Devolving responsibility to asset groups, whilst centrally controlling the reporting process; and
- Declaring PMAs associated with reported efficiencies.

We also observed that Network Rail has made moderate progress developing the granularity of its efficiency reporting within this structure. Network Rail has made moderate progress:

- Quantifying cost savings associated with each PMA reported for individual asset groups; and
- Disaggregating the calculation of renewals efficiency for volume-based categories.

We observed that Network Rail has made limited progress developing unit cost reporting and forecasting based on unit costs. We noted that Network Rail is yet to make significant progress breaking-down high level target efficiencies and monitoring expenditure against a target trajectory.

We find that Network Rail continues to improve its efficiency reporting. Nonetheless, in three key areas—monitoring of delivery robustness, monitoring and treatment of underspend and prudent reporting—our findings show limited progress since P06. As outlined in the table below, we consider that opportunities for improvement remain.

We recommend that Network Rail continues to work towards these recommendations. We have noted additional suggestions and lesser recommendations throughout the report, which we also have noted in the executive summary of this report.

Ref.	Previous recommendation to Network Rail	Progress made
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." (Comment received 5th July 2012).
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 deferrals are both robust and sustainable, as defined in the ORR's letter of June 2010.	**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

Ref.	Previous recommendation to Network Rail	Progress made
		Network Rail: "NR does not agree with the interpretation put forward by Arup. As part of the year end 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).

Ref.	Previous recommendation to Network Rail	Progress made
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: "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

Ref.	Previous recommendation to Network Rail	Progress made
		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).
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-efficient baseline value for every individual asset category.	**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).
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	**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 (FY 08/09), to be derived.

Ref.	Previous recommendation to Network Rail	Progress made
	electrification renewals.	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).
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).
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	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

Ref.	Previous recommendation to Network Rail	Progress made
	embedded into the efficiency reporting process.	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).
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

Ref.	Previous recommendation to Network Rail	Progress made
		again has said it does not agree with this recommendation. We note, in relation to this recommendation, the following comment from Network Rail: "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).
2011. RA.10 [2010/	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	**Significant progress**: Review by the Independent Reporter in progress.

Ref.	Previous recommendation to Network Rail	Progress made
2012]	level of uncertainty associated with the sustainability test on NR's asset policies that ORR performed previously.	

*Please note that 2011.RA.7, found in our report of the efficiencies calculated in the 2010/11 Regulatory Accounts, repeated recommendation 2011.RA.6. We have not included this duplicate here.

Appendix A: Regulatory accounts data assurance Reporter mandate

Regulatory accounts data assurance reporter mandate [AO/023]

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 2012, 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 2010-11, 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 2010-11 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 identified a number of serious issues in relation to Network Rail's reporting of efficiencies in 2010-11. Network Rail has accepted that there is a need to improve its reporting of efficiencies and is developing an improvement plan to ensure a more robust process for reporting efficiencies in 2011-12.

Given the importance of the issues raised in 2010-11 and Network Rail's proposed improvement plan for reporting in 2011-12, the reporter should redesign its review programme for 2011-12 as follows:

The reporter will assess the degree to which Network Rail's improvement plan addresses issues raised in its 2010-11 report regarding the systems and processes for the reporting of renewals efficiencies, what further developments improvements will be required going forward and how far Network Rail's plans for the remainder of the year address these issues. The reporter should notify Network Rail and the ORR as early as possible if it identifies any inadequacies in the improvement plan.

The reporter will review the interim Statement 12 efficiency statements for Great Britain, England & Wales and Scotland that Network Rail intends to prepare in October based on period six data. The reporter will confirm the degree to which Network Rail has progressed in implementing a robust

process for calculating efficiencies that addresses the issues raised in 2010-11. In particular, the review should assess 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 amounts of expenditure used in the efficiency calculation have been correctly extracted from the underlying accounting records;
5. 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;
6. 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
7. 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.

The review of the year-end Statement 12 of the regulatory financial statements for Great Britain, England & Wales and Scotland will depend upon the findings of the interim review. As a minimum the reporter will confirm whether:

1. the policies and processes for calculating efficiencies are the same as assessed at the interim review;
2. the breakdown of variances between actual and PR08 assumed renewals expenditure between deferral and efficiency is reasonable;
3. efficiency savings that have been recognised have been achieved on a sustainable basis;
4. Network Rail's explanations of the positive management actions which have resulted in efficiencies, and explanation of changes to calculated efficiencies since period six are reasonable;
5. the amounts of expenditure used in the efficiency calculation have been correctly extracted and agree to the underlying accounting records;
6. the baselines used are the ones agreed by the ORR;
7. the sub-totals and totals in the table down cast and cross cast;

8. the disaggregated amounts for England and Wales and Scotland add up to the Great Britain amounts; and
9. Network Rail's narrative within the statement is reasonable and agree the details set out in the narrative to the underlying supporting documentation.

In order to finalise Efficiency Benefit Sharing Mechanism (EBSM) payments for 2010-11, Arup is requested to provide an assessment of the nature of the positive management actions provided cumulatively for 2011-12 and the extent to which they may plausibly apply to efficiency levels reported for the year 2010/11.

If issues are identified within the interim review of the systems and processes for reporting efficiencies, further work will be need to be undertaken at year-end to determine whether these issues have been corrected or whether alternative substantive evidence is available to support reported efficiencies.

Statement 13

The reporter will review Statement 13 of the regulatory financial statements for Great Britain, England & Wales and Scotland 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 is accurate, of a sufficient quality and consistent with the purpose of the measures;
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; and
5. 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 (and other unit costs not shown in the published table)

The reporter will review Statements 14 and 15 of the regulatory financial statements for Great Britain, England & Wales and Scotland and the other unit costs which feed into Network Rail's strategic business plan[124] to 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;

[124] A list of unit costs that we think that this includes is attached as a spreadsheet to this mandate.

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 2011-12 compares to previous years where appropriate.

Deliverables:

- Interim report – this will cover the interim review of Statement 12 based on period 6 data.
- Final report – this will cover the entire mandate.

Delivery dates:

- Interim report issued by Thursday, 17 December 2011
- Initial final report issued by Thursday, 17 May 2012
- Draft final report issued by Thursday, 17 June 2012
- Final report issued by Thursday, 21 June 2012

Appendix – unit cost coverage

See spreadsheet "20110715_NR_PR13_Unit_Cost_Progressive_Assurance" (powerdocs ref #420937).

Appendix B: Meetings held to date

Subject	Date	Location	Present: Network Rail / (Other)	Present: Arup
FTN efficiencies	23 April 10:00-11:00	40 MS Room 5C	Andrew Ballsdon; Jon Cunningham; Hardy William; Martin Robinson	Dan Phillips, Sylvane Rajaratnam, Tim Ashwin, Ben Berman
Civils efficiencies	23 April 2012 11:00-13:00	40 MS Room 13-7 (8)	Andrew Ballsdon; John Moore; John Halsall; Chris Perkins; William Hardy	Mark Rudrum, Alexander Jan, Tim Ashwin, Ben Berman
Track efficiencies	24 April 12:00-14:00	40 MS Room 6B	James Dean; Derek Sledge; Andrew Ballsdon; William Hardy	Alastair Jackson, Alexander Jan, Tim Ashwin, Bruno Delgado
Signalling, Power & Communications efficiencies	24 April 15:30-17:30	40 MS Room 6C	Andrew Ballsdon; Simon Appleyard; Jerry England; William Hardy	Russell Hankey, Dan Phillips, Tim Ashwin, Bruno Delgado
Operations costs efficiencies	25 April 12:30-13:30	Kings place Rotunda room 09 (10)	Andrew Ballsdon; Michael Gurtenne; Lucy Bennett; Louise Kavanagh; William Hardy	Dan Phillips, Tim Ashwin, Ben Berman
Telecoms & IM efficiencies	27 April 09:00 – 10:00	40 MS Room 3C	Andrew Ballsdon; Simon Appleyard; Erwin Klumpers; William Hardy	Sylvane Rajaratnam, Dan Phillips, Tim Ashwin
Maintenance efficiencies	30 April 09:00 – 11:00	40 Melton Street (MS), Room 10A	Andrew Ballsdon; Michael Gurtenne; David Wynne; Louise Kavanagh; William Hardy	Oliver Billings, Dan Phillips, Tim Ashwin, Ben Berman
Civils Renewals Costs & RUCs (Statements 9 and 15)	1 May 10.00 – 11.00	Telephone conference	John Moore	Justice Sechele, Paul Davies, Jian Li, Tim Ashwin
Civils volume baseline modelling	2 May 10.00 – 11.30	40 MS	Simon Johnson	Mark Rudrum, Tim Ashwin
Civils sustainability evidence for efficiency reporting	2 May 12.00 – 13.00	ORR offices, One Kemble Street	Charles Robarts; John Halsall; Andrew Ballsdon; Chris Perkins; Carl Hetherington (ORR); Gordon Cole (ORR); Meryvn Carter (ORR); Jim Bostock (ORR)	Mark Rudrum; Alastair Jackson; Alexander Jan; Tim Ashwin

S, P & C Renewals Costs & RUCs (Statements 9 and 15)	3 May 12.00 – 12.30	40 MS Room 7A (10)	Josh Sims, William Hardy	Justice Sechele, Paul Davies
Discussion of efficiency reporting with PWC	3 May 14.30 – 15.00	Arup offices (8 Fitzroy St.)	Mark Robinson (PWC)	Alexander Jan, Dan Phillips
Detailed review of REEM calculation model	3 May 16.00 – 17.00	Kings place	William Hardy	Tim Ashwin, Jian Li
Catch-up meeting	08 May 11:00 – 13:00	Kings place Rotunda room 09 (10)	Andrew Ballsdon; William Hardy	Alexander Jan, Dan Phillips, Tim Ashwin
Civils volume baseline and CP4 volumes discussion	10 May 10:00 – 11:30	40 MS	Chris Perkins	Mark Rudrum; Alastair Jackson; Tim Ashwin
Track Renewals Costs & RUCs (Statements 9 and 15)	3 May 12.00 – 12.30	40 MS Room 7A (10)	Steven Denys	Justice Sechele, Jian Li
RUC Derivation – Track (call)	4 May 10:00 – 11:00	40 MS Room 1B (14)[24]	Steven Denys	Justice Sechele
Discussion of draft report with ORR	23 May 14:00-17:30	1 Kemble Street	Andrew Ballsdon; William Hardy	Alexander Jan; Ben Berman. From the ORR: Carl Heatherington; Gordon Cole
RUC Sampling – Track	25 May 09:30-11:00	40 MS Room 6c		Justice Sechele, Jian Li
RUC Sampling – SP&C and Telecoms	25 May 11:30 - 12:30	40 MS Room 6c		Justice Sechele, Jian Li

Regulatory Accounts report meeting	31 May 09:00-11:00	1 Kemble Street Room 9	Andrew Ballsdon	Alexander Jan; Ben Berman. From the ORR: Carl Heatherington; Gordon Cole
Review of track efficiencies	31 May 16:30-18:00	Call	Sue Coverdale	Alexander Jan; Ben Berman
Review of maintenance efficiencies	01 June 13:00-15:00	King's Place	Andrew Ballsdon; William Hardy; Louise Kavanagh; David Wynne	Alexander Jan; Ben Berman
Maintenance Unit Cost review meeting	07 June 12:30-15:00		Laura Foster; Benjamin Midway; Ashur Toma	Trevor Taylor
RUC Sampling – Civils	12 June 10:00-12:00	Birmingham, 7th Floor	Chris Sills	Justice Sechele

Appendix C: Documents received from Network Rail

Reference	Title	Description	File name	Date received
REEM efficiency reporting; process assurance documents				
EFF-1	REEM Calculation Model (dummy)	REEM and CEM efficiency calculation model (populated with dummy data)	REEM and CEM Model.xls	16 April 2012
EFF-2	REEM Calculation Model	Year-end REEM efficiency calculation model	REEM Model.xls	16 April 2012
EFF-3	Our suggested basis for the Reporter's audit of Civils' efficiency	Letter from Network Rail to ORR (17th April) regarding IR audit of civils efficiency	Letter to ORR on civils policy and volumes in CP4 April 2012.pdfLetter to ORR on civils policy and volumes in CP4 April 2012.pdf	20 April 2012
EFF-4	Statement 8b1.pdf	Regulatory Accounts Statement 8b (Part 1)	Statement 8b1.pdf	25 April 2012
EFF-5	Statement 8b2.pdf	Regulatory Accounts Statement 8b (Part 2)	Statement 8b2.pdf	25 April 2012
EFF-6	Statement 9b.pdf	Regulatory Accounts Statement 9b	Statement 9b.pdf	25 April 2012
EFF-7	Statement 12.pdf	Regulatory Accounts Statement 12	Statement 12.pdf	25 April 2012
EFF-8	Statement 14.pdf	Regulatory Accounts Statement 14	Statement 14.pdf	25 April 2012
EFF-9	Statement 15.pdf	Regulatory Accounts Statement 15	Statement 15.pdf	25 April 2012
EFF-10	Infrastructure Condition Report	Charts with FY11/12 infrastructure performance and condition KPIs	266263_ICR_Pd13_2011_12 pdf - Adobe Acrobat Pro (2).pdf	26 April 2012
EFF-11	Performance pages from Network Operations ERM	Summary charts of PPM / performance / delay minutes measures (FY 11/12 YTD)	Pages from P13 Network Operations ERM.pdf - Adobe Acrobat Pro.pdf	26 April 2012
EFF-12	Statement 13: Volume incentives	Report Volume incentives, broken down England, Wales and Scotland	Arup Stats.pdf	30 April 2012

Reference	Title	Description	File name	Date received
EFF-13	Regulatory Accounts statement 2011/12	Regulatory Accounts Statements 8 / 9 / 12 / 13/ / 14 / 15 in Excel format	Arup stats.xls	
EFF-14	Investment Expenditure Report	Investment Expenditure Report; Period Actual, Period Budget, Period Variance, YTD Actual, YTD Budget, YTD Variance, Full Year Forecast, Full Year Forecast , Full Year Variance	Delcap_P13.xls	03 May 2012
EFF-15	Reconciliation of renewals expenditure - REEM vs. Statement 9b	Reconciliation of renewals expenditures used for REEM calculation and as seen on Statement 9b at asset level - as response to Issues and Queries log Issue 41.	Reconciliation of 9b to REEM - actuals.xls	23 May 2012
EFF-16	FVA handbook	FVA handbook received in response to catch up meeting 28 May 2012	FVA v 0.6.doc	30 May 2012
EFF-17	ORR Board decision on Network Rail's performance in the long distance sector in 2012-13 and 2013-14	Letter from ORR to Network Rail (29 May 2012) regarding Network Rail licence breach	290512-performance-breach-letter[1].pdf	30 May 2012
EFF-18	ORR Board decision on Network Rail's performance in the long distance sector in 2012-13 and 2013-14.	Letter from ORR (Richard Price) to Network Rail (David Higgins) regarding Network Rail's performance in the long-distance sector (dated 29th May 2012)	290512-performance-breach-letter.pdf	01 June 2012
EFF-19	REEM Calculation Model	Updated year-end REEM efficiency calculation model	REEM Model 070612.xls	07 June 2012
EFF-20	Letter: Re. Breach of condition 1 of Network Rail's network licence with regard to operational performance	Letter from Network Rail to ORR (30th March 2012) regarding measures to improve train performance in light of the company's licence breach	Michael Beswick (submission for breach) 300312 (3).pdf	13 June 2012
EFF-21	Transformation Steering Group Investment Paper - Intelligent Infrastructure - Remote Condition Monitoring	Investment Paper setting out investment case for installation of Remote Condition Monitoring for S&C and cabling assets	FINAL IP paper for Phase 1 Rollout v6 171209.doc	13 June 2012

Reference	Title	Description	File name	Date received
EFF-22	ORR Board decision on Network Rail's performance in the long distance sector in 2012-13 and 2013-14	Letter from Network Rail (David Higgins) to ORR (Richard Price) regarding Network Rail's response to the ORR's enforcement order relating to long-distance performance (dated 22nd June 2012)	Letter dated 22 Jun 2012a (2).pdf	22 June 2012
EFF-23	Passenger and freight train mileage FY 2011-2012	Spreadsheet containing numbers for Passenger train mileage broken down by sector (Long Distance, Regional, London & SE, Scotland) derived from National Rail Trends. Provided by ORR.	TMileage and FMileage_20112012 - Arup request.xls	29 June 2012
EFF-24	REEM Calculation Model	Updated year-end REEM efficiency calculation model	REEM Model 180712.zip	24 July 2012
Maintenance efficiency (REEM)				
MTCE-1	Maintenance Operational Expenditure	Maintenance opex 11/12 vs. 08/09 broken down by cost type sub-category	Appendix 3.pdf	16 April 2012
MTCE-2	Maintenance 2011/12 Interim Efficiency Report	Report documenting REEM efficiencies, underlying drivers and PMAs	Maintenance PMAs.pdf	16 April 2012
MTCE-3	Maintenance & Ops - Year End Review	Minutes of O&M efficiencies challenge meeting.	Mtce Ops Internal Review.pdf	16 April 2012
MTCE-4	Maintenance 2011/12 Efficiency Report	Report documenting REEM efficiencies, PMAs and sustainability evidence.	Maintenance 1112 PMAs FY.pdf	16 April 2012
MTCE-5	Phase 2bc details	Details of agreement, Output from discussions held at ACAS were incorporated into the Work Practice changes	Phase 2bc follow up brief - 13 04 12.pdf	30 April 2012
MTCE-6	Maintenance organisation supporting document	maintenance organisational changes, the trends of outputs and critical work bank control measures	Phase 2bc supporting document to ORR - 28 03 12.pdf	30 April 2012
MTCE-7	Excel version of Statements 8, 7a and 14	Excel file from which Statement 8 (maintenance), 7a (operation) and 14 (MUC) are produced	Net Ops 1112 Reg Accountsv2.xls	09 May 2012
MTCE-8	Maintenance cost extract from General Ledger	General Ledger output showing raw maintenance cost data. This is where 'Centrally managed' maintenance costs in Statement 8b (1) come from.	Reports_P13.xls	09 May 2012

Reference	Title	Description	File name	Date received
MTCE-9	Maintenance FRM702	Maintenance FRM702 handbook (version 12, September 2011) detailing updated MUC MNT costs	FRM702 Version 12 02 sep 2011.pdf	14 May 2012
MTCE-10	Calculation of efficiencies resulting from Positive Management Action	Quantified breakdown of efficiencies attributable to PMA measures	PMA Benefits - Maintenance.doc	14 May 2012
MTCE-11	PMA National & Local management actions	Table of efficiencies relating to National & Local management actions	Local National PMA 2011 12.doc	14 May 2012
MTCE-12	BV1000	Email (Feb 2012)with notes of deployment of BV1000 equipment and saving	BV1000.msg	14 May 2012
MTCE-13	BV1000 meeting	Notes of meeting regarding BV1000 deployment	BV1000 meeting.msg	14 May 2012
MTCE-14	LNWS Business Plan Extract / variance analysis	Sample spreadsheet setting out cost and resource-based savings analysis (from LNW Route South)	LNWS BP Extract.xls	14 May 2012
MTCE-15	MBR Maintenance Efficiency Summary	Sample quantified maintenance efficiency summary (London North Eastern)	LNE MBR P6.pdf	14 May 2012
MTCE-16	Updated Network Ops PMA	Email containing updated table with breakdown of maintenance PMAs	Updated Network Ops PMAs.msg	07 June 2012
MTCE-17	Maintenance response to version 1.0 of year-end report into Network Rail Regulatory Accounts Interim Data Assurance	Paper setting out further details of maintenance delivery and performance measures in the context of robustness and sustainability in the delivery of outputs	Maintenance 1112 Efficiency Report - Supplementary Paper - 13 06 12.doc	13 June 2012
MTCE-18	RE: Maintenance efficiencies - vegetation management	Email containing table setting out the new unit cost breakdown by standard job / activity category and unit of measure for the new MUCs (MNT170, MNT171 & MNT172) replacing the previous MUC code (MNT 074) still used for efficiency reporting.	Email "RE: Maintenance efficiencies - vegetation management"	19 June 2012

Reference	Title	Description	File name	Date received
MTCE-19	Track response to Arup feedback of 15 June 2012 on year-end report into Network Rail regulatory accounts interim data assurance	Additional paper containing further information regarding track maintenance condition and performance measures and commentary on the linkage with train performance measures.	Maintenance 1112 Efficiency Report - Second Supplementary Paper - 26 06 12.doc	26 June 2012
MTCE-20	Track Performance Summary - position at period 3 v2.doc	Short paper setting out results for key track asset performance indicators for the first three periods of FY 2012/13 together with projected performance for the remainder of the FY.	Track Performance Summary - position at period 3 v2.doc	18 July 2012
MTCE-21				
Maintenance costs and MUCs				
MUC-1	Reporting of Maintenance Unit Costs - Version 12.0 1/10/2009	Specifies the framework and breakdown of key activity types to be used for the identification and reporting of maintenance volumes and associated costs	FRM702 Version 11 1.pdf	03 May 2012
MUC-2	Reporting of Maintenance Unit Costs - Version 12.0 02/09/2011	Specifies the framework and breakdown of key activity types to be used for the identification and reporting of maintenance volumes and associated costs	FRM702 Version 12 02 sep 2011.pdf	03 May 2012
MUC-3	"MUCs and CEM"	PPT outlines systems for gathering data related to the MUCs and CEM	1.B - New MUC Structure.ppt	29 May 2012
MUC-4	Not titled	PPT outlines MUC system before and after Hyperion system was introduced	1.C - MUC-HYPERION.ppt	29 May 2012
MUC-5	Maintenance Unit Costs	Excel chart explains how the MUCs are calculated	1.D - MUC Explanation Chart.xls	29 May 2012
MUC-6	Not titled	Chart explains difference between old and new MUC calculations	1.A - MUCs.doc	29 May 2012
MUC-7	Change Request (CR) Process	Explains change control process	3.A - MUC Framework Change Request Process.doc	29 May 2012
MUC-8	Maintenance Unit Cost Accuracy Study	4 page outline of study	2.A - MUC Scope (2).doc	29 May 2012

Reference	Title	Description	File name	Date received
MUC-9	Maintenance FRM702 (Version 11; October 2009)	This document specifies a procedure for capturing unit cost data and ensuring consistency of unit definitions and cost allocation principles.	3.C - FRM702 Version 11.1.zip	29 May 2012
MUC-10	Maintenance FRM702 (Version 12; Sept. 2011)	This document specifies a procedure for capturing unit cost data and ensuring consistency of unit definitions and cost allocation principles.	3.D - FRM702 Version 12 02 sep 2011.pdf	29 May 2012
MUC-11	Maintenance Unit Cost Process	MUC Handbook	3.B - MUC Handbook v3.doc	29 May 2012
MUC-12	Unable to open	Unable to open	3.E - MUC Plan2 17.04.2012.mpp	29 May 2012
MUC-13	MUC Working Group TOR	MUC Working Group TOR	3.F - MUC Working Group TOR V2.doc	29 May 2012
MUC-14	Cost and headcount breakdowns by MDU	Cost and headcount breakdown by MDU, for the review of Statement 8b. Received as the response to issue 16 of the Issues and Queries log	ARUP Detail Maintenance 1112 v1 1 (2).xls	31 May 2012
MUC-15	Not titled	MUC input data spreadsheet with route-level structure	Copy of MtceCEPeriod 13 Template 19Apr MUC updates.xls	06 June 2012
MUC-16	Not titled	MUC spreadsheet presenting MUC at cost-centre level breakdown	Unit Cost 4 - Infrastructure Maintenance Unit Costs - CC Format.xls	06 June 2012
MUC-17	MUC (Maintenance Unit Costs) data assurance review	Meeting notes from MUC meeting on 7th June	20120608_Meeting_note_MUC unit cost review v.1.docx	08 June 2012
MUC-18	MUC (Maintenance Unit Costs) data assurance review	Meeting notes from MUC meeting on 7th June-amended	20120608_Meeting_note_MUC unit cost review v 2.docx	08 June 2012
MUC-19	Hyperion MUC Process - As at 12/4	Description of when Hyperion activities need to be completed by	1A) Hyperion Process sheet 12.6.12.doc	13 June 2012
MUC-20	Not titled	Mapping between MUC codes as defined in FRM702 V11.1 to those defined in FRM702 V12	2A) Old Mucs - New MUCs Conversion Table (ARUP 12.6.12).xls	13 June 2012

Reference	Title	Description	File name	Date received
MUC-21	2011/12 OTL Rates for Labour Appropriation	Presentation showing how labour rates are calculated	3A) OTL Rate FY12 (ARUP 12.6.12).ppt	13 June 2012
MUC-22	Not titled	Hyperion report showing unit costs and data by IMDM and MNT Code for Week 1 of the period	Period 10 1112 Week 1.xls	13 June 2012
MUC-23	Not titled	Hyperion report showing unit costs and data by IMDM and MNT Code for Week 3 of the period	Period 10 1112 Week 3.xls	13 June 2012
MUC-24	Not titled	Hyperion report showing unit costs and data by IMDM and MNT Code for Week 1 of the period	Period 11 1112 Week 1.xls	13 June 2012
MUC-25	Not titled	Hyperion report showing unit costs and data by IMDM and MNT Code for Week 3 of the period	Period 11 1112 Week 3.xls	13 June 2012
MUC-26	Not titled	Hyperion report showing unit costs and data by IMDM and MNT Code for Week 1 of the period	Period 12 1112 Week 1.xls	13 June 2012
MUC-27	Not titled	Hyperion report showing unit costs and data by IMDM and MNT Code for Week 3 of the period	Period 12 1112 Week 3.xls	13 June 2012
MUC-28	Not titled	Hyperion report showing unit costs and data by IMDM and MNT Code for Week 1 of the period	Period 13 1112 Week 1.xls	13 June 2012
MUC-29	Not titled	Hyperion report showing unit costs and data by IMDM and MNT Code for Week 3 of the period	Period 13 1112 Week 3.xls	13 June 2012
MUC-30	Not titled	Hyperion report showing unit costs and data by IMDM and MNT Code for Week 1 of the period	Period 6 1112 Week 1.xls	13 June 2012
MUC-31	Not titled	Hyperion report showing unit costs and data by IMDM and MNT Code for Week 3 of the period	Period 6 1112 Week 3.xls	13 June 2012
MUC-32	Not titled	Hyperion report showing unit costs and data by IMDM and MNT Code for Week 1 of the period	Period 7 1112 Week 1.xls	13 June 2012

Reference	Title	Description	File name	Date received
MUC-33	Not titled	Hyperion report showing unit costs and data by IMDM and MNT Code for Week 3 of the period	Period 7 1112 Week 3.xls	13 June 2012
MUC-34	Not titled	Hyperion report showing unit costs and data by IMDM and MNT Code for Week 1 of the period	Period 8 1112 Week 1.xls	13 June 2012
MUC-35	Not titled	Hyperion report showing unit costs and data by IMDM and MNT Code for Week 3 of the period	Period 8 1112 Week 3.xls	13 June 2012
MUC-36	Not titled	Hyperion report showing unit costs and data by IMDM and MNT Code for Week 1 of the period	Period 9 1112 Week 1.xls	13 June 2012
MUC-37	Not titled	Hyperion report showing unit costs and data by IMDM and MNT Code for Week 3 of the period	Period 9 1112 Week 3.xls	13 June 2012
MUC-38	Not titled	P13 MUCs-Including percentage of maintenance spend covered by New MUCs	3B1) NEW MUCS P13 BIIM + Missing hours + HQ apportion +Vol Correct v1(ARUP 19.6.12).xls	19 June 2012
MUC-39	Not titled	P13 MUCs-Including data to allow percentage of maintenance spend covered by Old MUCs to be calculated	3b) OLD MUCS P13 MIIM + Missing hours + HQ apportion + Vol Correct v1(ARUP 19.6.12).xls	19 June 2012
MUC-40	Maintenance Unit Cost Process	MUC Handbook V2.1	4A) MUC Hand Book V2.1(ARUP 19 June 2012).doc	19 June 2012
Operations cost efficiency (REEM)				
OPEX-1	Information Management Efficiencies @ 2011/12 (CP4 to date)	IM opex efficiencies description and PMAs	01 PMA IM Opex Efficiencies CP4 to date @ 11-12.pdf	16 April 2012
OPEX-2	Opex Network Operations O&CS PMAs	Network Operations - Opex costs efficiencies - PMA proforma	Ops PMAs.pdf	16 April 2012
OPEX-3	Opex PMA Analysis - Government & Corporate Affairs	PMA Proforma - Government & Corporate Affairs	(Hard copy)	17 April 2012

Reference	Title	Description	File name	Date received
OPEX-4	Opex PMA Analysis - Human Resources	PMA Proforma - Human Resources	(Hard copy)	17 April 2012
OPEX-5	Operations Support Costs	Breakdown of Support Costs opex and efficiency by functional sub-category	OpsSupport.xls	26 April 2012
`	Strategic Sourcing PMAs	PMA proforma for efficiencies in Strategic Sourcing opex category	Strat Sourcing PMA.pdf	27 April 2012
OPEX-7	Property PMAs	PMA proforma for efficiencies in Property opex category	Property opex PMA.pdf	27 April 2012
OPEX-8	OPEX: Network Operations - O&CS; PMA analysis	Positive Management Actions Analysis	Ops New PMA Proforma FY.pdf	03 May 2012
OPEX-9	OPEX: Network Operations - O&CS; PMA analysis	Updated Positive Management Actions Analysis with updated figures	Ops New PMA Proforma FY.XLS	07 June 2012
Track renewals (REEM)				
TRACK-1	Efficiency Report (REEM) - Track Renewals	Report detailing 11/12 track renewals efficiencies including volume & unit cost breakdown and suporting evidence base.	TRACK EFFICIENCY REPORT Year End 2011-12 FINAL 16th April 2012.pdf	16 April 2012
TRACK-2	Track Year-End Review Minutes	Minutes of internal review and challenge meeting	Track Internal Review - draft minutes.pdf	16 April 2012
TRACK-3	Positive Management Actions Analysis	Summary table with high-level breakdown of track efficiency calculations.	Track PMAs.pdf	16 April 2012
TRACK-4	Historical Volumes - Track (excl West Coast proj)	Profile of Plain Line & S&C annual renewals volumes since 2003/04	(Hard copy)	24 April 2012
TRACK-5	Broken Rails	Broken Rails stats	Rail Breaks.pdf	02 May 2012
TRACK-6	Track Renewals, Maximising CP4 Delivery – HO	Strategy to Maximise CP4 Delivery	Maximising CP4 delivery - ho.pdf	02 May 2012
TRACK-7	Reporting of Track Unit Rates	Document containing definitions and standards for measurement of track renewals activities	AS Reporting of Track Unit Rates.pdf	04 April 2012
TRACK-8	P13 returns from Track	Submission from Track, source file for the REEM model	return from track volume P13v6.xls	09 May 2012

Reference	Title	Description	File name	Date received
TRACK-9	10/11 Track efficiency calculation	Extract of Track efficiency calculation for FY 10/11. Includes detailed explanation of how unit cost and volume baselines were derived.	1011 efficiency calculation	11 May 2012
TRACK-10	Baseline budget for maintenance develivered track renewals	Details of 11/12 baseline budget for maintenance delivered track renewals	Track Workbank Formally Agreed Baseline.xlsx	15 May 2012
TRACK-11	Actual cost downloads from OP	Actual cost downloads from OP, showing some adjustments made by FC to OP costs	11-12 Cost info to ARUP.xls	15 May 2012
TRACK-12	Written response to Issue 26	Written response from Sue Coverdale (Head of Track AM) on Issue 26 on Issues & Queries log regarding deferral of track renewals and residual asset life	Track response SCoverdale - issue 26.doc	28 May 2012
TRACK-13	Baseline unit cost calculation	Summary of Track REEM baseline unit cost calculation showing IMT, Maintenace and Enhancement exit costs and volumes in 08/09 and inflated to 11/12 prices	Baseline Calculation.xls	28 May 2012
TRACK-14	Written response to Issue 27	Written response from Sue Coverdale (Head of Track AM) on Issue 27 on Issues & Queries log regarding variances seen between REEM baseline unit costs used in 10/11 and 11/12.	Track baseline issue - issue 27.doc	28 May 2012
TRACK-15	OP backup showing old track projects	OP extract showing selected track projects from previous financial years with adjustments to current year expenditure shown. Received as a response to a query sent to Ram Ramakrishnan regarding Track RUC calculation	P13-12 ARUP Query Projects backup from OP.xls	31 May 2012
TRACK-16	Planned vs Actual 11_12 for arup.ppt	Charts with breakdown of planned vs. actual Plain Line and S&C delivery volumes by route criticality	Planned vs Actual 11_12 for arup.ppt	31 May 2012
TRACK-17	P13 Volume Variance by Project-worksite v1 1.xls	Breakdown of budget vs. actual track renewal volume by worksite	P13 Volume Variance by Project-worksite v1 1.xls	31 May 2012

Reference	Title	Description	File name	Date received
TRACK-18	Track Volumes 2011-12.xls	Spreadsheet containing track renewal volumes broken down by Work Order UID & Plain Line activity type	Track Volumes 2011-12.xls	31 May 2012
TRACK-19	VTISM Route Sustainability V2 with sleeper & S&C age.xls	Charts with overview of track condition, age and used life measures broken down by region and criticality categorisations	VTISM Route Sustainability V2 with sleeper & S&C age.xls	31 May 2012
Buildings (operational property) renewals (REEM)				
BLDG-1	Business Plan	Consolidated Business Plan for 2011/12 and rest of CP4m sent in response to Issues and Queries log Issue 1	Buildings Consolidated BP Frozen P02-13.xls	23 May 2012
BLDG-2	Change control for Business Plan	Change Control log for Business Plan sent in response to Issues and Queries log Issue 1	Buildings 1112 CC All.xls	23 May 2012
BLDG-3	Template for Buildings REEM calculation	Template for Buildings REEM calculation with full CP4 baseline and actual / forecast expenditure profile	Rebaseline template nonvol_P13_Operational Property.xls	30 May 2012
BLDG-4	PMA template for buidling	PMA template for buildings including a workings tab that explains the calculation - received as response to issue 2	New PMA Proformav2_JM_P13_for Arup.xls	30 May 2012
BLDG-5	PMA template for buidling	Short statement regarding the status of Ops Property asset condition monitoring for the remainder of CP4.	Ops Prop SSM LMDSM condition measures.doc	21 May 2012
Civils renewals (REEM)				
CVLS-1	Civils PMA descriptions (additional detail)	2 page document describing civils and operationsl property PMAs (not quantified)	Civils Ops Prop PMAs Additional Detail.pdf	16 April 2012
CVLS-2	Civils PMA pro forma	Unit, volume and non-volume efficiency PMA pro forma for civils & op property	Civils Ops Prop PMAs.pdf	16 April 2012
CVLS-3	B&C Asset Management Volume Efficiencies	2 page document describing basis for civils volume savings calculations	B&C Justification for volume efficiency claim.pdf	16 April 2012
CVLS-4	Buildings and Civils' Asset Policy Compliance	Current standing on asset policies for both categories	Buildings Civils Policy	16 April 2012

Reference	Title	Description	File name	Date received
			Compliance v1.0.pdf	
CVLS-5	Management of Earthworks & Volume Reporting Update @P5 -12	24 page PPT detailing claimed efficiency	ORR Earthworks Vol Reporting Update.pdf	16 April 2012
CVLS-6	Tunnel volume reporting update	PPT detailing claimed efficiency	Tunnels Vol Reporting.pdf	16 April 2012
CVLS-7	Year-end meeting minutes	1 page of minutes; AB queries	Civils Internal Review - draft minutes.pdf	16 April 2012
CVLS-8	The application of CP4 policy to the Civils' Business Plan	Slide pack describing application of civils policy to CP4 activities	(Hard copy)	23 April 2012
CVLS-9	B&C Workbank Planning - Non-Financial KPIs	Updated B&C workbank planning KPIs chart - updated to P13 2011/12		23 April 2012
CVLS-10	Performance management meeting	Civils meeting notes	120308 - Civils Performance Management meeting that illustrates Mervyn's points - vsn 1.0.pdf	27 April 2012
CVLS-11	CP4 Progress meeting	Civils meeting notes	120329 - Civils Asset Management in CP4 - progress meeting - 29 Mar 12 v1.0.pp.pdf	27 April 2012
CVLS-12	Asset management meeting	Civils meeting notes	120329 - Civils Asset Management in CP4 progress meeting - vsn 0 1.pdf	27 April 2012
CVLS-13	CIVILS ASSET MANAGEMENT IN CP4 PROGRESS MEETING	Civils meeting notes	120329 - Civils Asset Management in CP4 progress meeting - vsn 0.1.docx	27 April 2012
CVLS-14	Brief notes from ORR liason meeting held on Friday 9 march 2012.msg	Supporting email exchange	Brief notes from ORR liason meeting held on Friday 9 march 2012.msg	27 April 2012
CVLS-15	Civils internal review minutes	Minutes in supoprt of sustainability claims	Civils Internal Review - draft	27 April 2012

Reference	Title	Description	File name	Date received
			minutes.pdf	
CVLS-16	Notes from the Civils CP4 Asset Management-29 Mar 12.msg	Supporting email exchange	RE For Review please Notes from the Civils CP4 Asset Management-29 Mar 12.msg	27 April 2012
CVLS-17	Notes from the Civils CP4 Performance Management Meeting - Thu 8 Mar.msg	Supporting email exchange	RE Notes from the Civils CP4 Performance Management Meeting - Thu 8 Mar.msg	27 April 2012
CVLS-18	JMoore Civils response to Arup.pdf	Numerical tables: CP4 civils volume & expenditure profile, retaining walls info.	JMoore Civils response to Arup.pdf	27 April 2012
CVLS-19	RWI & Work Type Definitions NR/CIV/B&C/Vol Issue 1	Guidelines for the reporting of renewals RWI volumes.	NR-BC-Civ-Vol Issue1.pdf	15 July 2011
CVLS-20	AM (B&C) Business Planning	Asset Management (B&C) Business Planning Process & Guidelines	Asset Management_BC_Business Planning Guidelines v1 2 (30 10 09).doc	
CVLS-21	CEM and REEM GB spreadsheet - civils volume	Source data and calculation spreadsheet for civils renewals volumes, expenditure,unit costs and REEM efficiency	Rebaseline template volume civils_P13.xls	01 May 2012
CVLS-22	CEM and REEM GB spreadsheet - civils non-volume	Source data and calculation spreadsheet for civils "non-volume" expenditure and REEM efficiency	Rebaseline template nonvol_P13_Civils.xls	01 May 2012
CVLS-23	condition performance information	condition performance information broken down by Buildings, structures and geotechnics	BC condition performance information - 2011-12.pdf	01 May 2012

Reference	Title	Description	File name	Date received
CVLS-24	B&C CP4 Efficiency – Arup	B&C output results, comparing 2010/2011 against the previous year and CP4 target	BC condition performance information.pdf	01 May 2012
CVLS-25	CP4 Business Plan Annual Volume and Budget Comparisons with Calculated FD Equivalent Baselines in Post-Efficient Cash Prices	Comparison y-o-y of volumes, budget and unit rate per item	BVRT Baseline P6 for ARUP.xls	02 May 2012
CVLS-26	Network Rail Letter: Civils Cost and Volume Reporting	Letter from Network Rail to ORR (13th May 2011) regarding Civils Cost and Volume Reporting	cost volume reporting.pdf	02 May 2012
CVLS-27	ORR Letter: Civils Cost and Volume Reporting	Letter from ORR to Network Rail (7th July 2011) regarding Civils Cost and Volume Reporting	1395_001.pdf	02 May 2012
CVLS-28	P13 returns from civil	Submission from civils, source file for the REEM model	return from civils volume P13.xls	09 May 2012
CVLS-29	Expenditure figures breakdown in DP12 headings	Breakdown of Buildings and Civils expenditures into DP 12 headings, responsible Financial Controller John Moore.	Stat9b B&C.xls	09 May 2012
CVLS-30	Volumes 2011-12	Overview of budget vs. actual year-end civils volumes with explanation for variances	Volume delivery 2011-12 - extract from ERM.pdf	10 May 2012
CVLS-31	Volumes 2011-12	Overview of budget civils volumes vs. those projected at P10 for year-end with explanation for variances	P10 Volumes ERM Slide.xls	10 May 2012
CVLS-32	Civils sheets review - v.2 - Network Rail responses	Network Rail responses to civils efficiency calculation questions raised by Arup	Civil sheets review-v 2.xlsx	11 May 2012
Electrification and power renewals (REEM)				
E&P-1	PMA pro forma by project	3 page PMA pro forma by project	E&P PMAs Final.pdf	16 April 2012
E&P-2	E&P Sustainability	6-page text summary (PPT)	E&P Sustainability Slides.pdf	16 April 2012

Reference	Title	Description	File name	Date received
E&P-3	E&P PMAs Final.xls	Project by project breakdown of E&P renewals costs & calculated efficiencies	E&P PMAs Final.xls	26 April 2012
E&P-4	E&P Deliverability Review	Presentation explaining how E&P projects for the last two years of CP4 will be resourced and delivered. Received as a response to Issue 12	Electrification CP4 Deliverability Review v3.ppt	30 May 2012
Signalling **renewals** (REEM)				
SIG-1	PMA pro forma - Signalling, Telecoms and E&P	Single page pro forma	PMA - Proforma - SPC Submission - P13.pdf	16 April 2012
SIG-2	Signalling REEM efficiency	Efficiency quantities reported by PMA	Signalling PMAs Final.pdf	16 April 2012
SIG-3	Transformation Programme: Modular Signalling	Description of programme	PMA - S14 Modular Signalling.pdf	16 April 2012
SIG-4	"Signalling sustainability story"	3 charts for presentation	Signalling Sustainability.pdf	16 April 2012
SIG-5	Signalling Volumes Efficiency Analysis for Control Period 4	Review of variances between 2010 Delivery Plan and 2011 Annual return.	Sustainability - Signalling Volume movement explanation.pdf	16 April 2012
SIG-6	Signalling Stewardship Indicator	Capture of on-screen image	ASI.pdf	16 April 2012
SIG-7	SP&C ?] Year End Review	1 page draft year-end minutes	SP&C Internal Review - draft minutes.pdf	16 April 2012
SIG-8	Signalling PMAs Final v2.xls	Project by project signalling renewals costs & calculated efficiencies	Copy of Signalling PMAs Final v2.xls	26 April 2012
SIG-9	SPC Baseline vs actuals	SPC Baseline, adjusted baseline and actuals	SP&C Baseline vs Actuals.xls	01 May 2012
SIG-10	Expenditure figures breakdown in DP12 headings	Breakdown of SP&C expenditures into DP 12 headings, responsible Financial Controller Simon Appleyard	stat9b SP&C.xls	09 May 2012
SIG-11	Signalling renewals efficiency submission	Submission from civils, source file for REEM calculation	return from signalling vol P13.xls	10 May 2012
SIG-12	EV calculation LXEU and SEU	Detail of EV calculations showing AFC, planned total volume and calculation of unit rates for LXEU and SEU. Received as response to Issue 48/	EV Calc Example.xls	30 May 2012

Reference	Title	Description	File name	Date received
Telecoms renewals & FTN (REEM)				
TEL-1	Telecoms REEM efficiency	Efficiency quantities reported by PMA	Telecoms PMAs Final.pdf	16 April 2012
TEL-2	SP&C Volumes Efficiency Analysis for Control Period 4 - Telecoms	Detailed text explanation	Sustainability - Telecoms Volume movement explanation.pdf	16 April 2012
TEL-3	Telecoms Expenditure Charts	2 pages, including 2 charts and comparison to IIP	Telecoms slides - long term view for sustainability 11 October 2011.pdf	16 April 2012
TEL-4	FTN/GSM-R - 2011/12 Year End Efficiency Schedule	Summary of FTN CP4 expenditure vs. baseline and REEM calculation.	FTN GSM-R Efficiency.pdf	16 April 2012
TEL-5	Telecoms Asset Policy	Network Rail Telecoms Asset Policy for the IIP (dated September 2011)	150_ORR-#427990-v1-20110930_NR_PR13_CP5_Telecoms_Asset_Policy_for_IIP.pdf	16 April 2012
TEL-6	Infrastructure Progress Dashboard	Period 13 example of FTN programme dashboard	FTN GSM-R ERM 11_12 Period 13.pdf	24 April 2012
TEL-7	FTN/GSM-R Infra. Programme Request for Authority	Programme 1 authority paper with programme background	FTN-GSM-R Board Paper April 2010 - Infrastructure (2)	24 April 2012
TEL-8	Authority Paper: Cab Mobile	Programme 2 (of 2) authority paper	Cab Mobile Authority Paper.pdf	24 April 2012
TEL-9	Telecoms PMAs Final.xls	Project by project telecoms renewals costs & calculated efficiencies	Telecoms PMAs Final.xls	26 April 2012
TEL-10	Expenditure figures breakdown in DP12 headings	Breakdown of FTN expenditures into DP 12 headings, responsible Financial Controller Jon Cunningham	Stat9b ftn.xls	09 May 2012
TEL-11	Asset Management Policy - Telecommunications Engineering	Received as a response to Issues log isse ref 23.	Telecoms Policy1.pdf	23 May 2012
TEL-12	TSI measures	Email with 2011/12 TSI asset condition and reliability measures	Email: (Subject: "TSI measures")	21 June 2012
TEL-13	FTN GSM-R Business Requirements Specification.doc	FTN GSM-R Business Requirements Specification	FTN GSM-R Business Requirements Specification.doc	26 June 2012

Reference	Title	Description	File name	Date received
TEL-14	FTN GSM-R Functional Requirements Specification.doc	FTN GSM-R Functional Requirements Specification	FTN GSM-R Functional Requirements Specification.doc	26 June 2012
TEL-15	FTNGSM-R Client Requirements 3.1, 3.2, 4.xls	FTNGSM-R Client Requirements 3.1, 3.2, 4	FTNGSM-R Client Requirements 3.1, 3.2, 4.xls	26 June 2012
IT & Other renewals (REEM)				
IT-1	IM Renewals Efficiencies 2011/12	IM hardware, software and system integrator renewals efficiencies	02 PMA IM Capex Efficiencies YE 11-12.pdf	16 April 2012
IT-2	Property FY 11/12 - REEM	Comments oncommercial property nefficiency reported in REEM	(Hard copy)	17 April 2012
IT-3	Expenditure figures breakdown in DP12 headings	Breakdown of Plant and Machinery expenditures into DP 12 headings, responsible Financial Controller Mike Black	stat9b NDS.xls	09 May 2012
IT-4	definitions and breakdown of the EEA & Other categories	definitions and breakdown of the EEA & Other categories in response to catch-up meeting 28 May	EEA & Other categories.doc	30 May 2012
IT-5	Summary - Pre-Efficient Baseline v P8 Forecast submission DP12 11/12 Cumulative Variances	Tables breaking down original (pre-efficiencient) vs. actual Plant & Machinery renewals expenditure by P&M asset type	REEM P13 2011-12.pdf	18 June 2012
Renewals costs and RUCs				
RUC-1	Renewals Unit Cost handbook	Network Rail handbook setting out RUC process and calculations	Unit Cost Handbook 27 04 2012 (2).pdf	03 May 2012
RUC-2	Calculation of Renewals Unit Costs for 2011/12	Document describing the process for calculating of RUCs	Calculation of Renewals Unit Costs for 2012.doc	11 June 2012
RUC-3	Civils RUC P3e extracts and OP screenshot	P3e extracts and OP screenshots for selected sample projects showing COWD, AFC and how they compare to REEM costs	NAT-000000-PPC-Civils-Period 13-12 Volume Report.xls	21 May 2012
RUC-4	Proposed Route Budgets	Proposed route budgets and number of schemes planned for the £244m Autumn Statement funds (response to Issue 8 on Issues & Querires log)	ESP Proposed Route Budgets m .pdf	29 May 2012

Reference	Title	Description	File name	Date received
RUC-5	BG3 deferral into CP5	Business Plan extract showing BG3 works that are expected to be deferred to CP5, response to Issue 9 on Issues & Queries log	Book1.xls	29 May 2012
RUC-6	CP4 Civils Enhanced Spend Strategy Document	Document setting out Netowrk Rail's strategy for the Enhanced Spend Programme funded by the £250m Autumn Statemen funding	Enhanced Spend Strategy Document - Final Issue 1.pdf	29 May 2012
RUC-7	PMA template for civils	PMA template for civils including a workings tab that explains the calculation - received as response to issue 2	New PMA Proformav2_JM_P13_for Arup.xls	30 May 2012
RUC-8	RE: Telecoms RUC Data Request	Table listing COWD and AFC figures for requested sample telecoms projects.	Email: (Subject: "RE: Telecoms RUC Data Request")	01 June 2012
RUC-9	RUC review meeting - civils project sample data	Sample cost data and records relating to requested civils renewals projects.	Email: (Subject: "RUC Review Meeting - Back up required") containing attachments: - 115144 kirkby.pdf - 115157 bridgewater.pdf - 115630 Lindal tunnel.pdf - 117908 Birklands Beck.pdf - 115951.pdf - 106837 Bishopton.pdf - 104058 m6 motorway.pdf	12 June 2012
RUC-10	RUC review meeting - additional civils project sample data	Sample cost data and records relating to requested civils renewals projects.	Email: (Subject: FW "RUC Review Meeting - Back up required") containing attachments: - 117908 Birklands Beck.pdf - 115144 Kirkby Pool].pdf - P509 Payment Notice.pdf	13 June 2012

Reference	Title	Description	File name	Date received
RUC-11	TcomAuthPs.zip	Investment authority papers for 23 x sample telecoms renewals projects	Zip file "TcomAuthPs.zip", containing: - WES_106695_Telecoms SISS_P... .pdf - Telecoms Western DD6800 Swind... .pdf - Telecoms Western 118833 DOO ... .pdf - Telecoms Western 112257 Radyr ... .pdf - Telecoms Western 112256 Thame... .pdf - Telecoms SEA 112254 Guildford S... .pdf - Telecoms SEA 103875 Woking Si... .pdf - Telecoms LNW 112245 LNW Con... .pdf - Telecoms LNE 112231 LNE Small ... .pdf - Telecoms LNE 112228 York Conc... .pdf - Telecoms LNE 106683 LNE DOO ... .pdf - Telecoms Kent 121909 Ashford Si... .pdf - Telecoms Scotland 119943 Scorla... .pdf - LNE 123084 LNE Telecoms	26 June 2012

Reference	Title	Description	File name	Date received
			Retail ... .pdf - DDDA13.pdf Adobe Acrobat ... .pdf - 123087.pdf Adobe Acrobat ... .pdf - 118808.pdf Adobe Acrobat ... .pdf - 112250 Liverpool Lime Street GRI... .pdf - 112230.pdf Adobe Acrobat ... .pdf - 106690.pdf Adobe Acrobat ... .pdf - 106656 July SP&C panel issue 2.pdf - 101888 GE CIS 210907_ Stage 3-....pdf - 100813 - Investment Paper Post I... .pdf	

Reference	Title	Description	File name	Date received
RUC-12	SingAuthPs.zip	Investment authority papers for 18 x sample signalling renewals projects	Zip file "SingAuthPs.zip", containing: - Signalling Western 100395 Stocks Lane Causeway Level Crossing Renewals.pdf - Signalling SEA 112204 Charlton Lane Level Crossing Renewal.pdf - Signalling SEA 100110 Feltham West MCB Level Crossing Renewal.pdf - Signalling Scotland 101923 Annat East West LX Renewal.pdf - Signalling National 112202 East Lancashire MCB Level Crossing Renewals.pdf - Signalling National 106714 Tisbury to Gillingham Level Crossing Renewals.pdf - Signalling LNE 107071 Doncaster & Brampton Fell Level.pdf Crossing Renewals.pdf - 116104_Ley_5_8_ Investment Paper 1 2.pdf - 112195 Tranche 8 Level Crossing Renewals (x4).pdf - 109355.pdf - 107136.pdf - 107075.pdf - 107073.pdf - 107072.pdf - 106713 104553 101509 101507.pdf - 104550.pdf - 101843.pdf - 100396 - Colthrop and Kintbury Investment Paper - GRIP 5-8 270511 V1 1.pdf	27 June 2012

Reference	Title	Description	File name	Date received
RUC-13	RUC review meeting - additional civils project sample data	Sample cost data and records relating to requested civils renewals projects.	Email: (Subject: "RUC Review Meeting - Back up required") containing attachments: - 11736 london rd.pdf - 118527 sth hamp info.pdf - 119726 bay horse.pdf - 107783 morecambe.pdf - 112302 stockport info.pdf - 115169 ladybr info.pdf - 115937 skye beck.pdf - 116468 totley.pdf	28 June 2012
RUC-14	11-12 volume audit analysis	Signalling earned volume spreadsheet	Email: (Subject: "RUC records") containing attachment: -11-12 volume audit analysis.xls	29 June 2012
RUC-15	RUC Calc	COWD & AFC information requested for Signalling	Email: (Subject: "RUC calc") containing attachment: -RUC Calc.xls	29 June 2012
RUC-16	RUC Final Records	RUC Final Records	Email: (Subject: "RUC Final Records") containing attachement: -RUC.zip	05 July 2012
RUC-17	RUC Data	RUC Final Records	Email: (Subject: "RUC Final Records") containing attachements: -RUC.zip -12336 126521.xls	05 July 2012
RUC-18	RUC Data	RUC Final Records - Maintenance Delivered Track	Email: (Subject: "RUC Final Records") containing attachement: -12336 126521.xls	06 July 2012

Reference	Title	Description	File name	Date received
RUC-19	Telecoms COWD & AFC	Telecoms COWD & AFC	Email: (Subject: "Telecoms COWD & AFC")	10 July 2012
RUC-20	GL Transaction Listings and Annual COWD	GL Transaction Listings and Annual COWD (Budget)	Email: (Subject: "Telecoms COWD & AFC") containing attachements: -Listings.zip -Annual COWD.xls	12 July 2012
RUC-21	Annual COWD	Annual COWD	Email: (Subject: "Telecoms COWD & AFC") containing attachement: -Annual COWD.xls	13 July 2012
RUC-22	Civils GL Listings	Civils GL Listings	Email: (Subject: "Telecoms COWD & AFC") containing attachement: -Civilsii.xls	13 July 2012
Other Regulatory Accounts statements				
Other-1	Master file for Reg Account Statements	Master excel file from which Reg accounts statements have been produce	Master File 2011-2012.xls	09 May 2012
Other-2	Consolidated renewals efficiency numbers for all assets	Excel file with renewals efficiency numbers including baseline and actuals for all asset categories. The efficiency trajectory to the end of CP4 is also shown.	Total eff P13 for Arup.xls	09 May 2012
Other-3	Volume incentive calculation	Full calculation for Volume incentives (Statement 13) including actual mileage data	Volume Incentive for 11_12 v2.xls	23 May 2012
Other-4	Excel version of Statement 13	Excel version of Statement 13	11_12 reg accounts table for volume incentive v2.xls (changed to Stmt 13 v2.xls)	23 May 2012
Other-5	Full Regulatory Financial Statements 11/12 Version 19 May	Full set of Regulatory Financial Statements 2011/12 including narratives	RFS FY1112 version at 19may.doc	23 May 2012
Other-6	Full Regulatory Financial Statements 11/12 Version 29 May	Full set of Regulatory Financial Statements 2011/12 including narratives	RFS FY1112 version at 29 May AA.doc	30 May 2012

Reference	Title	Description	File name	Date received
REEM efficiency reporting; process assurance documents				
EFF-1	REEM Calculation Model (dummy)	REEM and CEM efficiency calculation model (populated with dummy data)	REEM and CEM Model.xls	16 April 2012
EFF-2	REEM Calculation Model	Year-end REEM efficiency calculation model	REEM Model.xls	16 April 2012
EFF-3	Our suggested basis for the Reporter's audit of Civils' efficiency	Letter from Network Rail to ORR (17th April) regarding IR audit of civils efficiency	Letter to ORR on civils policy and volumes in CP4 April 2012.pdfLetter to ORR on civils policy and volumes in CP4 April 2012.pdf	20 April 2012

Appendix D: MUC Accuracy Grading Methodology and Detailed Results

We set out below the methodology by which our analysis of MUC data accuracy under the data quality Confidence Grading process has been established, together with the full set of results for all MUC unit costs.

Previously, we received data from Ellipse, BMIS and OTL the source data that feeds in to the MUC Macro spreadsheet that, in turn, calculates the unit costs. We used this source data to calculate the unit costs ourselves and then compare the calculation to the MUC Macro output. Previously, we found a high level of correlation between our calculated unit cost and the MUC Macro unit costs: only 3% of the calculated unit costs differed from the MUC Macro unit costs by more than 1% at delivery unit level. We believed that this small difference was due to the mapping that we have used to allocate cost centres to delivery units where work is completed by one area on behalf of another. We have not investigated this discrepancy further, as we believe it would take a disproportionate amount of time to fully resolve this difference and for the purposes of this report, the above findings are sufficient to satisfy us that there is a negligible impact upon accuracy associated with the processing of data from source systems into the MUC figure. We have not received the source data to replicate this for the new process.

We have performed an analysis of the Hyperion Output files produced during week 1 and week 3 for periods 6 to 13 during 2011/12. For periods 1 to 5, the data has been taken from the MtceCEPeriod 13 Template 19Apr MUC updates file. Whilst this analysis does not give a definitive answer as to whether the MUCs are accurate or not, it does provide us with an indication of accuracy and gives us a level of confidence in our findings. The following is an explanation of the measures that have been used to give an indication of accuracy:

- **Variance**

  The variance of a measure is usually a good indicator of accuracy. However, in this case there are a number of factors which will impact on the variance of the individual MUCs. Network Rail has indicated that there will be differences in methods of working between areas that will make one area more efficient and therefore increase variance. Structural factors such as track access and geography may make working in one area more efficient than working in another area and therefore increase variance; a number of Standard Jobs with widely differing unit costs can contribute to one MUC figure, therefore the Standard Job composition of the work undertaken each period can contribute to variance. In order to account for working methods and structural variations we have compared variance to the baseline year. For each period, we have taken the Year To Date (YTD) Unit Cost and found the difference between this and the baseline year YTD Unit Cost for each MNT Code for each Route. This has then been expressed in terms of a percentage of the baseline unit cost. If this difference is the same as or less than the baseline unit cost, we have allocated a category of x1. If the difference is double we have allocated a category of x2; 3 times is x3; 4 times is x4; between 5 and 10 times the baseline unit cost is x5 and over 10 times the baseline unit cost is x10. We recognise that some of this difference may be due to increased efficiencies

compared to the baseline year but would consider such large changes to be rare (a unit cost would have to have more than halved to appear in category x2) and also consistent across periods. For each MNT Code we have then taken the number of times each category has been allocated and multiplied it by a weighting factor. As there are 10 routes and 13 periods, there will be 130 results per MNT Code. We have then weighted each category; x1 is weighted 1, x2 is weighted 2 etc. and calculated a score for each MNT Code. The most accurate MNT Codes will score 0 (130 is the minimum score possible so this is taken off the total) and the most inaccurate score would be 1130 (maximum possible is 1300 – 130). An accuracy score of 0 will be allocated an accuracy category of 1; a score less than 1130*5%=56.5 will score 2, less than 1130*10% = 113 will score 3 and over this will score 4. The above process has also been carried out on the Period Unit Cost as well as the YTD Unit Cost.

- **Costs With No Units**

  This indicator looks at the Week 3 figures and identifies those that, within each Delivery Unit within a period, have a cost associated with them but no volume of work recorded. The total of these costs per MNT Code is then compared to the total P13 YTD cost to give a percentage. If this percentage is less than or equal to 1% it is allocated an accuracy category of 1, >=5% scores 2, >=10% scores 3 and greater than 10% scores 4.

- **Units With No Costs**

  This is the same as the above indicator but identifies where there is work recorded with no cost and expresses the percentage in terms of the P13 YTD volume of work carried out.

- **5% Error Non-correction**

  The MUC Macro is calculated at Week 1 and Week 3 of a period in order to give people opportunity to correct errors and allow for late data entries to be made. Recognising that this correction is a manual process we feel that it is appropriate to make an assumption that for every 20 corrections there may be 1 which is missed. Therefore, in order to assess the impact on accuracy of this assumption, we have identified the difference between the Week 3 and Week 1 volumes of work carried out and costs recorded for P13[125]. We have then taken 5% of these total corrections and added them to the P13 Wk3 YTD costs and volumes to give an estimated corrected figure. A new corrected unit cost was then calculated and the percentage change between this and the original unit cost was calculated. If the percentage change is <= 1% an accuracy score of 1 has been allocated; <=5% scores 2, <=10% scores 3 and greater than 10% scores 4.

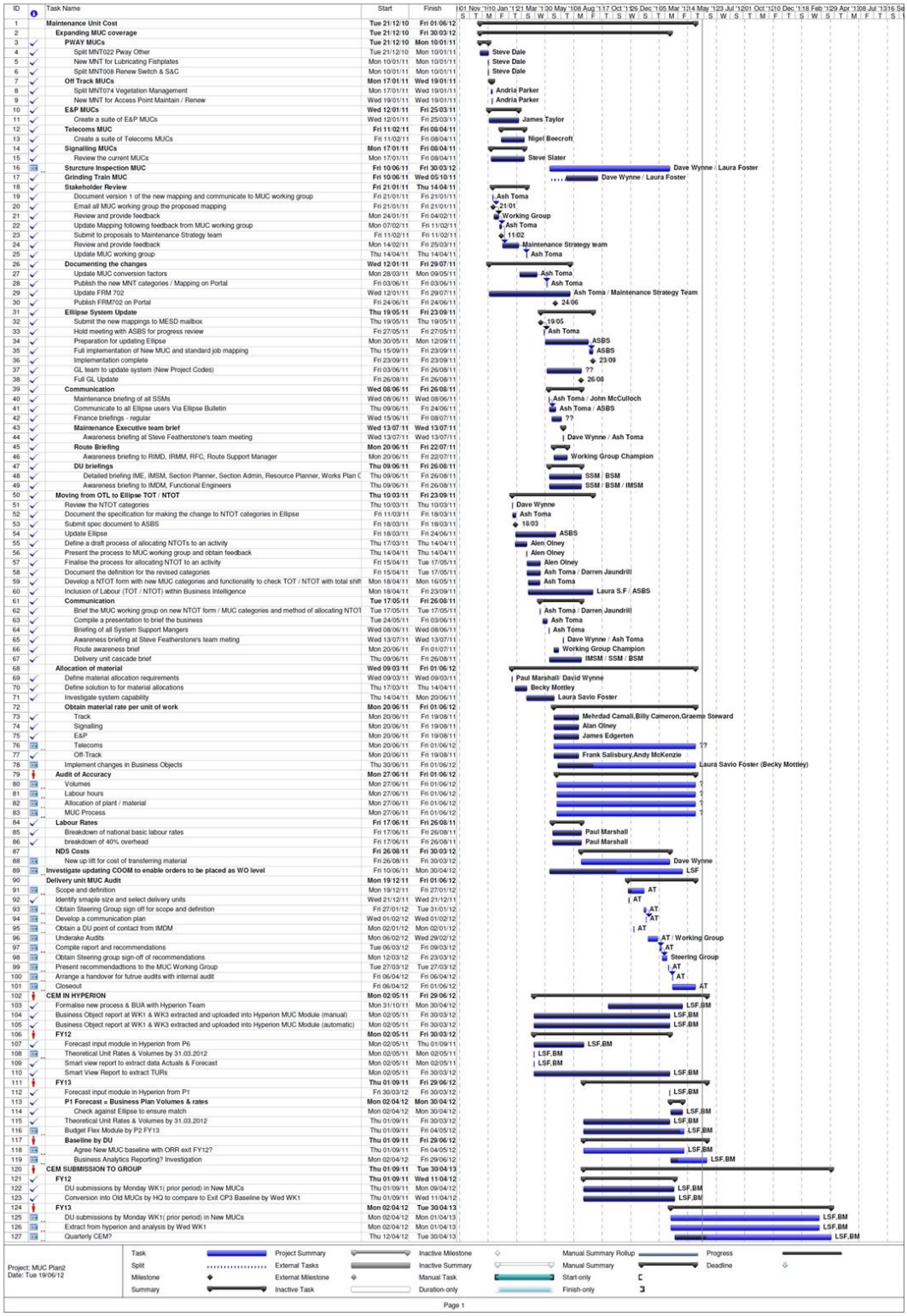
[125] This would have been done for each period within the year but as 6 periods worth of data was missing the YTD error correction at P13 was used. We would expect this to proportionally be the smallest correction of any of the periods.

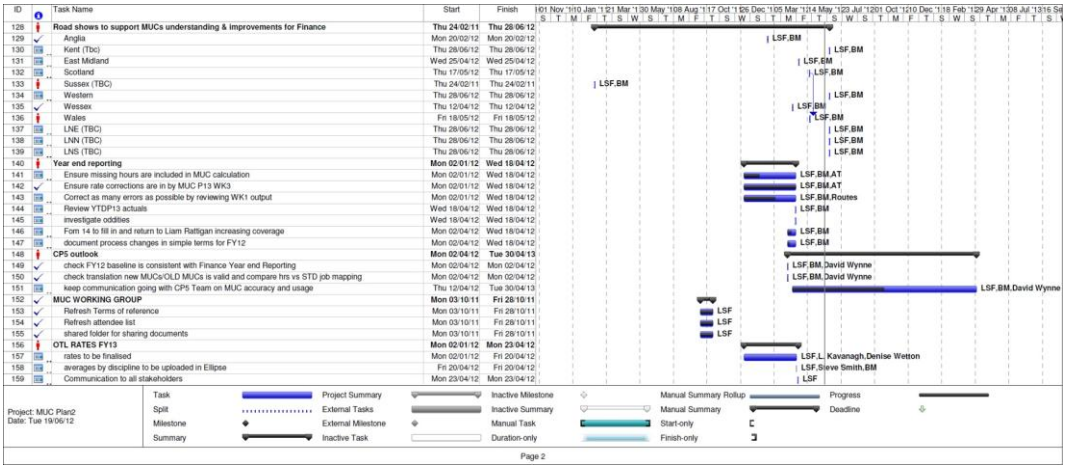
The average of the above indicators is then calculated. As the accuracy categories are based on the premise that a score over the accuracy limit results in the next category being allocated, this average is then rounded up to give an indicated accuracy score per MNT Code as shown in the table below.

Project	Period Variance	YTD Variance	Costs With No Units	Units With No Costs	5% Error Correction	Accuracy Score
MNT001	2	2	1	1	1	2
MNT002	2	2	1	1	1	2
MNT003	2	2	1	1	1	2
MNT004	2	2	2	1	1	2
MNT005	4	2	1	1	2	2
MNT006	2	2	1	1	1	2
MNT007	3	2	1	1	1	2
MNT008	2	2	1	1	1	2
MNT009	4	4	4	4	1	4
MNT010	3	2	1	1	1	2
MNT011	2	2	1	1	1	2
MNT012	4	3	1	1	1	2
MNT013	2	2	1	1	1	2
MNT014	4	4	1	1	1	3
MNT015	2	2	1	1	1	2
MNT016	3	2	2	1	1	2
MNT017	4	4	1	1	3	3
MNT019	4	4	1	1	1	3
MNT020	2	2	1	1	1	2
MNT021	4	3	1	1	1	2
MNT022	4	4	1	1	1	3
MNT024	4	4	1	1	1	3
MNT025	4	2	1	1	1	2
MNT026	4	2	1	1	1	2
MNT027	3	2	1	1	1	2
MNT028	1	1	1	1	1	1
MNT029	4	4	1	1	1	3
MNT030	4	4	1	1	1	3
MNT050	2	2	1	1	1	2
MNT051	2	2	1	1	1	2
MNT052	4	3	1	1	1	2
MNT053	4	4	1	1	1	3
MNT054	4	4	1	1	2	3
MNT056	3	2	1	1	1	2
MNT057	4	2	1	1	1	2
MNT058	4	4	1	1	1	3
MNT070	3	2	1	1	1	2

Project	Period Variance	YTD Variance	Costs With No Units	Units With No Costs	5% Error Correction	Accuracy Score
MNT071	2	2	1	1	1	2
MNT072	4	4	1	1	4	3
MNT073	4	4	1	1	1	3
MNT074	4	4	1	1	1	3
MNT075	4	4	1	1	1	3
MNT076	4	4	1	1	1	3
MNT077	4	2	1	1	1	2
MNT078	4	4	1	1	1	3
MNT079	4	4	1	1	1	3
MNT080	3	2	1	1	1	2
MNT081	4	4	1	1	1	3
MNT082	4	4	4	4	1	4
MNTPOS	1	1	1	1	1	1

Appendix E: Network Rail MUC plan – overview





ID	Task Name	Start	Finish
128	**Road shows to support MUCs understanding & improvements for Finance**	**Thu 24/02/11**	**Thu 28/06/12**
129	Anglia	Mon 20/02/12	Mon 20/02/12
130	Kent (Tbc)	Thu 28/06/12	Thu 28/06/12
131	East Midland	Wed 25/04/12	Wed 25/04/12
132	Scotland	Thu 17/05/12	Thu 17/05/12
133	Sussex (TBC)	Thu 24/02/11	Thu 24/02/11
134	Western	Thu 28/06/12	Thu 28/06/12
135	Wessex	Thu 12/04/12	Thu 12/04/12
136	Wales	Fri 18/05/12	Fri 18/05/12
137	LNE (TBC)	Thu 28/06/12	Thu 28/06/12
138	LNN (TBC)	Thu 28/06/12	Thu 28/06/12
139	LNS (TBC)	Thu 28/06/12	Thu 28/06/12
140	**Year end reporting**	**Mon 02/01/12**	**Wed 18/04/12**
141	Ensure missing hours are included in MUC calculation	Mon 02/01/12	Wed 18/04/12
142	Ensure rate corrections are in by MUC P13 WK3	Mon 02/01/12	Wed 18/04/12
143	Correct as many errors as possible by reviewing WK1 output	Mon 02/01/12	Wed 18/04/12
144	Review YTDP13 actuals	Wed 18/04/12	Wed 18/04/12
145	investigate oddities	Wed 18/04/12	Wed 18/04/12
146	Fom 14 to fill in and return to Liam Rattigan increasing coverage	Mon 02/04/12	Wed 18/04/12
147	document process changes in simple terms for FY12	Mon 02/04/12	Wed 18/04/12
148	**CP5 outlook**	**Mon 02/04/12**	**Tue 30/04/13**
149	check FY12 baseline is consistent with Finance Year end Reporting	Mon 02/04/12	Mon 02/04/12
150	check translation new MUCs/OLD MUCs is valid and compare hrs vs STD job mapping	Mon 02/04/12	Mon 02/04/12
151	keep communication going with CP5 Team on MUC accuracy and usage	Thu 12/04/12	Tue 30/04/13
152	**MUC WORKING GROUP**	**Mon 03/10/11**	**Fri 28/10/11**
153	Refresh Terms of reference	Mon 03/10/11	Fri 28/10/11
154	Refresh attendee list	Mon 03/10/11	Fri 28/10/11
155	shared folder for sharing documents	Mon 03/10/11	Fri 28/10/11
156	**OTL RATES FY13**	**Mon 02/01/12**	**Mon 23/04/12**
157	rates to be finalised	Mon 02/01/12	Fri 20/04/12
158	averages by discipline to be uploaded in Ellipse	Fri 20/04/12	Fri 20/04/12
159	Communication to all stakeholders	Mon 23/04/12	Mon 23/04/12

Source: MUC plan: "3.E - MUC Plan2 17.04.2012.mpp", received 29th May 2012

Appendix F: Arup opinion letter – regulatory accounts statements 2011/12

Reproduced from the letter from Arup (Stefan Sanders) to Network Rail (Patrick Butcher) on 31 July 2012

31 July 2012

Dear Sirs,

Network Rail Infrastructure Limited, regulatory accounts statements 2011/12: 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 2012, 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 February 2012, 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 subsequent amendments agreed between Network Rail and the ORR and are consistent with the underlying financial statements.

However, 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', 'Scotland' services as well as 'freight train delay per 100 train kilometres'). The total claimed efficiencies in respect of these categories of expenditure amount to approximately £21m. 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 J Sanders
Named Independent Reporter
Ove Arup & Partners Ltd
31 July 2012

Appendix G: Analysis of uncertainty informing Arup's opinion letter

We summarise in this section our assessment of the potential impact of the two key areas of uncertainty identified by Arup's review of efficiency evidence for the 2011/12 REEM efficiency calculation. This analysis has informed the quantified estimation of material uncertainty, which is contained within our opinion letter.

Uncertainty 1: maintenance robustness

Arup has identified uncertainty with regard to the robustness of a proportion of the REEM maintenance efficiency calculation. Robustness, in this sense, relates to the ability of Network Rail to deliver CP4 outputs as determined at PR08.

As explained in Section 1.4 of our report, we have identified uncertainty associated with on-track machinery (OTM) activity levels. We consider cost-saving measures in these areas have contributed to the shortfalls in required train performance levels in the Long Distance, London & SE, Scotland passenger sectors and the Freight sector during 2011/12.

To reflect this uncertainty, Arup has applied a negative sensitivity to the REEM maintenance efficiency amount. The estimated uncertainty amount is based on:

- Summation of the total efficiency amount associated with three OTM-related activity categories;
- Discounting from the uncertainty amount of a proportion of the efficiency attributable to the regional passenger train sector; this sector (unlike the Long Distance, London & SE and Scotland passenger sectors, plus freight) has not experienced shortfalls in its train performance output requirements compared with CP4 outputs. In the absence of information to allow us to apportion efficiencies by a distribution of assets according to train service category, the proportion has been estimated on the basis of 2011/12 train km.

Table 1 sets out the summation of the total efficiency amount associated with three OTM-related activity categories. This draws on the breakdown of expenditure and efficiency by Maintenance Unit Cost (MUC) category.

Maintenance activity (by MUC category)	REEM efficiency (£k)
MNT004 - Plain Line Tamping	**11,447**
MNT005 – Stoneblowing	**1,648**
MNT007 - S&C Tamping	**7,815**
Total	**20,910**

Table 66: OTM-related efficiencies in 2011/12 maintenance REEM calculation

As indicated above, total efficiency of £20.9 m is attributed to the maintenance activities relating to OTM under the 2011/12 REEM measure.

Table 2 sets out our calculation of the proportion of 2011/12 maintenance efficiency attributable to the regional passenger sector, based on the proportion of train km attributable to the sector (vs. the other sectors).

Service Sector	Train km ('000 km)	Proportion of total km (%)
Long Distance	**144,971**	**27.2%**
Regional	**107,135**	**20.1%**
London & South East	**201,109**	**37.7%**
Scotland	**42,622**	**8.0%**
Freight	**37,669**	**7.1%**
TOTAL	**533,506**	**100.00%**

Table 67: Regional passenger sector km as proportion of total 2011/12 train km[126]

As indicated above, 20.1% of 2011/12 total train km on the UK rail network relate to regional passenger services.

Overall uncertainty, based on total maintenance relating to OTM and vegetation management, discounted by regional train km, is calculated as follows:

= £20.9m x (1 - 20.1%) = **£16.7m**.

We consider this to be a conservative assessment (i.e. at the margin we are likely to under-estimate the value of non-robust reductions in maintenance activities). This is because, there may be wider uncertainty surrounding the robustness of cost reductions underpinning the maintenance and operations efficiencies reported under REEM. It is recognized by ORR and Network Rail that a number of other factors that are likely to have contributed to the non-delivery of CP4 PPM outputs, including increased traffic volume (over and above that anticipated and funded at the time of the CP4 determination), adverse climatic conditions, delays to the RCM project, ongoing issues with the ITPS system and increased external disruptive events including cable theft.

We do not consider it practicable within the scope of our current mandate to analyse the extent to which any lessening or reversal of cost efficiency measures may have led to the avoidance of Network Rail's performance shortfalls. Any attempt at a wider estimation of uncertainty, without a detailed and comprehensive study of how, retrospectively, performance shortfalls may have been mitigated, runs the risk of being disproportionate and therefore inappropriate.

Uncertainty 2: civils sustainability uncertainty

[126] Source: Passenger train mileage FY 2011-2012 derived from Network Rail BOPSS system, Freight Train mileage from National Rail Trends portal.

Arup identified uncertainty with regard to the sustainability of civils efficiencies contained within previous versions of Network Rail's REEM efficiency calculation (including the REEM figures provided prior to completion of the previous draft version of this report, submitted on 22nd June 2012).

As explained in Section 1.8 of this report we have been notified that the ORR and Network Rail have agreed not to include civils renewals expenditure within the updated 2011/12 REEM efficiency measure, which has been presented as the final efficiency number in Network Rail's published 2011/12 Regulatory Accounts (dated 31st July 2012).[127] Consequently, the REEM figures contained within Statement 12 of the regulatory accounts been recalculated to exclude civils renewals expenditure in its entirety. However, the ORR has indicated that our original assessment of evidence underpinning the civils efficiency original reported through the REEM should be retained in our report. Our analysis of the original civils efficiency calculations and supporting evidence is contained in Chapter 9 of this report).

We set out in the paragraphs that follow, our assessment of civils uncertainty within the original REEM calculation.

. As explained in Section 1.8 of our report, we consider that in the absence of an asset policy that is recognized by all parties as sustainable, there is uncertainty with regard to whether the volume and scope of works performed to date and planned for CP4 and beyond is sustainable (and therefore efficient).

In line with the RAGs and other ORR guidance, the lack of a Civils asset policy considered to be sustainable means that all of the volume efficiency amount associated with civils is not eligible for inclusion in REEM at present. This position may change.

With respect to civils unit cost efficiency, we consider a proportion may be sustainable (i.e. associated with renewals works on the assets that would still have been delivered under a sustainable asset policy) but not all. We have estimated that up to 20% of civils unit cost efficiency may not be sustainable

The results and associated uncertainty range are set out in the table below.

Civils efficiency discount factor	Original efficiency amount (£k)	Discount factor (%)	Discounted efficiency amount (£k)
Volume efficiency	**36,659**	**100.0%**	**36,659**
Unit cost efficiency	**60,454**	**20.0%**	**12,091**
Non-volume efficiency	**21,188**	**0.0%**	**0**
Total	**75,925**	**64.2%**	**48,750**

Table 68: Civils REEM uncertainty calculation

[127] As referenced in the Email from Gordon Cole (ORR) to Network Rail, "FW: Draft note for NR: Our approach to civils in our assessment of efficiency", 6th July 2012

The total uncertainty amount within the previous REEM efficiency calculation relating to civils sustainability is based on the discounting of the efficiency amounts indicated in Table 3 above. These total at **£48.8m.**

We note, as stated above, that civils expenditure – and the associated calculation of efficiency – has been removed entirely from the 2011/12 REEM efficiency calculation. The amended version of the REEM was included in Network Rail's published 2011/12 regulatory accounts, published on 31st July 2012.

Appendix H - RUC Confidence Grading: Original Accuracy Assessment

We set out in this appendix the original assessment of RUC data accuracy, based on sample data provided for a range of sample projects.

As explained in Section 20.5.2.3 of our report, this original sample dataset and the related analysis of accuracy has been superseded, following clarification by Network Rail that the nature of data provided in this original sample dataset comprises project data that does not capture the full scope of cost accruals utilised as the basis for the RUC calculation. As a result, the variances shown in the tables that follow are not based on like-for-like project cost comparisons. Our amended approach, based on a very limited sample dataset, is documented in Section 20 of this report.

H1.1 Track Review Results

The table below summarises results of the original track accuracy analysis based on the 15 sample projects selected for review. These results are based on OP transactions listing data provided by NR.

Project ID	OP Transactions	COWD P13-12	Variance
122687	15,101,200	7,412,167	104%
122691	8,826,936	9,673,730	-9%
122684	19,565,810	4,581,621	327%
122714	3,249,717	4,324,164	-25%
122841	5,539,194	7,452,812	-26%
122850	5,648,576	5,310,170	6%
122853	6,757,453	7,298,025	-7%
122854	8,718,922	8,562,766	2%
118338	1,206,072	-1,796,000	-167%
118734	481,622	-1,150,000	-142%
112824	3,596,603	4,065,786	-12%
112831	2,991,736	3,326,265	-10%
118624	5,019,144	5,175,857	-3%
123366	7,587,554	5,177,775	47%
126521	2,285,102	2,332,007	-2%

Table 69: track sample projects – results of accuracy assessment

As indicated in the table above, in the majority of the cases there were significant variances between transactions listing totals and figures from Period 13 2011/12 used to feed into numbers reported in Statement 15. This is due the data provided being exclusive of accruals, as clarified by NR (see Section 20.5.2.3).

H1.2 Civils Review Results

A summary of the analysis undertaken from records presented on the original sample projects is provided below. The first table is a summary of initial analysis based on data from commercial records. The second table provides a summary of results from final data provided based on transactions listing.

Network Rail provided commercial records on that included:

- Original budget built-up.
- Work in Progress (WIP) which provides details from Authority, Contract figures, Variations, AFC, COWD and Actual Expenditure.
- Copy of Final Account for completed projects or latest payment certificate for ongoing projects.

Region: LNW	**Commercial Records (CM) AFC (£)**	**OP Analysis**			
Civils Project ID	AFC (£)	AFC Forecast (£)	COWD (£)	Variance: CM AFC vs OP AFC	Variance: OP AFC vs OP COWD
106837	609,512	609,511	609,511	0%	0%
107783	No data.	843,478	843,478	n/a	0%
115937	No data.	617,990	617,996	n/a	0%
115951	531,192	531,191	531,191	0%	0%
119726	No data.	617,965	617,965	n/a	0%
106894	No data.	1,233,006	1,233,006	n/a	0%
114914	No data.	604,420	604,420	n/a	0%
115616	No data.	427,379	427,379	n/a	0%
115630	801,307	801,307	801,307	0%	0%
116468	No data.	941,354	941,354	n/a	0%
117082	No data.	475,000	367,000	n/a	23%
121878	No data.	363,000	363,000	n/a	0%
102338	No data.	2,428,966	2,428,966	n/a	0%
115192	No data.	1,329,000	1,329,000	n/a	0%
115596	No data.	1,387,000	1,387,000	n/a	0%

Table 70: Civils RUC sample projects – CM & OP AFC costs and variances

The next table below summarises results from our original analysis of OP transactions listing. In this instance, transactions listing totals were analysed against COWD to maintain consistency with the other asset categories. It is noted that for Civils AFC is used in the calculation of RUC whilst other asset categories use COWD.

Project ID	OP Transactions	COWD P13-12	Variance
106837	563,167	609,511	-8%
107783	787,809	843,478	-7%
115937	570,106	617,996	-8%
115951	464,753	531,191	-13%
119726	495,451	617,965	-20%
106894	2,450,734	1,233,006	99%
114914	1,853,597	604,420	207%
115616	1,448,305	427,379	239%
115630	1,147,922	801,307	43%
116468	392,990	941,354	-58%
117082	151,820	367,000	-59%
121878	220,000	363,000	-39%
102338	2,152,407	2,428,966	-11%
115192	1,126,836	1,329,000	-15%
115596	821,547	1,387,000	-41%

Table 71: Civils RUC sample projects – OP Transactions costs and variances

As indicated in the table above, in the majority of the cases there were significant variances between transactions listing totals and figures from Period 13 2011/12 used to feed into numbers reported in Statement 15. This is due the data provided being exclusive of accruals, as clarified by NR (see Section 20.5.2.3).

H1.3 Signalling Review Results

For our original review and sampling of project cost data, the following records were requested from Network Rail for the sampled projects to facilitate RUC review under this asset category. Only the last two types on the list were provided.

- Contractor payment certificates that support cost of work done used for year-end unit cost calculations
- Copy of General Ledger showing COWD and AFC numbers used for year-end unit cost calculation
- Authority paper
- Record / spreadsheets used for earned-volume calculations at year end

The table below summarises analysis of final data provided based on transactions listing.

Project ID	OP Transactions	COWD P13-12	Variance
107075	2,313,456	3,313,183	-30%
107071	2,992,569	4,003,060	-25%
112195	778,790	1,992,993	-61%
107136	1,827,853	2,488,539	-27%

101923	2,282,654	2,317,274	-1%
107072	2,235,882	2,678,683	-17%
100396	348,926	1,395,100	-75%
106714	1,566,382	2,148,905	-27%

Table 72: Signalling RUC sample projects – OP Transactions costs and variances

As indicated in the table above, in the majority of the cases there were significant variances between transactions listing totals and figures from Period 13 2011/12 used to feed into numbers reported in Statement 15. This is due the data provided being exclusive of accruals, as clarified by NR (see Section 20.5.2.3).

H1.4 Telecoms Review Results

Similar records to the ones requested for Signalling were requested for Telecoms, and similarly only two types were provided.

The table below summarises analysis of final data provided based on transactions listing. In the majority of the cases there were significant variances between transactions listing totals and figures from Period 13 2011/12 used to feed into numbers reported in Statement 15. This is due the data provided being exclusive of accruals as clarified by NR.

Project ID	OP Transactions	COWD P13-12	Variance
106656	726,736	1,737,057	-58%
106683	531,388	2,319,484	-77%
112228	1,202,999	1,895,534	-37%
112230	1,432,518	1,903,462	-25%
112256	1,229,515	1,690,306	-27%

Table 73: Telecoms RUC sample projects – OP Transactions costs and variances

As indicated in the table above, in all cases there were significant variances between transactions listing totals and figures from Period 13 2011/12 used to feed into numbers reported in Statement 15. This is due the data provided being exclusive of accruals, as clarified by NR (see Section 20.5.2.3).