

Office of Rail Regulation, Network  
Rail

**Independent Reporter (Part A)**  
**Mandate AO/013**

**Audit of Renewals Volume Data**

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## Executive Summary

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The background to this report is that the ORR has concerns about inconsistent renewals data reported in the Finance Pack (especially for signalling, telecoms and electrification renewals). Also, Network Rail has recently reported significantly different full year forecasts for Signalling Equivalent Unit renewals from three different sources. As a result of these concerns, and to ensure a high standard of accuracy and reliability of Network Rail's renewals data going forward, the ORR has asked the Independent Reporter to review the renewals data supplied by Network Rail in the Period Finance Pack and Annual Return.

Network Rail has a range of documents describing the definitions to be adopted, and the procedures for recording and reporting renewals volumes. These procedure documents are not wholly consistent with each other, reporting requirements based upon them are only loosely defined, and the procedures are deficient in a number of aspects.

Renewals volumes do not form a regulated output within the CP4 settlement between ORR and Network Rail, although this information is a key input to ORR's assessment of Network Rail's efficiency and delivery of its asset policies. The reporting of renewals volumes is, as a result, only informally specified and Network Rail is largely free to determine how, in what form, and in what currency, reporting takes place. In practice, Network Rail uses the reporting measures which are consistent with its own recording and reporting requirements, and appears to also be free to amend or change these measures, and definitions relating to them, without informing ORR or seeking any form of approval to do so. Consequently, the consistency of reporting through the key Network Rail reporting documents is variable.

The reporter team has been unable to find any evidence that ORR has approved, or concurred with the definitions in use by Network Rail, or the reporting formats used by Network Rail for period and annual reporting of renewals volumes. There are no clear reporting conventions, or definitions. Terms such as 'budget', 'plan', 'target' and 'forecast' appear to be used inconsistently, and appear not to have formalised definitions across the suite of reports. That said, Network Rail and the ORR have agreed a new specification for what volumes to report in the 2011 Annual Return so that there is consistency with the Delivery Plans.

The change control process, used throughout Investment Projects (IP) and Maintenance Delivery for managing project changes through the life cycle of each project, ensures that all changes to planned volumes must be authorised through the functional change control group before any amendments are made to the plans in P3e or Oracle Projects. It is a sound process for ensuring a clear audit trail from initial plan through to delivery, and provides the right incentives to ensure that the plan is accurate up to the point of implementation. The papers for a sample period change control review group (for S & T) were seen by the reporter team; the arrangements appeared both diligent and thorough.

The Period Volumes Return in the period Finance pack carries data for all activities, and a sample is shown at Appendix A. The Period Volumes Return uses square metreage for most measures in Buildings & Civils. The Track measure is a composite kilometre figure, though this is not overtly stated in the document. Although not specified, Network Rail advise that the 'Budget' figures stated in this Report refer to the 'Delivery Plan' reported in the Annual Return and

the Period 8 'Full Year Forecast' refers to the 'Forecast' reported in the relevant Delivery Plan.

The reporting of actual volumes for Track in Investment Projects, and asset dimensions at the planning stage in Buildings & Civils was found to be generally robust. However, reporting of track renewals delivered by Maintenance was found to contain some errors (for example, in the conversion of figures from imperial to metric measures).

ORR has been critical of B&C for the reactive nature of forward planning in the function, the wide variation in actual volumes against plan, and the lack of robust commentary against this delivery. Considerable work has been undertaken within B&C to address the perceived shortcomings, through revised working arrangements. A major verification exercise to check volumes recorded in the Business Plan and in P3e was undertaken during the summer of 2010, and valuable lessons have been learnt from this exercise

Network Rail's S&T organisation has an established methodology for counting, recording and reporting signalling volumes, and a comprehensive set of 'rules' against which signalling volumes are calculated. The common currency is the Signalling Equivalent Unit (SEU) and all signalling renewals volumes are described in terms of the count of SEUs. For Telecoms renewals, a more straightforward measure, of the physical number of assets or systems installed, is used.

Signalling renewals are characterised by extremely long planning timescales - some major schemes in excess of 10 years - and during the planning life of such schemes, the SEU count may be amended several times as the project scope alters and the search for efficiencies is undertaken. It is a requirement that an SEU re-count is undertaken every time such a scheme is submitted for re-authority. A robust change control process is in place at HQ level, and the governance group meets each period to review applications to (amongst other things) amend planned volumes within authorised schemes.

The reporter team carried out a series of checks of 2011/12 signalling schemes to confirm the correct calculation of SEUs. Some discrepancies were found, and in one case 9 fewer SEUs were claimed for a job in error. In these cases, the issue appears to be that rewiring or interlocking schemes do not require a re-check by the delivery agent on the SEU numbers as they are deemed to be unchanged. However, if the SEU count at a location has been reviewed and changed between scheme Initial Proposal and implementation, this change may not be reflected in the project files. Network Rail advise that following our review this anomaly was corrected.

The reporting of Telecoms volumes in the Annual Return and Finance Pack contained several inconsistencies in both the numbers and measures used.

The confidence ratings ascribed to renewals volumes are as follows. We do acknowledge that Network Rail has put effort into improving the reporting of volumes for the 2011 Annual Return, which can be reviewed in a future audit once the document is published.

- Track – the audited data has a rating of B for Reliability and 2 for Accuracy.

- Buildings & Civils - the audited data has a rating of C for Reliability and 2 for Accuracy.
- Signals - the audited data has a rating of B for Reliability and 2 for Accuracy.
- Telecoms - the audited data has a rating of B for Reliability and 3 for Accuracy.

More information on the definitions of the Reliability and Accuracy gradings can be found in Section 5 of the main body of this report. A number of recommendations have been made to improve the reporting of renewals volumes which can be found in Section 6.



# 1 Background

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The Office of Rail Regulation (ORR) reviewed Network Rail's revised asset policies in 2010, concluding that the policies appeared to be sustainable (with the exception of Civil Structures). Network Rail is now implementing these asset policies by delivering the plans outlined in the Network Rail Delivery Plan, a document updated each year. The ORR monitors delivery against this plan to determine whether the sustainable asset policies are being implemented by Network Rail. It is therefore important that reported renewals data are reliable and accurate, to enable the ORR to complete a robust assessment.

The ORR has concerns about inconsistent renewals data reported in the Finance Pack (especially for signalling, telecoms and electrification renewals). Also, Network Rail has recently reported significantly different full year forecasts for Signalling Equivalent Unit renewals from three different sources:

- Finance Pack;
- Direct contact with the Asset Management team; and
- Network Rail 2011 Delivery Plan update.

As a result of these concerns, and to ensure a high standard of accuracy and reliability of Network Rail's renewals data going forward, the ORR has asked the Independent Reporter to review the renewals data supplied by Network Rail in the Finance Pack and Annual Return. This report presents the findings of this review.

The mandate for this study is presented in Appendix B.

## 2 Methodology

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### 2.1 Scope

The ORR requires a critical review of a sample of the renewals reports, looking at the Periodic reports produced within the Finance Pack every four weeks, and how these are collated into the Annual Return.

The scope of the review is to examine how the data are calculated, including the procedures in place, how these are documented, how the data are collated and the definitions being worked to by the data compilers. The Independent Reporter was also required to look at the consistency of approach across the different disciplines and seek to understand any variations in approach that exist, and the impact these may have on the accuracy of the reported results. The Independent Reporter was required to make recommendations for improvements including how progress with these actions could be tracked. The review was required to cover the following disciplines:

- Track;
- Civils;
- Signalling;
- Telecoms;
- Electrification; and
- Plant & Machinery.

Unfortunately, it was not possible to meet with the data champions for electrification, plant & machinery in the reporting timescales agreed, and as a consequence, these disciplines have not been covered in this review. In addition, Operational Property was not included in the scope of the mandate and so this too has been excluded. The position was discussed with the ORR, and it was agreed that, if required, these disciplines could be reviewed as a further stage of work in the future.

### 2.2 Meetings

An initial start up meeting with ORR representatives took place on 16th March 2011, at which the content of the mandate was confirmed, available Network Rail renewals volumes reports and returns were reviewed, and clarification given. Meetings with Network Rail data champions for Buildings & Civils (Geotechnical), Signalling & Telecoms, Track, and Buildings & Civils (Structures) took place on 16th, 18th & 25th March 2011, and on 13<sup>th</sup> & 18<sup>th</sup> May 2011.

Following these meetings and the review of documents and data supplied by the data champions, two separate streams of meetings were initiated;

- A number of meetings with Network Rail staff involved in the data reporting processes and in recording data in Network Rail's systems and spreadsheets. These meetings reviewed the processes used in the calculation, recording and

reporting of renewals volumes, and allowed computational checks of sample data being forwarded into the Periodic Finance Packs.

- Further meetings with managers responsible for the data processes to examine the data reporting hierarchy, and assess the accuracy and reliability of data reporting from worksite, through the various Network Rail reporting systems and spreadsheets, to the Period and Annual Returns. Once again, sample checks were undertaken. Details of these checks can be found in Appendix C. Note that these meetings were originally expected to be 'route' level meetings, but were more appropriately led by the HQ Data Champions and Programme Managers who had access to the route level data.

A meeting was also held with the ORR Civil Engineering Advisor to discuss issues emerging from the reviews in Track, and Buildings & Civils, and to help understand the ORR position and requirements in respect of renewal volumes information from Network Rail.

## 3 Findings

### 3.1 Definitions and Key Processes

Network Rail defines how renewals volumes are recorded and reported in a series of procedure documents laid down in the Asset Reporting Manual. These documents set out ‘Definitions’ and a number of supporting reporting ‘Procedures’, as follows.

All documents are referenced in the series NR/ARM/MXXDF or PR.

Discipline	Definition	Reporting Procedure
Track Renewals	M20DF	M20PR
Sleeper Renewals	M21DF	-
Ballast Renewals	M22DF	-
Bridge Renewals	M23DF	-
Structures Renewals	-	M23PR
Signalling Renewals	M24DF	M24PR
S&C Renewals	M25DF	-
Culvert Renewals & Remediation	M26DF	-
Retaining Wall Renewals	M27DF	-
Earthwork Remediation	M28DF	-
Tunnel Remediation	M29DF	-
Level Crossings Renewals	M31DF	M31PR
Telecoms Renewals	M32DF	M32PR

All the documents bear February or March 2009 applicability dates, apart from the M31 and M32 documents which are dated July 2010.

A separate procedure document was introduced in July 2010, covering similar ground for Buildings & Civils renewals (‘M’ procedures, numbers 23, 26-29), entitled “Network Rail Buildings & Civils, RWI & Work Type Definitions - Instructions & Guidance” (NR/B&C/CW/Vol Issue 1).

Signalling guidance for assessing Signalling Equivalent Units (SEUs) volumes was revised in 2008 in Signalling Standard BP001 “Definition of Signalling Equivalent Units (SEUs) and Volume Reporting”, and the Signalling Systems Asset Database (SSADS) was revised accordingly.

A separate procedure for track renewals “Reporting of Track Unit Rates (Part of the Network Rail Cost Analysis Framework)” (NR/L3/INI/TK0040) sets out a matrix of renewal types showing how the volumes are to be counted.

The various procedure documents are not wholly consistent with each other, and reporting requirements based upon them are only loosely defined:

- The ‘M’ procedure documents are of most relevance in reporting for the Annual Return, but have limited application in the production of periodic data. For example, the procedures for Buildings and Civils set out how to

count physical jobs only and not the volumes of work, and then only for jobs with a value over £50K. It is these figures that are reported in the Annual Return, but are not applicable to the period returns.

- In respect of track volumes, these are recorded for rail, sleepers and ballast, with the documented measure being linear kilometres. These components are recorded in the Annual Return, but the Period Return shows composite volume only. Signalling renewals, level crossing renewals and Telecoms renewals are all reported in the defined currency - either Signalling Equivalent Units, Level Crossing Equivalent Units, or in the case of Telecoms, the physical number of installations undertaken – in both Period and Annual Returns.
- The procedures are deficient in a number of aspects. For example:
  - Those relating to Buildings & Civils appear to have been superseded by the B&C July 2010 instruction noted above, for all reporting in the Annual Return, although this situation is not overt in the documentation;
  - Virtually all track renewals reporting is measured in “Composite Kms” - an aggregation of track, sleepers and ballast - although this is not stated in the Period Return nor is the definition of ‘composite’ shown in any of the definitions documents; and
  - Telecoms renewals are defined in four categories only - Concentrators, Public Emergency Telephone Systems, DOO CCTV and Voice Recorders - when a wider portfolio of assets are actually reported. In the period volumes report, the additional reporting covers station CIS systems. In the Annual Return, CCTV systems (non-DOO) and clocks are also reported.

The terms ‘budget’ and ‘forecast’ are used extensively in the Period Reporting packs, but are not defined. They appear to have been used in different ways, and with subtly different meanings in the various reports.

The change control process, used throughout Investment Projects (IP) and Maintenance Delivery for managing project changes through the life cycle of each project, was described to the Reporter team by each Network Rail data champion. All changes to planned volumes must be authorised through the functional change control group before any amendments are made to the plans in Primavera (P3e) for IP, and Oracle Projects for Maintenance Delivery. It is a sound process for ensuring a clear audit trail from initial plan through to delivery, and provides the right incentives to ensure that the plan is accurate up to the point of implementation. The papers for a sample period change control review group (for S & T) were seen and reviewed by the Reporter team; the arrangements appeared both diligent and thorough.

## 3.2 Reporting Requirements

The ORR monitors renewals volumes as a key input to its assessment of Network Rail’s efficiency and delivery of asset policies. However, they do not form a regulated output within the CP4 settlement between ORR and Network Rail. The reporting of renewals volumes is, as a result, only informally specified and Network Rail is largely free to determine how, in what form, and in what

currency, reporting takes place. In practice, Network Rail uses the reporting measures which are consistent with its own recording and reporting requirements, and appears to also be free to amend or change these measures, and definitions relating to them, without informing ORR or seeking any form of approval to do so. There have, however, been meetings between ORR and Network Rail to discuss the reporting of Civils renewals volumes.

The consistency of reporting through the key Network Rail reporting documents is variable. The 2010 Delivery Plan contains volume plans for track, signalling, telecoms and electrification only, whereas the 2010 Annual Return carries volumes reports for all disciplines, broken down to Route level, and type of component. For Buildings & Civils volumes, both the area of renewal, and the number of jobs are shown in the Annual Return, allocated to Network Rail's chosen categories of work, to "... provide some consistency for comparison [with CP3]" ( page 143, Annual Return 2010).

The Period Volumes Return in the period Finance pack carries data for all activities, and a sample is shown in Appendix A. The Period Volumes Return uses square metreage only as the measure in Buildings & Civils (except for coastal/estuary defence which is measured in metres). The Track measure is a composite kilometre figure, though this is not overtly stated in the document. Network Rail advised the reporter team that the 'Budget' figures stated in this Report is the same as the 'Delivery Plan' reported in the relevant year's Annual Return, and so should remain constant for all periods in a financial year. They also advised that the 'Full Year Forecast' reported in period 8 should be the same as the 'Forecast' reported in the relevant year's Delivery Plan document.

The very existence of the Period Volumes Return was a surprise to a number of the NR Managers interviewed, who were curious as to how it was compiled, what information was inserted into it, and, equally significantly, what was left out. The fact that the Period Return does not have ownership within the asset managers group, and carries no commentary, goes some way to explaining the apparent gap in understanding between ORR and the asset data champions regarding renewal volumes reporting. Clarifying and strengthening the reporting hierarchy within Network Rail to address any disconnect between functional reporting and the Finance-led collation of the period reporting pack would help to resolve this problem.

The reporter team has been unable to find any evidence that ORR has concurred with the definitions in use by Network Rail, or the reporting formats used by Network Rail for period and annual reporting of renewals volumes. Whilst there is no formal requirement for the ORR to approve Network Rail's definitions, clear and shared definitions would be expected. There are no clear reporting conventions, or definitions. Terms such as 'budget', 'plan', 'target' and 'forecast' appear to be used inconsistently, and appear not to have formalised definitions across the suite of reports. These shortcomings have already been recognised by both Network Rail and the ORR, and a new specification has been agreed for the 2011 Annual Return which is due for publication on the 31<sup>st</sup> July 2011. It will be a shorter document than the 2010 Annual Return and will include measures that are consistent with the Delivery Plans, so that planned and actual deliveries can be compared.

The Reporter Team noted that the Delivery Plans and Annual Return do not have document version numbers or dates of publication.

## 3.3 Track Renewals

### 3.3.1 Introduction

Network Rail has an identified bank of track renewals work for the whole period of CP4. The 2010 Delivery Plan shows the following proposed volumes:-

	2009/10	2010/11	2011/12	2012/13	2013/14	Totals
Rail (km)	755	777	716	756	764	3,767
Sleepers (km)	496	499	600	535	540	2,670
Ballast (km)	553	607	642	604	611	3,018
S&C (equiv. units)	326	343	359	378	376	1,781

Track renewals planning has fairly long lead times, which are driven by possession planning timescales and the availability and deployment of high-output track relaying equipment. As a result the forward plan is relatively stable, and is likely to be so through CP4, both for volumes delivered by Investment Projects (IP), and those delivered by Maintenance or Enhancements.

### 3.3.2 Investment Projects (IP)

Network Rail's IP planning database for track renewals is the Track Renewals System (TRS), where initial work identification statements, site surveys, project methodology, approvals documentation and resource plans are developed. Once the delivery plan for each job is formulated it will be entered into P3e with associated volumes by the programme management team.

Once entered into P3e, the volumes data is fixed, unless amended or changed through the authorised project governance arrangements. This change control mechanism assures that P3e contains an up to date volumes specification for all jobs at all times.

Volumes information is reported and recorded as it is completed and entered into Network Rail's asset database, GEOGIS. The site supervisor will prepare the requisite GEOGIS form or Completion Certificate which will show full location details, project number, and the exact miles and yards of track, sleepers and ballast installed. These are exact, measured volumes at site, and will be entered into P3e exactly as shown on the GEOGIS form, save for conversion from imperial to metric measures. Minor variation between planned and actual volume is quite normal, either to achieve a better transition between old and new, or where work volume has been lost due to shortened possession times, plant failure etc.

At Route level, all P3e volumes data is aggregated from two work sheets - 'P3e Plain Line' and 'P3e S&C' - and forms the basis of the data which appears in the Monthly Business Report (MBR) for each Route. At HQ level, a similar aggregation of data from Routes is undertaken, but volumes delivered by Maintenance are also added in to provide a national picture for the period finance returns.

A random sample of 6 track renewals jobs was tracked by the reporter from plan, through the GEOGIS reporting to P3 and into the Route MBR, to verify that the data flow and arrangements were robust. No errors were found in any of the examined records.

A meeting was held on 4<sup>th</sup> April 2011 at Network Rail's 40 Melton Street offices with the Senior Management Accountant for Track, to review the data and processes used in the calculation of the Track renewals volumes in the Periodic Finance Packs.

Track renewals volumes delivered by other functions in IP (Buildings & Civils, and SP&C) are included in the Track P3e data. Track volumes funded and managed by Enhancements are not reported by the IP Track team, and these project volumes are specifically excluded from the functional period return shown at Appendix A. Planned track volumes data are entered in P3e by the planners, and Track MBRs are produced using the volumes data in P3e. The reported volumes for each route are checked and validated by the responsible Programme Finance Manager, and any discrepancies are identified and adjusted where necessary.

The original P3e data (as shown in worksheets 'P3e Plain Line' and 'P3e S&C' of the supplied 'P11-11 Volume Analysis YTD Actual.xls' spreadsheet), and the equivalent data are amended as necessary by the Programme Finance Managers to reflect actual conditions and outputs, and thus any variations from programme (as shown in the hidden worksheet 'P11' of the supplied spreadsheet), are included in a single spreadsheet. The spreadsheet includes comparisons between the two sets of outputs, and explanations of any identified variances, as shown on the 'Pd 11' worksheet.

The spreadsheet is clearly laid out and labelled, and checks showed that the calculations contained in it are performed consistently and correctly; the comparison between the original P3e data and the data as amended by the Programme Finance Managers (as described in the preceding paragraph) provides an in-built cross-check of the data.

### 3.3.3 Maintenance

A significant quantum of track renewals volume is delivered by Network Rail organisations other than Investment Projects. In 2010/11, approximately 10% of S&C units, and 11% of plain line on track renewal projects will be delivered by the Maintenance Unit; in 2009/10, 23% was delivered by Maintenance.

These volumes are not managed or reported through P3e, but through an Oracle Projects database, and are reported in a single spreadsheet each period by the Finance Controller (Maintenance). Maintenance delivery uses identical investment review and change control processes as IP, and the data is recorded in GEOGIS. Collation of Route and Delivery Unit input data for renewals volumes is aggregated centrally, and electronically, to create the period returns from both IP and Maintenance.

The data from Oracle Projects are sent through to the Senior Management Accountant for Track in a single spreadsheet by the Financial Controller (Maintenance). The two sets of volumes are consolidated and reported by the Senior Management Accountant for Track.

Four Maintenance Projects covering nine separate renewals jobs were tracked by the Reporter team from plan, to AMP014 Completion Certificate, through GEOGIS to OP/ Ellipse, to verify that the data flow and arrangements were robust. We have reviewed all data, except from GEOGIS for one of the projects (for which the data was not available) and note the following issues:

- Renewals volume is only reported for work funded under the capex budget. Any additional renewals work undertaken at site, not agreed in advance with the Route Asset Manager, will be funded through opex, and **not** reported as renewals volume. However, the opex funded renewals are reported in GEOGIS.
- There has been confusion as to what detail to record on the AMP014 Completion Certificate. It has been confirmed that Jobs 33456 & 33457, for example, record completion of both capex and opex volumes, when the convention in NR is for only capex renewals to be reported on this form.
- The conversion from imperial (miles/chains and miles/yards) to metric measures is an obvious source of potential error. All reporting on AMP014 and in GEOGIS is imperial, all recording in OP and Ellipse is metric, as is all forward reporting into period reports and the Annual Return. This was demonstrated in Job 33457 which was found to have 300 metres reported as 300 yards.
- Reconciliation between AMP014, GEOGIS and OP/Ellipse is complicated as GEOGIS records all renewals work for all jobs, however funded. Job 33456, for instance, records 640 yards of work (585 metres, which includes 5 metres that could not be claimed as capex), and GEOGIS records 681 yards, the balance of which relates to a different job undertaken under opex, and therefore not recorded and reported as renewals volume.
- In respect of Job M44999 (Gillingham Emergency), the AMP014 certificate recorded the incorrect mileage (814 yards instead of 968 yards). This has since been corrected. The volume recorded in OP was correct.

In all, these issues constitute a risk to both the accuracy and reliability of recorded and reported data. The conventions used, and how to treat renewals work undertaken but not currently reported as such in NR reports needs to be clarified with ORR.

### 3.3.4 Enhancements

Enhancement projects account for 9% of plain line and 40% of S&C renewal volumes, and are recorded in GEOGIS. However, these volumes are not included in the Delivery Plans under 'Renewals' nor are they reported in the Period Return or Annual Return. Instead, their output is described in terms of project deliverables such as new platforms and new concourses, and as expenditure. So the volumes, whilst recorded in the various Asset Management Systems, are not 'counted' for the purpose of the returns.

### 3.3.5 Volume Reporting

The following table compares the reporting of track and S&C volumes in various documents. Some of the figures from the Annual Return have been summarised for comparison purposes.

	2010 Annual Return		2009 Delivery Plan (2009/10)	2010 Delivery Plan (2009/10)	2011 Delivery Plan		Finance Pack 09/10 (pd13)		Finance Pack 10/11 (pd8)	
	Delivery plan	Actual			Actual (2009/10)	Forecast (2010/11)	Budget	Full year	Full year Budget	Full Year Forecast
rail (km)	678	810	568	755	810	712	n/a	n/a	n/a	n/a
sleeper (km)	417	438	447	496	438	457	n/a	n/a	n/a	n/a
ballast (km)	479	509	556	553	509	556	n/a	n/a	n/a	n/a
Total (km)	1574	1757	1571	1804	1757	1725	1571	1756	1883	1726
S&C (equivalent units)	312	319	312	326	319	341	312	319	343	341

This table shows that there is a lack of transparency in terminology in the reporting of volumes. The ‘Delivery Plan’ figures for the year 2009/10 shown in the 2010 Annual Return have no definition, and are different to both the 2009 and 2010 Delivery Plan figures for the same year. They are, though, the same as the period 8 ‘Full Year’ forecast figures for 2009/10 (not shown in the table) which concurs with Network Rail’s advice. Also as advised by Network Rail, the 2010 Annual Return correctly reports the 2009/10 period 13 ‘Budget’.

The definition of the ‘Full Year Budget’ in the 2010/11 Finance Pack is not specified. It was set at the Full Year Forecast of period 1 and has remained unchanged to period 11. Full Year Forecasts change but not every period, for example they were unchanged from periods 7 to 10 inclusive. It is important that these full year forecasts and budget figures are clearly defined and there is a clear protocol and basis for changing them – it seems odd that forecasts remain unchanged for some periods.

It would also be helpful to clarify that the Track volumes shown in the Finance Pack are measured in “Composite kms” and not just ‘kms’, to show that they include ballast and sleepers as well as track.

The reporting of actual volumes is consistent for 2009/10 in the 2010 Annual Return, the 2011 Delivery Plan and the 2009/10 Finance Pack (period 13).

## 3.4 Buildings & Civils Renewals

### 3.4.1 Introduction

The functional responsibilities within Buildings & Civils (B&C) range across a wide portfolio of assets from operational property to coastal defences. Buildings, including operational property such as stations, are not reported in the Delivery Plans or Finance Packs and therefore, for the purposes of this review, the focus of attention has been:-

- Earthworks;
- Structures - bridges, tunnels and retaining walls; and
- Culverts.

No volumes for B&C were actually shown in the 2010 Delivery Plan, only expenditure budgets. However, performance against the 2010 Delivery Plan is shown in the 2010 Annual Return:-

	2010 Actual	2010 Delivery Plan	% Variation
Overbridges (m <sup>2</sup> )	5235	6235	(16)
Underbridges (m <sup>2</sup> )	75298	60573	24
BridgeGuard3 (m <sup>2</sup> )	2985	2838	5
Footbridges (m <sup>2</sup> )	1271	925	37
Tunnels (m <sup>2</sup> )	11664	11757	(1)
Culverts (m <sup>2</sup> )	1416	871	63
Retaining Walls (m <sup>2</sup> )	2153	2511	(14)
Earthworks (m <sup>2</sup> )	405898	323519	25
Coastal Defences (m)	541	1766	(69)

### 3.4.2 B&C Reporting Processes

In the case of B&C, the technically assessed volume measurement definitions are based on the asset dimensions prior to remediation. For example, for an earthworks embankment re-grading scheme the volume is based on the original surface area, i.e. that of the asset requiring remediation, rather than the larger 'as built' surface area. Throughout the lifetime of a project the volume will be updated in the Business Plan through change control if there is a change of scope, or if improved dimensional information becomes available. At close out of a scheme, the volume is checked and any variance regulated through Business Plan change control. The definitions for measurement, however, remain based on the asset dimensions prior to remediation throughout the whole process. Sources for data to support volume calculations and checks vary depending on asset type and scheme complexity, and include record or as-built drawings, examination reports, GIS system mapping and on site measurement. Volume source and calculation information is retained on file through the lifetime of a scheme.

ORR has been concerned about B&C for the reactive nature of forward planning in the function, the wide variation in actual volumes against plan, and the lack of robust commentary to explain this variation.

Network Rail's view is that scarce financial resources have to be directed to areas of greatest need, which are themselves identified by asset condition reports. Condition reports regularly lead to redirection of resources to deal with priority work, usually within the year of delivery. Variation at category level arises when resources are reallocated between categories of work.

Although internal business planning processes are considered by Network Rail to be robust for both volumes and cost for the 5 year and 1 year planning horizons, this volume data and information has been largely viewed as indicative, and a guide for internal use, rather than an output to be shared with the ORR. Hence the fact that the 2009, 2010, and 2011 Network Rail Delivery Plans are consistently silent on B&C volumes. For instance, in the 2010/11 plan far more work is being undertaken on underbridges than was postulated in the original CP4 plan. This work has been re-prioritised as a result of condition reports, and money moved into this area at the expense of other, less pressing asset renewals works. It is suggested that the rather less standard the asset, the less predictable is the renewal work arising, and the priority to be accorded to it.

Considerable work has been undertaken within B&C to address the perceived planning shortcomings, through revised working arrangements. As a result

- The B&C recording and reporting standard has been revised and reissued (see 3.1 above);
- A major verification exercise to check volumes recorded in the Business Plan and in P3e was undertaken during the summer of 2010, and valuable lessons have been learnt from this exercise;
- The definition of primary and secondary work, and the hierarchy of priorities thereafter, has been established; and
- Categories of work on structures have been clearly laid down by Network Rail (Preventative/repair/replace/strengthen/waterproof).

Furthermore, Network Rail are confident that the Structures Condition Monitoring Tool (SCMT), which is now populated with nearly a decade of inspection and assessment data, is now generating valuable information about structures, condition and change over time. However, Network Rail believes it is still some way from being able to populate a comprehensive register of B&C asset condition, or predict robustly work volumes for particular types of work. They have now embarked on a programme to improve this position.

The 2010 verification exercise produced a relatively large number of generally small discrepancies but, more importantly, allowed a comprehensive independent check of calculation methodologies and key assumptions made. For the 3 years 2009-2012, a total of 427 submissions (18% of total schemes) for change control have been made as a result of the verification exercise, with a total net volume impact of nearly 88,000 m<sup>2</sup> (2% of total volume). This was felt to have been a valuable exercise from which a number of lessons had been learnt, and should be considered for adoption as a formal procedure within B & C.

As part of a separate mandate (AO/007, Review Asset Policy, Stewardship and Management of Structures), the Independent Reporter has proposed that Network Rail should derive a workbank for Civils Structures that is based on technical need and unconstrained by cost. Comparing this unconstrained workbank against the delivery plans and actual volumes would be informative.

### 3.4.3 Data Checks

A random sample of Buildings & Civils jobs was tracked by the reporter from the Business Plan through to P3e, to verify that the data flow and arrangements were robust (see Appendix B). Where change control was recommended by the 2010 verification survey, a check was undertaken to establish that this had been carried through. No errors were found in any of the examined records.

A meeting was held on 23<sup>rd</sup> March 2011 at Network Rail's Waterloo offices with the Programme Reporting Specialist (IP B&C), to review the data and processes used in the calculation of the Civils and Buildings renewals volumes in the Periodic Finance Packs.

The Business Plan for a given year is set at Period 12 of the preceding year, and spread over 13 Periods, setting out the baseline financial and volume budget. Jobs comprising more than 5,000 m<sup>2</sup> of output are now reported on a period-by-period basis, to provide a more realistic impression of progress – previously the full volume was reported in the period of delivery. Actual volumes are updated and adjusted in P3e as they become known, and fed into the Business Plan by means of the formal process of change control.

In summary, P3e reports are generated overnight, capturing the latest volumes updates, and are incorporated into a master Volume P3e vs. Business Plan (VPBP) spreadsheet, which essentially combines information from the P3e, the latest business plan and a 'sense check' against the latest Financial MBR (to clarify project numbers, ownership by territory and high-level financial information for Unit Cost calculations). The output forms the basis for the volumes in the Periodic Finance packs.

The P3e data sits in a number of files split by region, financial year and periodic forecast and actualised spreads. These are melded together creating national files split by financial year and periodic forecast and actualised spreads. (The Programme Reporting Specialist observed that a macro for this purpose would be useful.) These sheets are then copied into the VPBP workbook. A macro (created by the Programme Reporting Specialist) is run to format columns, remove spaces and blank entries, referencing P3e coding to Civils Repeatable Work Items (RWIs) and project identification against the latest MBR report. The data are manually sorted (due to CPU macro processing constraints) by territory, and nil entries are removed; they are then sorted by Activity ID, and unnecessary duplicate entries are removed. This process is repeated for Actual and Forecast data, both of which should have the same number of results, providing the basis of a further check. The data are then sorted by Project number and Resource ID (P3e coding for RWI).

The Actual and Forecast data tables are then combined on one sheet using lookups linking to 2010/11 P3e data; a further check is provided by means of the records in the 'Check' column, which should all be 'TRUE'. Additional internal checks are conducted on net volumes. The total number shown in the P3e pivot table is

checked, and the list of projects is copied into the 'P3e to BP volume check' worksheet for checking purposes, with any variations being passed to the Planners for review. Allowances are made for Business Plan emergency volumes 'pots' that are not reflected in P3e as they are estimates of future unknown works.

A further check is conducted in the 'CEI Workings (P3e)' worksheet using a pivot table and various lookups to the 2010/11 P3e data and the MBR. The results are copied into the 'P3e Converted Data' worksheet, which contains a lookup to the ORR work categories used in the Finance Pack. The data are sorted to remove records with zero volume outturns in the year, and duplicated projects with multiple RWIs are identified and project Financial information looked up against the MBR is apportioned appropriately by volume RWI ratio.

These results are copied into the 'Raw Data' worksheet in the workbook NAT-000-PPC\_Civils-Period xx-xx Volume report. A Summary pivot table is refreshed and the National Volumes Summary sheet is then updated with the latest Periodic, year to date and outturn for both volumes (actual and projected) and the baseline volume budget. A further check is conducted by tying the results back into the Business Plan as identified in the VPBP. The volumes summary is also produced for Scotland projects only.

Checks conducted on the data for 2010-11 Period 12 indicated that the P3e data are being consolidated accurately and consistently, and spot checks indicated that the data are being imported and filtered correctly into the VPBP. Further spot checks and monitoring of total values indicated that the data pass consistently and accurately thorough the VPBP and into the National Volumes Summary sheet in the NAT-000-PPC\_Civils-Period xx-xx Volume report spreadsheet.

The process is essentially undocumented, although the data volumes and file sizes involved are large, and the process, although reasonably straightforward, is quite convoluted, with the objective of ensuring data accuracy and traceability. There are aspirations to further improve the process where possible and to remove unnecessary steps due to changes in business needs. The business is developing an automated MBR, due for completion by June 2011; however, volumes are outside the scope of this process. The Programme Reporting Specialist apparently has no direct back-up, although two of his colleagues are familiar with the processes involved and could provide cover if necessary.

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### 3.4.4 Volume Reporting

The following table summarises the volume reporting for Civils renewals

	2010 Annual Return		2009 Delivery Plan	2010 Delivery Plan	2011 Delivery Plan		Finance Pack 09/10 (pd13)		Finance Pack 10/11 (pd8)	
	Delivery plan	Actual			Actual (2009/10)	Forecast (2010/11)	Budget	Full year	Full year Budget	Full Year Forecast
Overbridges (sq ms)	6,235	5,235	-	-	-	-	6,235	5,235	13,409	13,806
Underbridges (sq ms)	60,573	75,298	-	-	-	-	60,573	75,298	77,678	94,058
Bridgeguard 3 (sq ms)	2,838	2,985	-	-	-	-	2,838	2,985	6,762	7,680
Footbridges (sq ms)	925	1,271	-	-	-	-	925	1,271	1,147	1,541
Tunnels (sq ms)	11,757	11,664	-	-	-	-	11,757	11,664	19,514	19,390
Culverts (sq ms)	871	1,416	-	-	-	-	871	1,416	1,262	2,170
Retaining walls (sq ms)	2,511	2,153	-	-	-	-	2,511	2,153	2,384	3,301
Earthworks (sq ms)	323,519	405,898	-	-	-	-	323,519	405,898	519,587	352,122
Coastal/estuary defence (ms)	1,766	541	-	-	-	-	1,766	541	1,235	1,245
Other (including major structures) (sq ms)	-	-	-	-	-	-	80,977	79,027	91,087	53,794

Volumes are reported in the 2010 Annual Return and Finance Pack. There is consistency between the Annual Return and period 13 of the 2009/10 Finance Pack, in that the Budget/Delivery Plan and Actual/Full Year figures for 2009/10 are the same. However, only the Finance Pack reports volumes for Other (including major structures).

The figures for the 2010 Annual Return have been taken from Table 4.24 of that document. However, some of these are inconsistent with other tables in the same document, for example:

- Retaining Walls actual volume is shown as 1,737 in Table 4.20, but 2,153 in Summary Table 4.24; and
- Bridge renewals actual volume is shown in Table 4.17 (14,698 sq ms) where “the term ‘bridge’ includes over- and under-bridges, side of line bridges and footbridges”; but the total volume for bridges (over-bridges, under-bridges, bridgeguard 3 and footbridges) in Summary Table 4.24 is 21,197 sq ms.

The Finance Pack for 2010/11 includes budget volumes for the year from period 3 which are consistent through to period 11 (which is the last period we have received for checking).

### 3.5 Signals & Telecoms Renewals

The identified bank of signals and telecoms renewals volume for the period of CP4 is shown in the 2010 Delivery Plan, as follows:-

	2009/10	2010/11	2011/12	2012/13	2013/14	Total
Conventional (SEU)	792	802	1225	1081	1428	<b>5328</b>
ERTMS (SEU)	0	88	0	0	779	<b>867</b>
Level Crossings (No.)	20	30	78	59	47	<b>234</b>
CIS (Systems)	7	14	6	7	1	<b>35</b>
Public Address (Systems)	6	8	9	2	3	<b>28</b>
CCTV (Systems)	0	2	2	0	1	<b>5</b>
Clocks (No.)	193	356	119	98	35	<b>801</b>
Concentrators	41	55	61	27	27	<b>211</b>
DOO CCTV (Systems)	248	69	59	115	6	<b>497</b>
PETS (No.)	18	47	14	26	65	<b>170</b>
Voice Recorders	0	6	0	42	8	<b>56</b>

Network Rail’s S&T organisation has an established methodology for counting, recording and reporting signalling and Level Crossing volumes, and a comprehensive set of ‘rules’ against which signalling volumes are calculated. The common currencies are the Signalling Equivalent Unit (SEU) and the Level Crossing Equivalent Unit (LXEU), and all renewals volumes are described in terms of the count of SEUs or LXEUs.

For Telecoms renewals, a more straightforward measure, of the physical number of assets or systems installed, is used.

### 3.5.1 Signalling & Level Crossing Renewals Reporting Processes

Signalling renewals are characterised by extremely long planning timescales - some major signalling schemes will take in excess of 10 years to progress from submission for initial authority to commissioning, and during the planning life of such schemes, the SEU count may be amended or adjusted several times as the project scope alters, and the search for efficiencies is undertaken. It is a requirement that an SEU re-count is undertaken every time such a scheme is submitted for re-authority. A robust change control process is in place at HQ level, and the governance group meets each period to review applications to (amongst other things) amend planned volumes within authorised schemes.

Whilst SEU count is important in its own right for volume recording and reporting, the scale of expenditure associated with a single SEU renewal - around £200k - renders the planning of volumes particularly important in this function.

The initial SEU count for a renewal scheme Initial Proposal will be undertaken by a Renewal and Enhancement Engineer based within a Route team, and once the scheme is approved for development, the scheme and SEU count will be entered into the Business Plan and P3e where it is tracked to completion.

The initial SEU count will largely be based on the historic asset management record of the layout, facilities and assets installed. This database - the Signalling Systems Asset Database (SSADS) - contains all SEU data by location and holds a change control record which identifies when changes were made and why.

Any subsequent changes in P3e must be supported by a Change Control authority, or an investment submission/re-submission, if a change to the scheme authority is being sought.

A final SEU count of a planned project will take place by the delivery organisation prior to start of work, and this effectively ensures an independent verification of SEU count against the current plan. The record of work undertaken is therefore a confirmed actual.

Where S&T renewals work is undertaken by Enhancements - or indeed, where enhancements work is undertaken by IP - the rule is that volume count follows funding. Consequently, the risk of 'double counting' or volumes being completely missed is minimised. In all cases, funding across functional boundaries will be directed towards specific assets and specific SEUs, thereby protecting the integrity of the volume recording arrangements. As only 7 SEUs of a 2010/11 total of 854 are being delivered this way, this is a relatively minor feature of the renewals process. It should be noted that the S&T renewal volumes reported in the Finance Pack exclude this renewals work undertaken by Enhancements.

In respect of Level Crossings, the installation of a complete LC represents one LXEU. Although partial installations may be counted in proportion to the amount of renewal undertaken, it is unusual for a partial renewal to be commissioned. No partial renewals were undertaken in 2009/10, although Network Rail advise that five partial renewals were undertaken in 2010/11.

### 3.5.2 Telecoms Renewals Reporting Processes

Whilst telecoms renewals volumes appear to be the most straightforward of all to report, there are a number of inconsistencies in the way that telecoms renewals are represented in the various summary reports produced by NR. The M32 definition and procedure for reporting of telecoms renewal volumes (see Section 3.1 above) provides for reporting against five sub-categories of Operational Telecoms. In the 2010 Annual Return, only these five sub-categories have a volume reported against them, consistent with the M32 procedure and definition.

However, in the annual Delivery Plans for 2010 and 2011, two categories of renewal volumes are reported - Station Information & Surveillance Systems (SI&SS) and Operational Telecoms. Only the latter category was reported in 2009. In SI&SS, the 2010 Delivery Plan reported on planned numbers of *systems* installations, but the 2011 Delivery Plan reports on planned numbers of *components* (cameras, speakers, monitors etc). Only Clocks in this category are reported in both Delivery Plans using the same currency – physical number of clocks planned or installed. There is no explanation in the 2011 Delivery Plan for the dramatic reduction in clocks planned in CP4 from that shown in the 2010 Delivery Plan - 801 down to 223 – or the considerable volume difference between 2009/10 Actual number of clocks in the 2011 Delivery Plan (3), and the volume planned in the 2010 Delivery Plan (193). We understand that the reason for the reduction in volumes is because Network Rail are now utilising Monitors to have a clock display in place of installing separate clocks, however no explanation is given in the reporting.

In the 2010/11 Period Reports, telecoms volumes are shown for the five sub-categories of Operational Telecoms with no reporting of SI&SS.

At the time of our audit, no written procedure or definition could be found to cover the reporting of the SI&SS category of renewals. However, Network Rail advise that the M32 definition has now been updated (version 2, dated 17 May 2011) to include a definition for SI&SS as well as Operational Telecoms.

The 2011 Delivery Plan does provide volumes for both operational telecom and SI&SS measures for each year in CP4. Network Rail also advise that the latest period reporting (not reviewed by the Reporter Team) and the forthcoming 2011 Annual Return report all measures on a consistent basis.

### 3.5.3 Data Checks

The Reporter team carried out a series of checks of 2011/12 signalling schemes to confirm the correct calculation of SEUs. (Note that this did not include checking the signalling plans against the Line Standard to independently calculate the SEUs. This is a major exercise which could be undertaken by a competent engineer at a future review). The proposed scheme volumes were checked against SSADS and scheme authorities. In one case a rewiring scheme was found to have 88 SEUs in the volume base for calculation, whereas SSADS stated the interlocking only had 67 SEUs at that location meaning that 9 fewer SEUs would have been claimed for this job (45% of 88 vs. 45% of 67 = 9 – wiring is defined to constitute 45% of an SEU). Smaller discrepancies were found on three other schemes, of either one or two SEUs. In particular the issue appears to be that

rewiring or interlocking schemes do not require a check by the delivery agent on the SEU numbers as they are deemed to be unchanged. However, if the SEU count at a location has been reviewed and changed between scheme Initial Proposal and implementation, this change may not be reflected in the project files. This anomaly should be corrected - Network Rail has subsequently advised that it has done so and this will need to be confirmed in a future audit.

A limited sample check of Telecoms data was undertaken, to confirm that installation volumes of operational telecoms had been carried through from project report level through to MBR.

A meeting was held on 30<sup>th</sup> March 2011 at Network Rail's 40 Melton Street offices with the responsible Swindon-based Project Planner, to review the data and processes used in the calculation of the Signalling, Electrification and Plant (S, E&P) renewals volumes in the Periodic Finance Packs.

The inputs to the process are similar to those for the Civils Renewals Volumes calculations, taking the form of P3e reports in .csv format, covering the Asset Management (AM), Investment Projects (IP) and Other categories for Control Periods 3, 4 and 5.

In contrast to the Civils process, however, the P3e reports are imported to an Access database, using macros to automate the process and re-name the imported files so that they can be more readily identified and understood. The data are first stored in a temporary Crosstab table in Access, removing redundant entries in the process. Further queries are then used to remove extraneous projects (i.e. project details which are held in P3e but do not actually represent existing projects), and the remaining project data are stored in the table 'tblVolumeSpreadsMain' (which is the basis of the Deliverability Volumes Report), and summarised in the table 'tblVolumeDetails'.

One problem that is sometimes encountered is that P3e reports to only two decimal places, with the result that, when relatively small budgets are spread across several Periods, rounding errors can occur. Checks are in place to identify and correct these, however. Checks are also in place to ensure that the data being used are the most recent available.

A Work Instruction has been produced to describe and explain the processes used, including screenshots of the various dialogue boxes encountered, and there is a pool of four core staff who can carry out the work, with another six available if needed.

The time and resources available precluded a detailed check of the queries and VBA-based macros used in the calculation process, but the nature of the process used, the checks and documentation in place, and the large number of staff familiar with and able to use the processes employed provide a high degree of confidence in the accuracy and reliability of this element of the reporting process, which provides a 'benchmark' for other reporting categories.

### 3.5.4 Volume Reporting

The table below shows the reporting of signalling and level crossing renewals.

	2010 Annual Return		2009 Delivery Plan (2009/10)	2010 Delivery Plan (2009/10)	2011 Delivery Plan		Finance Pack 09/10 (pd13)		Finance Pack 10/11 (pd8)	
	Delivery plan	Actual			Actual (2009/10)	Forecast (2010/11)	Budget	Full year	Full year Budget	Full Year Forecast
SEUs (conventional total)	792 *	813	604	792	813	963	604	827	802	903
Level crossings (no.)	28 **	20	8	20	20	21	8	20	30	8

\*The text noted that this figure had changed from the 2009 Delivery Plan

\*\*This was stated in the text rather than presented in a table

The following inconsistencies are noted:

- The 2011 Delivery Plan 2010/11 Forecasts are different to either the Full Year Budget or the Full Year Forecast in the period 8 2010/11 Finance Pack;
- The conventional SEUs reported as Full Year in period 13 of the 2009/10 Finance Pack (827) are higher than the Actual for 2009/10 shown in the Annual Return and 2011 Delivery Plan (813); and
- The Level Crossing Delivery Plan in the Annual Return is different to the 2009 and 2010 Delivery Plans and the Budget reported in the 2009/10 Finance Pack.

A comparison of the Telecom renewals is shown below. It should be noted that the Telecom renewals reported in the Annual Return showed the 2009/10 Delivery Plan rather than the actual delivered in Table 4.15. However, the actuals were correctly shown in the summary Table 4.24 which are replicated below.

	2010 Annual Return		2009 Delivery Plan	2010 Delivery Plan	2011 Delivery Plan		Finance Pack 09/10 (pd13)		Finance Pack 10/11 (pd8)	
	Delivery plan	Actual			Actual (2009/10)	Forecast (2010/11)	Budget	Full year	Full year Budget	Full Year Forecast
<u>SI&amp;SS</u>										
CIS (systems)	-	-	-	7	113	1318	0	0	-	-
Public address (systems)	-	-	-	6	1096	3315	-	-	-	-
CCTV (systems)	-	-	-	0	87	780	-	-	-	-
Clocks (no.)	-	-	-	193	3	147	-	-	-	-
<u>Operational Telecoms</u>										
Large concentrators (no.)	6	2	6	5	2	5	6	0	28	55
Small concentrators (no.)	50	27	50	36	28	21	50	27		
DOO CCTV (systems)	275	247	275	248	247	123	275	219	120	69
PETS (no.)	70	5	70	18	5	72	70	8	53	47
Voice recorders (no.)	0	8	0	0	8	13	0	0	6	6

The following should be noted:

- As explained above, the units of measure for CIS, Public Address and CCTV changed in the 2011 Delivery Plan from systems to components which explains the higher values when compared to the 2010 Delivery Plan;
- There is no reporting of the SI&SS in the Finance Pack or 2010 Annual Return;
- The Delivery Plan for 2009/10 is consistently reported except in the 2010 Delivery Plan where some of the figures are significantly different; and
- The Actuals are consistently reported except in Period 13 of the 2009/10 Finance Pack.

## 4 Conclusions

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Network Rail has a range of procedure documents relating to volumes reporting, not all of which are up to date, or consistent with each other.

The reporting of renewals volumes has been only informally specified with Network Rail largely free to determine how, in what form, and in what currency, reporting takes place. In practice, Network Rail used the reporting measures which were consistent with its own recording and reporting requirements, and appears to also have been free to amend or change these measures, and definitions relating to them, without informing ORR or seeking any form of approval to do so. Consequently, the consistency of reporting through the key Network Rail reporting documents was variable across asset categories. However, ORR and Network Rail have agreed a new specification for the 2011 Annual Return which will report measures that are consistent with the Delivery Plans, so that planned and actual volumes can be compared.

This study was a high level audit, comprising of three elements:

1. Bottom up check of the reporting of a small sample of jobs;
2. A review of the process for aggregating reporting of jobs; and
3. A review of the summary reports provided to ORR

### 4.1 Results of Sampling

No errors were identified in the reporting of IP job for Track Renewals. Maintenance jobs had one error with GEOGIS out of the six returned to us (no information was provided for three jobs) and one of the nine Completion Certificates had an error. The reported volumes in OP were correct in all cases. However, if a Maintenance job exceeded the volume pre-agreed with the RAM, then the excess was reported as Opex and not as a renewal. Of the nine jobs sampled, this affected three jobs which over the nine jobs suggested that 2% of volumes were not reported in this way.

One error was identified for the signalling jobs, which resulted in approximately 4% in volumes misreported. No errors were found for the Telecoms or Civils and Structures jobs.

### 4.2 Process of aggregation

Checks were carried out on the process of aggregation for Track (IP), Buildings and Civils, and Signals & Telecoms Renewals. These were shown to be accurate with no errors having been identified. However, the process for Buildings and Civils was undocumented.

### 4.3 Summary Reports

There are three different reports provided to the ORR: the annual Delivery Plans, Periodic Reports (in the Finance Pack), and the Annual Return. Two tests of consistency were undertaken: one for the reported budget/forecast and one for the volumes reported as delivered.

However, the first point to note is that there is inconsistency in the use of terminology in these reports, and no documentation was seen to define terms in these reports or how they were compiled. The following observations are made.

### Period Report

- The terms “Budget” and “Forecast” as used in the report are not defined.
- Track volumes are shown as measured in “kms”, when they are actually measured in “Composite kms” (i.e. includes ballast and sleepers as well as track).
- Use of parentheses to denote over/under budget performance/ variance is inconsistent between reports (Period Report and Annual Return Summary).

### 2010 Annual Return

- Table 5 (Activity Volumes) omits Level Crossings, Telecoms, and most Civils volumes.
- In Telecoms, no volumes are shown for CIS (monitors), public address (speakers), non-DOO CCTV (cameras) or clocks (no.), but forecasts and actuals are shown in the 2011 Delivery Plans, although using different volumes currencies to what was reported in the 2010 Delivery Plan. (Clocks is the exception which uses the same measure.)
- Civils volumes are shown in a ‘Delivery Plan’ column in Table 4.24, but no Civils volumes are actually shown in the 2010 Delivery Plan (or, for that matter, in the 2009 or 2011 Delivery Plans).
- None of the tables 4.1 – 4.23 contains clarification in respect of renewals volumes delivered by Maintenance and Enhancements. From interviews conducted, Maintenance-delivered volumes are included in the tabulated volumes, but enhancements funded and delivered volumes are not.

### **4.3.1 Test one: Budgets / Forecasts**

Although not stated in the reports, Network Rail have advised that:

- The figure reported as *Forecast* in the Delivery Plan should be the same as the corresponding year’s *Period 8 Full Year Forecast* from the Finance Pack.
- The figure reported as *Delivery Plan* in the Annual Return should be the same as the *Full Year Budget* reported in all the Finance Pack Periods of the corresponding year.

Somewhat confusingly, this means that the *Delivery Plan* reported in the Annual Return is not the same as the *Forecast* figure reported in the Delivery Plan.

The following table checks the consistency of these reports and highlights any discrepancies for which no reasons are provided in the text.

**Table 4.1: Comparison of Budgets / Forecasts from different reports**

	2009/10				2010/11		
	2010 Delivery Plan	2009/10 Period 8 Full Yr Forecast	2009/10 Period 8 Full Yr Budget	Annual Return Delivery Plan	2011 Delivery Plan Forecast	2010/11 Period 8 Full Yr Forecast	2010/11 Period 8 Full Yr Budget
<b>Track Renewals</b>							
Plain Line	1,804	1,804	1,571	1,571	1,725	1,726	1,883
S&C	326	326	312	312	341	341	343
<b>Signalling</b>							
SEUs (conventional)	792 (-5%)	837	604	792 (+31%)	963 (+7%)	903	802
Level Crossings	20 (-5%)	21	8	28 (+250%)	21 (+163%)	8	30
<b>Telecoms</b>							
Large Concentrators	5 (+67%)	3	6	6	5	28	55
Small Concentrators	36 (+20%)	30	50	50	21 (both -7%)		
DOO CCTV	248 (+5%)	237	275	275	123 (+3%)	120	69
PETS	18 (+260%)	5	70	70	72 (+36%)	53	47
Voice Recorders	0	0	0	0	13 (+116%)	6	6

The figures should be the same for columns with the same shading.  
The percentages shown are of differences against the Finance Pack Period reporting.

**Table 4.1: Comparison of Budgets / Forecasts from different reports (cont)**

	2009/10				2010/11		
	2010 Delivery Plan	2009/10 Period 8 Full Yr Forecast	2009/10 Period 8 Full Yr Budget	Annual Return Delivery Plan	2011 Delivery Plan Forecast	2010/11 Period 8 Full Yr Forecast	2010/11 Period 8 Full Yr Budget
<b>Civils</b>							
Overbridges (sq ms)			6,235	6,235			13,409
Underbridges (sq ms)			60,573	60,573			77,678
Bridgeguard 3 (sq ms)			2,838	2,838			6,762
Footbridges (sq ms)			925	925			1,147
Tunnels (sq ms)			11,757	11,757			19,514
Culverts (sq ms)			871	871			1,262
Retaining walls (sq ms)			2,511	2,511			2,384
Earthworks (sq ms)			323,519	323,519			519,587
Coastal / estuary defence (ms)			1,766	1,766			1,235

The figures should be the same for columns with the same shading.

The percentages shown are of differences against the Finance Pack Period reporting.

### 4.3.2 Test Two: Actual volumes delivered

The table below compares the volumes delivered for 2009/10 in the three reports. Any discrepancies from the Finance Pack Period reporting are again highlighted.

**Table 4.2: Comparison of Renewal Volumes Delivered**

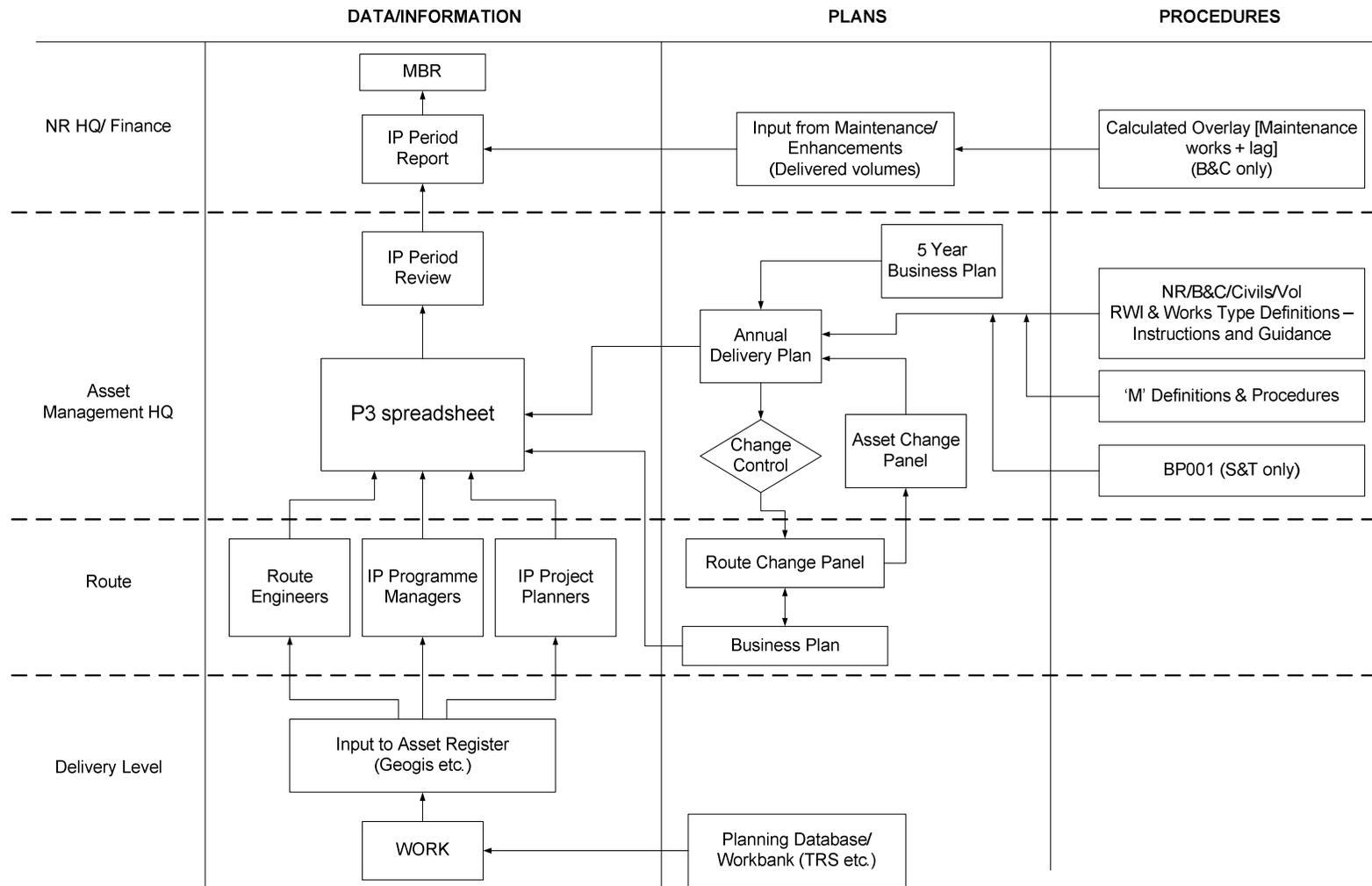
	2009/10		
	2011 Delivery Plan - Actual	2009/10 Period 13 - Actual	Annual Return Actual
<b>Track Renewals</b>			
Plain Line	1757	1756	1757
S&C	319	319	319
<b>Signalling</b>			
SEUs (conventional)	813 (-2%)	827	813 (-2%)
Level Crossings	20	20	20
<b>Telecoms</b>			
Large Concentrators	2 (+2 units)	0	2 (+2 units)
Small Concentrators	28 (+4%)	27	27
DOO CCTV	247 (+13%)	219	247 (+13%)
PETS	5 (-38%)	8	5 (-38%)
Voice Recorders	8 (+8 units)	0	8 (+8 units)
<b>Civils</b>			
Overbridges (sq ms)		5,235	5,235
Underbridges (sq ms)		75,298	75,298
Bridgeguard 3 (sq ms)		2,985	2,985
Footbridges (sq ms)		1,271	1,271
Tunnels (sq ms)		11,664	11,664
Culverts (sq ms)		1,416	1,416
Retaining walls (sq ms)		2,153	2,153
Earthworks (sq ms)		405,898	405,898
Coastal / estuary defence (ms)		541	541

These tables show:

- Track Renewals are all consistently reported.
- Signalling Budgets / Forecasts have some significant inconsistencies. Actual volumes are consistent within 2%.
- Telecoms Budgets / Forecasts have some significant inconsistencies. Actual volumes have varying levels of consistency, up to 38% for PETS.
- Civils Budgets / Forecasts and Actuals are all consistent. However, there are no volumes reported in the Delivery Plans.

A flowchart showing how the IP asset volumes data is processed is shown below.

### NR INVESTMENT PROJECTS DATA PROCESS FLOWCHART



## 5 Confidence Ratings

Following a review in March 2010, a revision to the confidence ratings used up until that date was agreed with ORR and Network Rail. This is not substantially different to the previous system, still requiring scores for reliability and accuracy. The definitions have however been amplified slightly and the number of accuracy bands reduced. The use of manual or automated calculation has been factored into the description. An additional accuracy factor of X has been added for KPIs that are calculated from a very small data sample, or where the accuracy cannot be reliably assessed.

The tables below describe the revised descriptions used to assess the KPIs in this report:

**Table 5.1: Confidence Grading System: Reliability**

Reliability Band	Description
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
B	As A, but with minor shortcomings. Examples include old assessment, some missing documentation, insufficient internal verification, undocumented reliance on third-party data.
C	Some significant shortcomings in the process which need urgent attention.
D	Major shortcomings in all aspects of KPI: process unfit for purpose

**Table 5.2: Confidence Grading System: Accuracy**

Accuracy Band	Description
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 $\pm 1\%$
2	KPIs expected to be accurate to within $\pm 5\%$
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 $\pm 10\%$
4	KPIs expected to be accurate to within $\pm 25\%$
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 $\pm 25\%$
6	No longer used
X	KPI is calculated on a very small sample of data, or accuracy cannot be assessed for some other reason (to be qualified in text of report)

In line with the remit for this mandate, the Reporter Team have produced confidence gradings for the renewal volumes data in the 2010 Annual Return and the Finance Pack. These gradings cover both the relevant reporting systems within Network Rail and the aggregation of this data for reporting in these two documents.

As a general comment that covers all the gradings, the definition of some terms used in both the Annual Return and Finance Pack is unclear (for example, 'budget' and 'forecast'). Also, use of parentheses to denote over/under budget performance/ variance can be inconsistent between the two reports. This lack of robust reporting measures means that no individual discipline can be rated higher than B for reliability.

Our ratings for each discipline are described below. We do acknowledge that Network Rail have put effort into improving their reporting of volumes for the 2011 Annual Return. This document is not yet available for checking, but can be reviewed in an audit next year.

(Note that Network Rail disagree with our ratings for Track, Telecoms and Civils and Structures.)

	<b>Sampling of jobs</b>	<b>Amalgamation</b>	<b>Reporting to ORR</b>	<b>Confidence Grading</b>
Track Renewals	No errors identified in reporting volumes for Investment Projects in P3e or Maintenance (Capex) projects in Oracle Projects. Renewals funded by Maintenance Opex not reported: about 2% of Maintenance renewal volumes (less than 1% of all renewal volumes). An error identified in GEOGIS representing 3% of Maintenance volumes sampled. An error in 1 of 9 Maintenance Completion Certificates.	No errors identified.	Inconsistent use of terminology between reports, such as 'budget', 'delivery plan', and 'forecast'. No errors identified in volumes.	B for reliability because of inconsistent reporting terminology, and lack of definition of 'composite kms' measure. Also procedural shortcomings identified in the sampling of Maintenance jobs. 2 for accuracy, within 5%. Although volumes reported to ORR are accurate, there are some concerns about consistency with volumes reported in GEOGIS for Maintenance renewals. (In addition, 1 is not compatible with B in the rating system.)
Signalling and Level Crossings	An error affecting 4% of SEU volumes (now corrected procedurally by NR).	No errors identified.	Inconsistent use of terminology between reports, such as 'budget', 'delivery plan', and 'forecast'. Actual SEU volumes are consistent between the various reports within 2%. There are larger variations in the forecasts.	B for reliability because of inconsistent reporting terminology, and for possibility of updated SEU count not being reflected in the project files (noting NR advise this has since been corrected). 2 for accuracy, within 5%. This reflects the level of errors found in the sampling and in the level of inconsistencies in the reporting of actual volumes to ORR.
Telecoms	No errors identified.	No errors identified.	Inconsistent use of terminology between reports, such as 'budget', 'delivery plan', and 'forecast'. No procedure or definition to cover reporting of SI&SS	B for reliability because of inconsistent reporting terminology. Also, the specification of units of measure should be defined.

			<p>telecoms (though document M32 has been updated since our review).</p> <p>Actual volumes have varying levels of consistency, up to 38% (though in this case only 3 units difference). Annual Return Delivery Plan concurs with Finance Pack. However, there are some large variations between Delivery Plan document and Finance Pack.</p>	<p>3 for accuracy. Although inconsistencies are larger than 10% in some cases, the numbers are small (4 of the 5 categories had actual volumes of less than 30 units in 2009/10).</p>
Civils and Structures	<p>No errors identified. NR carried out their own checks in summer 2010 and identified errors representing 2% of total volume. These have now been corrected. Processes are being updated to improve accuracy.</p>	<p>No errors identified. However, process is undocumented.</p>	<p>Annual Return is consistent with the Finance Pack. However, there is no clear definition of units being reported.</p> <p>The 2010/11 Budget was updated in Period 3 of the Finance Pack, such that it and all subsequent Periods were consistent with the Annual Return.</p> <p>There are no volumes or forecasts reported in the Delivery Plans.</p>	<p>C for reliability because procedures are still being updated in the light of the summer 2010 checks, and data consolidation processes are undocumented.</p> <p>2 for accuracy. NR's checking shows accuracy of volumes delivered within 5%. (We considered a 3 to reflect the missing forecasts from the Delivery Plans but concluded this does not fit with the Confidence Grading description.)</p>

Achievable future ratings are:

- Track – data reporting processes need to be underpinned by formalised definitions, and through the use of agreed and well defined terminology, to enable a future A1 rating to be achieved.
- Buildings & Civils - the reporter team believes that continuing with the current review project, and extending it where appropriate, to
  - overhaul the data recording and reporting arrangements, to include all Buildings and Civils renewals data in a single system – presumably the IP P3e projects suite – and verified through common processes, and
  - review volumes reporting definitions, and their application in the reporting of data to ORR

would enable a future rating of A1 to be achieved. Similar comments about formalising definitions, and using agreed and well defined terminology apply in this category as much as in Track Renewals.

- Signals and Level Crossings - the report team believe that addressing the shortcomings identified would enable a future rating of A1 to be achieved.
- Telecoms – a future rating of A1 should be possible once the discrepancies in the reporting have been corrected, the specification of *what* is to be reported is defined, and ensuring that the recording, reporting, and format is properly specified in NR standards and processes.

Electrification, Plant & Machinery have not been reviewed in this report.

## 6 Recommendations

The following recommendations are made. We propose to add them to our recommendations tracker spreadsheet and to review progress with the Data Champions on a quarterly basis.

Number	Recommendation	Section in Report	Data Champion	Due Date
2011REN01	ORR to agree with Network Rail a clear reporting specification and format for all renewals volumes to be regularly reported, and to agree the definitions for terms such as 'budget', 'plan' and 'forecast' which are used extensively in reports. To include consideration of track renewals (Maintenance) that are funded by opex.	3.2  3.3.3	Matt Wikeley	October 2011
2011REN02	NR to review its management processes & standards for recording and reporting volumes data to ensure that they: Are comprehensively documented; Are up to date and consistent; Cover both the functional and cross functional reporting requirements; and Are adequately checked.	3.1, 3.3.3 3.3.5, 3.4.1, 3.5.2, 3.5.4	Each Discipline Data Champion	November 2011
2011REN03	ORR to confirm that the current arrangements, in which Enhancements volumes are not recorded in period or annual returns, meet requirements	3.3.4	Matt Wikeley	October 2011
2011REN04	Buildings & Civils to consider formalising the arrangements for independent verification of work volumes, to build upon the perceived success of the special exercise undertaken in 2010.	3.4	Dan Athol	September 2011
2011REN05	Network Rail to strengthen the reporting hierarchy to address any disconnect between functional reporting and the Finance-led collation of the period pack.	3.2	Each Asset Data Champion	September 2011
2011REN06	ORR to confirm that the current methodology for recording volumes in B&C – the asset dimensions prior to remediation – is acceptable and appropriate.	3.4	Mervyn Carter	September 2011
2011REN07	All recording and reporting processes used should be documented, and sufficient numbers of staff should be trained in them to cover periods of	3.2, 3.4	Each Discipline Data Champion	November 2011

	holiday, staff illness, etc., and to ensure business continuity.			
2011REN08	Network Rail to use a clear version control for their reporting documents and to show the date of publication.	3.2	Bill Davidson	July 2011
2011REN09	Network Rail to carry out further checks on the accuracy of Maintenance job records, and to consider what improvements to processes are needed.	3.3.3	Relevant Data Champion	September 2011



## Appendix A

### Example of Network Rail Period Volumes Return



The following table is an extract from Period 13 of the 2009/10 Period Finance Pack to illustrate the volume data that is reported.

**RENEWALS VOLUMES**

2009/2010

**Full Year**

	Full Year Budget	Budget Variance	% Budget Variance	Prior Year Actuals	Prior Year Variance	% Prior Year Variance	Prior Period Actuals	P12 Forecast Variance	% Prior Period Variance	
<b>Great Britain</b>										
<b>Track</b>										
Plain Line (kms)	1,756	1,571	(185)	(12)%	1,766	10	1%	1,747	9	0%
S&C (eq.Units)	319	312	(7)	(2)%	277	(42)	(15)%	321	(2)	(1)%
<b>Civils</b>										
Overbridges (m <sup>2</sup> )	5,235	6,235	1,000	16%	3,470	(1,765)	(51)%	4,638	597	13%
Underbridges (m <sup>2</sup> )	75,298	60,573	(14,725)	(24)%	32,473	(42,825)	(132)%	55,885	19,413	35%
Bridgeguard 3 (m <sup>2</sup> )	2,985	2,838	(147)	(5)%	2,143	(842)	(39)%	3,536	(551)	(16)%
Footbridges (m <sup>2</sup> )	1,271	925	(346)	(37)%	645	(626)	(97)%	1,231	40	3%
Tunnels (m <sup>2</sup> )	11,664	11,757	93	1%	17,909	6,245	35%	14,768	(3,104)	(21)%
Culverts (m <sup>2</sup> )	1,416	871	(545)	(63)%	429	(987)	(230)%	1,455	(39)	(3)%
Retaining walls (m <sup>2</sup> )	2,153	2,511	358	14%	148	(2,005)	(1,355)%	1,788	365	20%
Earthworks (m <sup>2</sup> )	405,898	323,519	(82,379)	(25)%	229,594	(176,304)	(77)%	376,388	29,510	8%
Coastal/estuary defence (m)	541	1,766	1,225	69%	323	(218)	(67)%	541	-	0%
Other (including major structures) (m <sup>2</sup> )	79,027	-	1,950	0%	39,894	(39,133)	(98)%	-	79,027	0%
<b>Signalling (SEUs)</b>										
<b>Signalling Equivalent Units</b>										
(conventional)	827	604	(223)	(37)%	843	16	2%	913	-86	(9)%
Signalling Equivalent Units (ERTMS)	-	-	-	0%	-	-	0%	0	0	0%
Level crossings (no.)	20	8	(12)	(150)%	-	(20)	0%	20	-	0%

## Telecoms

## Telecoms

Concentrators (No.)	-	6	6	100%	2	2	100%	-	0	0%
Concentrators Small (No.)	27	50	23	46%	53	26	49%	31	-4	(13)%
DOO CCTV Systems (Systems)	219	275	56	20%	30	(189)	(630)%	224	-5	(2)%
PET Systems (No)	8	70	62	89%	10	2	20%	8	0	0%
Voice Recorder (No)	-	-	-	0%	155	155	100%	-	0	0%
CIS Systems (No. of Stations)	-	-	-	0%	12	12	100%	-	0	0%
Other	-	-	-		35	35		-	0	0%



## **Appendix B**

### **Mandate for Study**



## Mandate for Independent Report – Data Quality

Audit Title:	Audit of renewal volumes data
Mandate Ref:	AO/013
Document version:	Draft A
Date:	24 February 2011
Draft prepared by:	Matt Wikeley
Remit prepared by:	Matt Wikeley
Network Rail reviewer:	Justin Kennedy

Authorisation to proceed

ORR		
Network Rail		

### Purpose

This mandate sets out the scope of work for the Part A independent reporter (Arup) to undertake a review of the renewals data reported by Network Rail in the finance pack. The renewal volumes data to be reviewed in this audit includes:

- actual completed against plan; and
- year end forecast.

This review will assess the accuracy and reliability of the above renewals data. This audit **excludes** a review against good practice asset management.

### Background

The ORR reviewed Network Rail's revised asset policies in 2010, concluding that the policies appear to be sustainable (with the exception of Civils). Network Rail is now implementing these asset policies by delivering the plans outlined in the Network Rail Delivery Plan, a document updated each year. ORR monitors delivery against this plan to determine if the sustainable asset policies are being implemented by Network Rail. It is therefore important that reported renewals data is reliable and accurate for ORR to complete a robust assessment.

The ORR has concerns about inconsistent renewals data reported in the finance pack (especially for signalling, telecoms and electrification renewals). Also, Network Rail has recently reported significantly different Signalling Equivalent Units full year forecasts from three different sources:

- finance pack
- direct contact with the asset management team
- Network Rail 2011 Delivery Plan update

To ensure a high standard of accuracy and reliability of Network Rail's renewals data the ORR plans to use the independent reporter to audit renewals data supplied by Network Rail in the finance pack and annual return.

## Scope

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Audit of renewals volumes data in the finance pack and the annual return. An extract from the finance pack report can be found in appendix A.

**Exclusions:** a review **against asset management best practice is excluded** from the scope of this audit. This is within the scope of reviews by the part B independent reporter (AMCL).

**Interfaces:** this review should take into account and not duplicate work completed for the review of 2009-10 regulatory accounts, unit costs and the current audit of 2010-11 regulatory accounts. The systems and methodology reviewed as part of these audits may also be used to report renewals volumes.

## Methodology

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The reporter is required to critically review/audit a sample of the renewals report that Network Rail issues:

- Every period (four weeks) in the finance pack; and
- Every year in the annual return.

This includes any related systems, processes, methodologies and procedures, to ensure that the data provided is comprehensive, accurate and consistent. The review needs to ensure the data which underpins the volume of renewals reported as “delivered” and/or “forecast” for year-end is verifiable and robust.

It should be noted that some assets groups (including Signalling) only report delivered renewal volumes when renewal schemes are commissioned.

The audit for reliability and accuracy of all data mandated should be assessed using the confidence grading system employed for the quarterly programme to of Network Rail data assurance.

## Deliverables

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A data assurance report including detail of the review and resulting recommendations. The report shall contain appendices listing reference documentation and the people interviewed.

We expect the report to include a confidence grade for each of the following asset group renewals data:

- Track
- Civils
- Signalling
- Telecoms
- Electrification
- Plant & Machinery

In addition, the reporter shall make recommendations on potential improvements, sufficiently described to outline tasks and benefits (SMART). The reporter should also recommend a system for tracking progress against the recommendations.

The final version of the report will be made available on the ORR public website.

### **Timescales**

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- Work to commence early March 2011
- Draft A report by end March 2011
- Final report by mid April 2011

The governance process for issuing Independent Reporter reports is outlined in appendix B.

### **Independent Reporter remit proposal**

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The Independent Reporter shall prepare a proposal for review and approval by the ORR and Network Rail on the basis of this mandate. The approved remit will form part of the mandate and shall be attached to this document.

The proposal will detail methodology, tasks, programme, deliverables, resources and costs.

**Appendix A: Finance pack renewals data**

<b>RENEWALS VOLUMES</b>						
						Period
2010/2011						10
Year to Date			Full Year			
Actual	Budget Variance b/(w)	Prior Year Variance b/(w)	Full Year Forecast	Budget Variance b/(w)	Prior Year Variance b/(w)	
<b>Great Britain</b>						
<b>Track</b>						
Plain Line (kms)	1,123	143	190	1,726	157	(146)
S&C (eq.Units)	221	19	(0)	341	2	(28)
<b>Civils</b>						
Overbridges (sq ms)	7,687	2,441	(6,591)	12,972	436	(8,846)
Underbridges (sq ms)	42,213	21,389	765	91,160	(13,483)	(19,647)
Bridgeguard 3 (sq ms)	4,407	831	(2,700)	7,681	(919)	(3,862)
Footbridges (sq ms)	882	(43)	(249)	1,224	(77)	34
Tunnels (sq ms)	5,594	1,415	(1,017)	13,818	5,696	(7,055)
Culverts (sq ms)	860	(370)	(530)	2,385	(1,123)	(614)
Retaining walls (sq ms)	2,235	(574)	(727)	2,931	(547)	(281)
Earthworks (sq ms)	199,332	181,891	1,834	375,813	143,774	(44,911)
Coastal/estuary defence (ms)	1,010	225	(772)	1,245	(10)	(704)
Other (including major structures) (sq ms)	10,553	50,089	(10,553)	28,912	62,175	(7,060)
<b>Signalling (SEUs)</b>						
Signalling Equivalent Units (conventional)	901	-	(109)	904	(102)	(106)
Signalling Equivalent Units (ERTMS)	35	-	(35)	199	(111)	(199)
Level crossings (no.)	5	8	15	8	22	4
<b>Telecoms</b>						
<b>Telecoms</b>						
Concentrators (large & small) (No.)	16	24	3	28	27	1
DOO CCTV Systems (Systems)	125	(76)	(94)	187	(118)	(58)
PET Systems (No)	8	21	(8)	66	(19)	(64)
Voice Recorder (No)	-	6	-	8	(2)	(1)
<b>Electrification</b>						
HV Switchgear (Circuit Breakers)	34	(2)	52	54	(11)	59
AC GSP transformer (No)	-	-	-	-	-	2
AC GSP cable (Km)	-	-	-	-	-	-
Booster transformers (No.)	26	12	(4)	29	14	4
<b>OLE</b>						
OLE re-wiring (Wire runs)	45	2	(11)	60	8	7
OLE campaign changes (Wire runs)	295	64	19	814	206	(202)
OLE Structures (No.)	25	10	9	63	37	36
Conductor Rail (km)	0	24	(0)	7	24	(2)
<b>DC</b>						
HV Switchgear (No.)	62	(14)	-	105	(19)	(63)
HV Cables (km)	37	-	15	46	16	(88)
LV Switchgear (No.)	38	-	(8)	60	35	(71)
LV cabling (km)	-	-	-	-	4	-
Transformers / Rectifiers (No.)	32	(6)	(32)	45	(1)	(9)
<b>Plant &amp; Machinery</b>						
Points Heaters (No.)	396	(96)	(183)	934	292	88
<b>Scotland</b>						
<b>Track</b>						
Plain Line (kms)	83	(18)	7	146	5	3
S&C (eq.Units)	21	(3)	(3)	36	(1)	(3)

Note 1: A positive budget variance indicates delivering less volume.

Note 2: Volumes include those delivered by Maintenance.

Note 3: Renewals carried out as part of major enhancement programmes are currently excluded.

## Appendix B

Governance process for issuing Independent Reporter reports.

Revision	Purpose	Outcome
Draft	Review for factual correctness and comments	First drafts of the report should be issued to ORR and Network Rail, who have fourteen days to review the contents before a tri-partite session is arranged at which feedback is provided to the reporter. Network Rail may choose to provide Director level input at this stage.
Final draft	Review	The Reporter will issue a final draft report to both ORR and NR within five working days of the tri-partite meeting All three parties agree contents and recommendations as far as possible via correspondence or meetings as appropriate. Further comments shall be provided within five working days.
Final report		The Reporter will issue its final report to both the ORR and NR. If agreement over its contents has not been reached the report will contain the Reporter's independent assessment together with opinions from ORR and NR to document their positions ORR will publish the report on their website It is anticipated that the issue of the final report (i.e. version 1) would take no longer than 1 working week after receiving the final report.



## Appendix C

### Sample Data Checks



The following checks of renewals schemes were undertaken to verify the data transfer from site project documentation into P3e and MBR, conversion to metric measures, and comparison with plan volumes.

## C1 Track – IP

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Job Ref.	Location	Rail Yards	Sleepers Yards	Ballast Yards
1210022	Bloxwich North	480	474	460
210027		1425	1420	1379
5220152	School Lane	739	736	708
21100710	Ribblehead	336	316	316
23180311	Roade	0	0	600
23380511	Old Fishery Lane	0	0	347

## C2 Track – Maintenance Delivery

Project Ref	Job Ref	Location	Type of Renewal	AMP014 Volume	GEOGIS Volume	OP Volume	Comment	OK?
122409	M11848	Cowlairs Aberdour	Renew RH Rail	235 yds	235 x 0.5	108 mtrs	} Single rail only. } Allowable output = 0.5 yardage	✓
	M11850		Renew side worn rail	280 yds	280 x 0.5	128 mtrs		✓
119482	M48146	Blue Anchor Elephant & Castle	CWR renew	440 yds	440 x 2	402 mtrs	880 units, rail & ballast	✓
	M48149		CWR renew	484 yds	484 x 2	443 mtrs	968 units, rail & ballast	✓
118202	M44483	Oakley Up Line	Renew RH & LH rail	1606 yds	Data not received	1469 mtrs	No comment	✓
	M44528	Steventon	Renew RH rail (RCF)	1100 yds	Data not received	503 mtrs	Single rail only - 0.5 yardage	✓
	M44999	Gillingham (Dorset)	Emergency	814 yds	Data not received	864 mtrs	The AMP014 certificate has since been corrected to 968 yards (885 mtrs), of which 21m are reported as opex.	X
118776	M33456	Derby Morton	Replace Life expired rail joints	640 yds	681 yds	580 mtrs	5 mtrs could not be claimed in Capex due to not being agreed in advance with RAM. Not all 2011 GEOGIS volumes relate to this renewals job (some was Opex rail replacement).	✓
	M33457	Trent High Level	Renew side worn rail	400 yds	300 yds	300 mtrs	66 mtrs could not be claimed in Capex due to not being agreed in advance with RAM. Entry in GEOGIS was erroneous - should be 400 yards, not 300 yards (this has since been corrected).	X

## C3 Buildings & Civils

Job Ref	Location	Volume Sq. Mtrs.	Work Type	Basis
108420	Kent Viaduct Br. 13	100 340	Repair Preventative	Design Drawing Design Drawing
115144	Kirkby Pool Viaduct	268 268	Repair Preventative	Marlin Deck area Marlin Deck area
103885	Arnside (Kent) Viaduct	10,060	Preventative	Marlin Deck area
115937	Syke Beck Up (Earthworks Embankment)	2,023	Preventative	Assessment/ Examination

## C4 Signals & Telecoms

Location	SEU Plan	SSADS Count	Job	Comments
M. Pleasant/ Southampton/ Totton	351	351	Interlocking	Plan error - SEU count should be 158 (45% of total SEU count of 351)
Great Chesterford	67	88	Re-wire (degradation)	Scheme plan not amended after BP001 recalculation of SEU count in SSADS
Robin Hood Line	31	30	Resignalling	
Moorthorpe	55	57	Re-wire (degradation)	



## **Appendix D**

### **Glossary of Terms & Abbreviations**



AM	–	Asset Management
B&C	–	Buildings & Civils organisation within NRIP
BP	–	Business Plan
CCTV	–	Closed Circuit Television
CIS	–	Customer Information System
CP3/ CP4	–	Control Period 3/4
Delivery Plan planned	–	NR's annual statement of expenditure, work & volumes planned
DOO	–	Driver Only Operation
ERTMS	–	European Rail Traffic Management System
GEOGIS	–	Civil Engineering asset information system
IP	–	Investment Projects (organisation/ function within NR)
MBR	–	Monthly Business Report
NRIP	–	Network Rail Investment Projects (see IP, above)
OP	–	Oracle Projects
ORR	–	Office of Rail Regulation
P3/P3e	–	Primavera workbank recording & reporting system
PETS	–	Public Emergency Telephone System
RWI	–	Repeatable Work Item
S&C	–	Switches and Crossings
S&T NR)	–	Signalling & Telecoms (organisation/ function within NR)
SP&C	–	Signalling, Power & Communications
SCMT	–	Structures Condition Monitoring Tool
SEU	–	Signalling Equivalent Unit
SSADS	–	Signalling Systems Asset Database
TRS	–	Track Renewals System
VBA	–	Visual Basic for Applications (Microsoft spreadsheet and database macro programming language)
VPBP	–	Volume P3e vs. Business Plan



## Appendix E

# Documents Reviewed and People Interviewed



***The following documents were examined during this review;***

- 2009 NR Delivery Plan
- 2010 NR Delivery Plan
- 2010 NR Annual Return
- 2011 NR Delivery Plan
- 2009/10 Period Finance Packs
- NR Asset Reporting Manual
- Procedure NR/B&C/CW/Vol Issue1 - Buildings & Civils, RWI & Work Type Definitions – Instructions & Guidance
- Procedure NR/L3/INI/TK0040 – Reporting of Track Unit Rates (part of NR CAF)
- Procedure MDTR AMP Issue 05 – NR Infrastructure Maintenance Delivered Track Renewals – Asset Management Plan
- Summary of Volume Verification Exercise (email from Simon Offley, Principal Business Planner, Programme Controls – IP Buildings & Civils)
- Procedure BP001 - Definition of Signalling Equivalent Units & Volume Reporting
- Various spreadsheets used in the preparation of the volumes data for inclusion in the Periodic Finance Packs

***The following personnel were interviewed during this review;***

- Matt Wikeley, Project Sponsor, ORR
- Tony Wilcock, Head of Civils Asset Management (Geotechnical), NR
- Dan Athol, Head of B&C Programmes, NR
- Chris Sills, Principal Programme Controls Manager, NR IP Building and Civils.
- Andy R. Smith, Senior Business Planning Specialist (S&T), NR
- Mark Woodhouse, Principal Programme Control Manager (S,P,&C), NR
- Duncan Sooman, Head of Asset Management (Structures), NR
- Stewart Lothian, Senior Structures Management Engineer, NR
- Andrew Sykes, Programme Controller (Track), NR IP
- Bhumixa Shah, National B&C Planning Manager, NR
- Adrian Golumbina, Financial Controller (Track), NR
- Mervyn Carter, Civil Engineering Advisor, ORR
- Louise Kavanagh, Financial Controller (Works Delivery), NR
- Neil Johnson, Works Delivery Director, Infrastructure Maintenance, NR
- Paul Marshall, Financial Controller, NR
- Paul Greene, Principal Programme Planner (Track), Asset Management, NR
- John Armstrong, Senior Analyst (Track), Asset Management, NR

- Ram Ramakrishnan, Senior Management Accountant (Track), NR
- Stewart Westsmith, Programme Reporting Specialist, NR
- Phil Yeadon, Project Planner, NR
- Ram Ramakrishnan, Senior Management Accountant, NR