OFFICE OF RAIL AND ROAD

Network Rail Monitor

Quarters 1-2 of Year 4 of CP5 1 April 2017 to 14 October 2017

4 December 2017

Contents

1. Overview

Health and safety

1.1 Safety performance indicators for the first half of 2017-18 show that Network Rail has maintained a good level of safety management. It can still claim to be the safest large railway in Europe.

1.2 For example, we have continued to monitor Network Rail's progress in achieving its *Electrical Safety Delivery Programme.* The activities being delivered through this programme are now starting to show improved safety benefits along with increased legal compliance and productivity gains.

1.3 However, as some incidents illustrate, there is a continuing need for focus and vigilance. In August 2017, for example, there were three derailments in a short space of time: at Ely West Junction on 14 August, where a freight train derailed; at Waterloo station on 15 August, when a passenger train derailed and collided with a barrier train that was part of the blockade; and at Paddington station on 20 August when an HST derailed at low speed. Our inquiries into these incidents are continuing. However, maintenance remains a concern given the challenge of managing assets of known poor condition where there are competing priorities for available resource. This continues to be a priority for our inspection programme.

1.4 In the course of our inspections, we saw that progress remains slow in important areas that could bring improvement to Network Rail's management maturity. As mentioned in previous monitors, we continue to see inconsistent or delayed delivery of significant programmes, such as Business Critical Rules (BCR), Risk Based Maintenance (RBM) and ORBIS (for asset information). We have still to see robust or consistent responses from the routes to our earlier challenge to strengthen assurance arrangements. This is fundamental to Network Rail identifying and addressing weaknesses in its safety management system.

Train service performance

Passenger

1.5 ORR regulates Network Rail's delivery of performance to its customers, the train operators. We assess Network Rail's performance by looking at the performance of the train service itself, primarily through the Public Performance Measure (PPM) and Cancellations and Significant Lateness (CaSL).

1.6 There has been an improvement in the first half of 2017-18, although performance has again fallen short of target. The PPM Moving Annual Average (MAA) at the end of period 7 was 88.1%, 4.3 percentage points below the regulatory target of 92.4%. 18 passenger train operating companies (TOCs) are falling short of their thresholds[1] for PPM and 15 TOCs are falling short of their thresholds for CaSL.

Freight

1.7 Network Rail's performance for the freight sector was strong. The Freight Delivery Metric (FDM) MAA at the end of period 7 stood at 94.1%, well ahead of the national regulatory target of 92.5%.

Asset management

1.8 Network Rail has continued to improve the overall performance of the network assets so far this year. The Composite Reliability Index (CRI), which measures asset reliability across the network compared to the end of CP4, has risen to +17.6%, from +15.8% at the end of 2016-17. LNE/EM and LNW routes have improved the most so far this year, with CRI gains of 6.3pp and 2.3pp respectively, whereas Anglia and Western have fallen back by 4.5pp and 3.0pp respectively. Wessex and South East continue to be the routes that have made the biggest gains overall during CP5; their CRIs are 27.5% and 26.5% respectively.

Developing the network

1.9 Network Rail's delivery of the enhancements portfolio remains mixed. There have been some significant deadlines missed on electrification projects across the portfolio and the regulated milestones for electrification of the Great Western main line are still at risk. Network Rail has a significant amount of work to do in the coming months to meet its obligations to its funders and to be ready for major timetable changes in 2018.

1.10 We have seen evidence that Network Rail is embedding the tools developed as part of its *Enhancements Improvement Programme (EIP)* in its business. The company now needs to show how this will feed through into benefits for customers and stakeholders, for example through consistent delivery of project milestones and more robust financial management.

[1] We set a 'regulatory threshold', outside which we will consider further action. For PPM, this is 2.0pp below (worse than) Performance Strategy target and for CaSL, this is 0.2pp above (worse than) the Performance Strategy target.

Expenditure and finance

1.11 Financial headroom, i.e. the difference between forecast CP5 borrowing and available borrowing, is forecast to be £80m for England and Wales, and £139m for Scotland. Forecast financial headroom at the end of CP5 has decreased by 38% in England and Wales, and by 21% in Scotland in the first half of 2017-18. Some risks are now starting to decrease as Network Rail gets nearer to the end of the control period. The company is now considering whether risk provision can be released, for example relating to Scotland enhancements. This would allow additional expenditure in some areas.

2. Health and Safety

2.1 This section describes Network Rail's safety management performance and assesses progress against a range of indicators and measures. It also describes significant themes emerging from our inspection and investigation activity.

2.2 Some of the issues we report on here are linked to other sections, particularly section 4, Asset Management.

Performance against key indicators

2.3 Network Rail measures its performance against various corporate targets. For workforce safety, for example, it has a target to achieve a Lost Time Injury Frequency Rate (LTIFR) of 0.402 by the end of 2017-18 – a 10% improvement on its target for 2016-17. To reach this target the rate at the end of the half year needed to be 0.426. The actual figure was 0.423. In period 7 there were 41 lost time injuries compared to 55 in the same period last year.

2.4 The target is a challenging one, but LTIFR has improved by 8% over the last 12 months and is at historically low levels. LTIFR is a composite measure and it serves to illustrate some of the complexity of judging Network Rail's performance. There is variation in the constituent parts of the overall measure. For example, over the last year, the routes' combined performance has improved by 6%, whereas Infrastructure Projects' has improved by 16%.

2.5 A further consideration is the number of hours worked. The number of RIDDOR specified injuries for the first half of 2017-18 was 39, compared to 49 over the same timescale last year. However, fewer hours were worked,11 million in period 7 compared to 12 million for the same period last year. In this context, the figure for fatalities and weighted injuries (FWI) normalised for hours worked can be more helpful than simple numbers of RIDDOR reportable injuries. Again at period 7 the normalised FWI stood at 0.075, a decrease (improvement) of 16.6% over a twelve-month period. This reflects the impact of reducing injury severity and, despite fewer hours having been worked, the trend has improved because the most severe injuries comprise a smaller proportion of the total.

2.6 Network Rail is responding appropriately to this complex picture. It has analysed the data and is targeting its efforts at slips, trips and falls prevention. It is also making effective use of its close call information.

2.7 Network Rail has made considerable progress in level crossing safety but still missed its target. There are both corporate and devolved route risk reduction milestones. Many rely on third party actions which are becoming harder to achieve, for example, securing local authority co-operation to close a crossing. As a result, at the half-year point, Network Rail has had to re-forecast or abandon some milestones. The challenges of achieving these plans mean that the forecast benefits of the level crossing risk reduction fund will be around 18% at the end of CP5, instead of the originally anticipated 25%.

2.8 There have been significant changes in the way incident data informing the Precursor Indicator Model (PIM) is reported. This means that for some asset safety precursor measures there is no recent data or there are no meaningful comparators. However, it is clear that for many of the contributory elements to train accident risk, the current performance measures are at historically 'best ever' rates. Network Rail is helping RSSB to reinstate reporting of all the train accident risk categories in the PIM by the end of December 2017.

2.9 Network Rail has a *Train Accident Risk Reduction* programme underpinned by a range of contributory workstreams assigned to accountable owners. We have however noted that where milestones are missed it is often for reasons which have already been identified by previous ORR inspection activity. Our findings suggest that Network Rail is sometimes overambitious in its objectives and underestimates the challenge of effective delivery – or fails to assure itself that implementation is embedded. These weaknesses are reflected in the missed milestones for CSAMS (Civils Strategic Asset Management Solution) introduction, Eddy Current Testing and achievement of Business Critical Rules (BCR). We note that installation of Remote Condition Monitoring has been paused, but at this point we see this as a healthy sign that difficulties have been identified and are being addressed.

2.10 The revised company standard for workforce safety when accessing the track is identified by Network Rail as key to delivering its workforce safety risk reduction programme. It has been successfully introduced during the first half of this year – showing that lessons have been learnt following the considerable difficulties with the introduction of PDSW (*Planning and Delivering Safe Work*). The limited changes and the recognition that different parts of the business have different needs and will work to different timescales, mean this change is more likely to bring improvements.

Inspection and investigation findings

2.11 Some of our enforcement activity in the first half of 2017-18 has reflected shortfalls in the way Network Rail introduces and manages change. In May we issued an Improvement Notice due to weaknesses in managing infrastructure changes (as revealed by our enquiries into a freight train derailment at East Somerset Junction on 20 March 2017). In the same month we issued an improvement notice in the light of evidence that a revised standard to improve the control of risks from the use of iron men rail transporters had not been effectively introduced or monitored. In June we took enforcement action in respect of LNW route on exposure to respiratory risk arising from masonry grinding. Good practice elsewhere had not been adopted in that route.

2.12 Funding constraints and consequential deferral of planned renewal work place increasing pressure on day-to-day maintenance and inspection activities. It is therefore increasingly important that Network Rail can manage that shift in focus effectively. Much of our inspection activity has been targeted at that aspect of operational delivery. It is critical that the company can rely on predictably competent, experienced, skilled staff and this led us to take enforcement action in June 2017 on Track Maintenance Engineer (TME) competence. Network Rail could not demonstrate fully that it had satisfied previous commitments in the area and we needed to ensure that adequate interim arrangements are in place until a new competence management regime is introduced.

2.13 A number of incidents occurring during the first half of the year pointed to gaps in Network Rail's capability. At Ely West Junction on 14 August a freight train derailed and a passenger train departing Paddington station derailed on 20 August. At both locations, maintenance staff were dealing with assets of known deteriorating condition (Switches and crossings (S&C) at Ely and longitudinal timbers at Paddington).

2.14 The passenger train derailment at Waterloo on 15 August was a reminder of the potential consequences of a signalling wrong-side failure and the need for stringent controls to prevent such incidents which are potential precursors to significant accidents. We are currently investigating this incident.

2.15 Our inspection findings for the first half of this year have emphasised the importance of Network Rail improving its frontline assurance arrangements. Too often we find non-compliances that are a surprise to supervisors and managers. Effective assurance would increase the likelihood of Network Rail discovering and remedying these shortcomings itself. In the process, it would strengthen its own management maturity. We have had variable engagement from the routes on this point although the central technical authority has made changes to the assurance

framework. These will be introduced later in December 2017 and we will continue to inspect to see how the routes respond.

2.16 As mentioned above, we have revisited a rising number of topics that had been raised previously – and reportedly dealt with at that time. For example, we have had to exert pressure to ensure that backlogs in structures and earthworks examinations are addressed appropriately. These are areas of previous enforcement. We have also required action plans for management of the risk of scour – something that was looked at following a bridge collapse at Feltham in November 2009. We have also been concerned to hear that the drainage asset register is estimated to fall significantly short of the true total. All these points serve to emphasise the gains Network Rail can achieve if it improves its own assurance activities and management maturity. A mature, excellent organisation ensures that change is embedded and guards against corporate loss of memory – avoiding repeating the same shortcomings.

2.17 One common theme emerging from a range of inspections is the importance of planning. Well-planned work optimises worker safety and efficient access to the infrastructure. In contrast, poor planning leads to unsafe systems of work, frustrated access and possibly unmitigated precursors to catastrophic risk. We are developing a view on how some relatively simple improvements might be made and will share our findings with Network Rail.

Track

2.18 We have continued to work closely with Network Rail to monitor, analyse and understand track geometry performance. Nearly all track KPIs are at or close to 'best ever' levels. That said, we have encouraged Network Rail to develop and maintain more robust data on twist faults – to determine the real risk and to distinguish repeat faults that are attributable to inadequate repair. Good progress is being made.

2.19 Network Rail has identified a number of enablers to further improved performance. However, there are delays to many of these, for example the implementation of TIGER and ORBIS decision support tools, and eddy current testing for rolling contact fatigue. Proof of concept tools are providing decision support capability ahead of production versions, but we have not seen consistent evidence of adoption in the Maintenance Delivery Units (MDUs)

2.20 We have inspected the application of risk-based maintenance (RBM) in plain line track. We found that it was being appropriately applied – but not to the extent we had anticipated. We believe there is scope for considerably more efficiency gain and continue to work to explore this.

2.21 We have yet to see sufficient evidence that Network Rail has addressed our concerns about gaps in the introduction of BCR. Inspections finish later in December and we will review our findings. We are also continuing our inspections of handback procedures involving Works Delivery. Emerging findings are that some routes have robust arrangements whilst others are less convincing.

Off track

2.22 During the first half of the year, we visited all routes to assess arrangements to recover compliance with the Network Rail company standard for vegetation management. We were looking for assurance that long term volumes were sensible and activity well-targeted. However, we saw very few agreed recovery plans. The reasons for this included uncertainty over funding and CP6 budget preparation. We will be looking for greater clarity in the second half of the year.

2.23 There remains a lack of consistent thinking and preparation regarding the risk to the network from potentially hazardous (e.g. dead or diseased) trees adjoining the infrastructure. We will follow up specific vegetation-related incidents that involve significant safety risk and plan inspection work before the end of 2017-18 to test management of risk from falling trees in severe weather.

Civils and Drainage

2.24 Our inspection and investigation work in 2017-18 has identified a number of emerging common themes:

- Failure to plan work effectively has hampered Network Rail in a number of areas. In particular, structures examination non-compliance remains at unacceptable levels, with a failure to plan work robustly often cited as a primary reason for examinations not being carried out. This is a particular problem for more complex or difficult to access locations. Completion of the work to identify hidden tunnel shafts has also been hampered in some routes by a lack of access linked to planning arrangements. Poor planning also appears to be a factor in the recent failure of a retaining wall at Moses Gate – those involved appeared unaware that the wall had been undermined by similar work in the past. Work is ongoing to investigate the reasons for poor planning in the structures discipline, and to identify solutions.
- Missing or incomplete asset information affects Network Rail's ability to manage risk in several asset areas. The lack of such basic asset knowledge inhibits the adoption of a system risk management approach to civils assets. In particular, despite extensive intervention from ORR over several years, Network Rail is again reporting that drainage asset information remains incomplete. The Professional Head of Drainage is concerned that asset knowledge nationally may have significant gaps. Network Rail has been asked to provide route by

route information on the extent of drainage asset knowledge, and a plan for reaching 100% coverage. In addition, Network Rail is yet to identify all hidden tunnel shafts, again despite a long timescale having been allowed for this work. Investigations have also identified poor or incomplete asset information as a contributory factor in a number of recent incidents, including the Watford tunnel derailment and several retaining wall failures (e.g. Lochburn and Moses Gate.)

2.25 More specifically:

- *Drainage management* - As described above, Network Rail has reported that a full asset inventory will still take time and effort to achieve. Many assets in earthworks are thought to be unidentified. Whilst work is underway in the routes to identify all drainage assets, progress is slow. We will require timescales and action plans for completion of asset inventories and we will evaluate the adequacy of each route's response. On a more positive note, after some time we have seen action taken to replace missing catch pit lids. Good progress has been made and the work is scheduled for completion in February 2018.
- *Management of scour* - We have continued to engage with Network Rail to ensure that suitable scour risk assessments have been carried out and mitigation/remediation actions put in place. This has required approaches direct to routes in some cases. Network Rail has now completed all 'Stage 1' scour assessments. 'Stage 2' assessments have also been completed in most routes. Our attention now turns to securing remediation work as quickly as possible.
- *Operational property* - Progress is being made in securing the completion of Hidden Critical Element (HCE) examinations in the operational property estate. Network Rail's originally proposed timescales have been halved, and a risk-based prioritisation delivery plan is being put in place. Inspections are planned to gather further assurance on the work being done. An incident at Abergavenny station on 28 July 2017, when a train struck a power cable dangling below a footbridge, is being followed up to ensure that the risks of a repeat are being reduced both locally and within other routes.
- *Hidden tunnel shafts* - Network Rail failed to deliver on a commitment to identify all hidden tunnel shafts by the end of 2016-17. A programme for completing the work in all routes has now been produced, with the majority of shafts scheduled to be identified by the end of the current work year. However, some routes have proposed longer timescales, or have not yet scheduled all the work. We are monitoring progress against this plan and challenging routes with long timescales or incomplete plans to improve.

- *Accidental wheel loading* - Further clarification has been obtained regarding bridges with weak verges that may be at risk as a result of accidental wheel loading; and of the action being taken to minimise those risks. In many cases, risk control measures need to be put in place by local authorities, and this work is not always forthcoming. Further work is planned to develop a scheme to escalate these issues where necessary, along similar lines to that already in place for vehicle incursion risks.
- *Management of retaining walls* - Incidents involving the failure of masonry walls at Liverpool Lime Street (March 2017), Lochburn (Glasgow, 4 April 2017) and Moses Gate (25 August 2017) have highlighted the management of retaining walls. Network Rail has proposed a number of initiatives, including: the introduction of a condition marking index; a risk prioritisation exercise and improved tracking and management of defects. Some of these activities are dependent on the delivery of CSAMS (Civils Strategic Asset Management Solution), which has been delayed. ORR expects to maintain an increased focus on this asset group in order to monitor the delivery of these improvements.
- *Prevention of falls from height* - Information has recently been received from Network Rail describing routes' progress towards installing handrails at structures where necessary to prevent falls from height. The information received indicates variable progress across the routes, with some reporting work as almost complete, and others large work banks still apparently outstanding. Timescales for completion are also unclear in some cases. Further work – again likely to be on a route by route basis – will be needed to clarify the situation and drive progress.

Electrical Safety

2.26 We have continued through the first half of 2017-18 to monitor Network Rail's progress in achieving its *Electrical Safety Delivery Programme*. The activities being delivered through this programme are now starting to show improved safety benefits along with increased legal compliance and productivity gains.

2.27 Following trials of a range of Circuit Main Shorting (CMS) devices, company standards have been changed to incorporate requirements for this equipment. This will deliver significant benefits by ensuring more secure and convenient means of making equipment dead. But these benefits are longer term and will only come when switchgear is renewed and CMS functionality is integrated by design. In the meantime, the use of Negative Short Circuiting Devices (NSCD) and Track Feeder Switches (TFS) is delivering benefits on legacy infrastructure that cannot yet accommodate full CMS functionality. This equipment provides isolations with greater integrity and avoids the need to expose people to the risk involved in extensive earthing of conductors.

2.28 On Wessex, for example, installation of NSCDs around Guilford and Woking Junction has demonstrated a significantly reduced need for staff to access the infrastructure to take isolations – reducing risk from exposure to electrical hazards and train movements. It has increased the productive time available to work in possessions, allowing backlogs to be addressed. When the rollout is complete at the end of CP5 it will enable some 5,000 safer isolations to be taken per year. Each shift is around 20% more productive and is enabling plant to carry out significant maintenance improvements.

2.29 Solutions for the AC infrastructure have been more difficult to achieve. However, in September 2017 Network Rail demonstrated a prototype proof of concept of a software-based means of remotely securing isolated equipment. This offers the best prospect of introducing safer, faster isolations across the legacy network. Trials will be undertaken in LNW and Western in the remainder of the Control Period.

2.30 Network Rail has continued to develop the use of its Electrical Safety Decision Support Tool to provide a structured aid to prioritising investment decisions and understanding the costs and benefits of a range of options. It has informed the development of Route Strategic Business Plans for CP6. We will continue to support the company in identifying the optimal uses of constrained funds to improve risk control and legal compliance.

2.31 Our inspections continued to find evidence of confusion about application of the electrical *Life Saving Rules* (LSRs). As a result, Network Rail is producing revised guidance which will be published in November 2017. We will monitor this to ensure it brings better implementation of these vital mitigations.

Level Crossings

2.32 We have continued to monitor the spend of the CP5 level crossing risk reduction fund during the first half of 2017-18. It is clear that it is becoming harder to secure crossing closure. Some route targets for closure have had to be abandoned and the spread of spend between routes has been reallocated to reflect these difficulties. In England and Wales, the fund is being used for measures other than closure that will achieve risk reduction, for example introduction of additional warnings at whistle board crossings. Network Rail had hoped to achieve a 25% reduction in risk at level crossings with this ring-fenced fund. The final reduction looks more likely to be 18-18.5%.

2.33 Our inspections have been focussed on Network Rail's management of user-worked crossings (UWCs) in long sections with telephones. Typically, these crossings are in areas where the signaller cannot pinpoint a train's location – merely knowing that it has left point A but not yet arrived at point B. This means that, in the absence of accurate train detection, when a user telephones to seek permission to

cross a signaller has to refuse until the train passes the signalbox. This can lead to considerable delay to users. There have been fatal incidents associated with these crossings, where a user has become frustrated or a signaller confused.

2.34 Our inspections have found that there are some basic improvements that could be made in some routes. Not all routes had identified all long sections. Not all had engaged with authorised users to help them understand issues. We found that some routes were struggling to complete assessments of the risks in long signal sections by the target date of December 2017.

2.35 Our main finding is that there is uncertainty in every route about how Network Rail will achieve its ambition of having no crossings in long sections that rely on telephones to grant permission to users to cross. This is because of competing demands for funds in CP6 and beyond. Effective solutions are often judged to be prohibitively expensive, preventing widespread adoption, and even those which are 'overlaid' rather than integrated into the signalling system are sometimes rejected on cost grounds. This is a particular issue in remote areas where use of crossings is infrequent. Network Rail has struggled to secure a cost effective, reliable means of providing warning of approaching trains at these crossings.

2.36 During the first six months of 2017-18, we also inspected management of level crossing renewal deferrals. We found pronounced differences with these assets compared to other deferred renewals we have scrutinised. Most of the deferrals are associated with signalling schemes that have been deferred – and often were not associated with crossings reaching the end of their asset life. There are not the same risks to be managed as with other condition-related renewals that have been postponed. Where renewal was condition-led we found that there was reasonable prioritisation and renewals were proceeding on a risk basis.

Workforce Safety

2.37 Following the problems of introducing PDSW in the maintenance function in East Midlands last year Network Rail paused the company-wide roll-out of this change to the way it plans and delivers safe systems of work. It has been engaging with staff representatives to learn the lessons and devise an acceptable way forward. This culminated in the introduction of a revision to its company standard, '019', for the safety of those working on or near the line. This change brings clarity in responsible roles on site and involves practitioners in the planning of work and issue of permits. The standard adopted a flexible approach so that different parts of the business could introduce the change only when they judged they were ready.

2.38 The new standard took effect in May 2017 and ORR will monitor its implementation. Our inspections and investigations frequently show that greater attention to planning considerations can bring significantly improved arrangements – as demonstrated by

the *Safe and Effective Worksites* initiative in some areas. These themes were picked up in a workshop held in June by Network Rail in response to the Rail Accident Investigation Branch's 'class investigation' into worker safety.

Occupational health

2.39 2017-18 saw the appointment of a new Chief Medical Officer (CMO)at Network Rail and this has led to constructive engagement around issues identified by ORR inspections during previous years. In relation to Hand Arm Vibration Syndrome (HAVS), for example, the CMO has responded positively to all our recommended actions, setting up structures to liaise with routes to monitor and respond to reports of symptoms at various levels.

2.40 Unfortunately, delivery of these planned improvements was severely hampered by the recent service disruptions impacting Network Rail's occupational health services provider. A large number of records were not transferred successfully during an IT system change. This has rendered health surveillance impossible until the situation is recovered. There have also been problems with the quality of some of the clinical work carried out. Staff changes were implemented as a result and it is taking time to build up the necessary capability.

2.41 We recognise the problems these factors are causing Network Rail but we have been clear that the situation is not sustainable. Route inspections of HAVS management continue to show non-compliance with basic legal requirements for health surveillance and elimination of risks. We will continue to monitor closely.

2.42 We have scrutinised Network Rail's asbestos management programme requiring updates every period. The deadline for surveying highest risk locations (31 March 2018) may be missed, due to delays securing a contractor to carry out the survey work. However, there are contingency plans in place and we are confident in the work of the programme team, who have brought energy and commitment to this area.

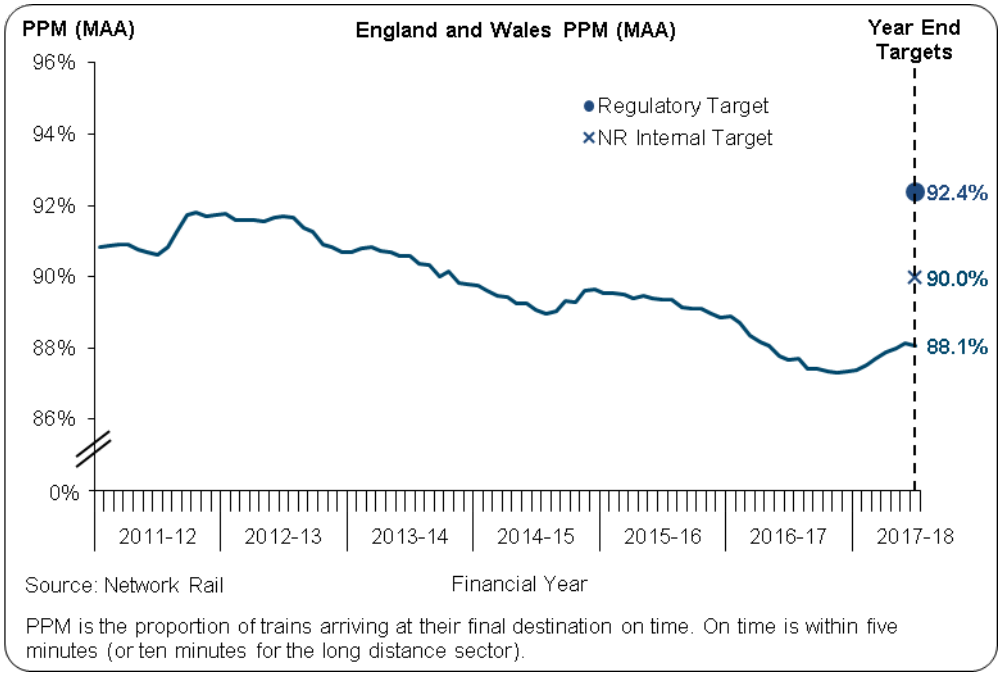
2.43 In June 2017 we issued an improvement notice in relation to managing the respiratory risks arising from masonry grinding in LNW. The response has been positive, with the Works Delivery organisation exploring whether it can eliminate the need to grind masonry at all and identifying a range of controls including exclusion zones and improved PPE.

3. Train service performance

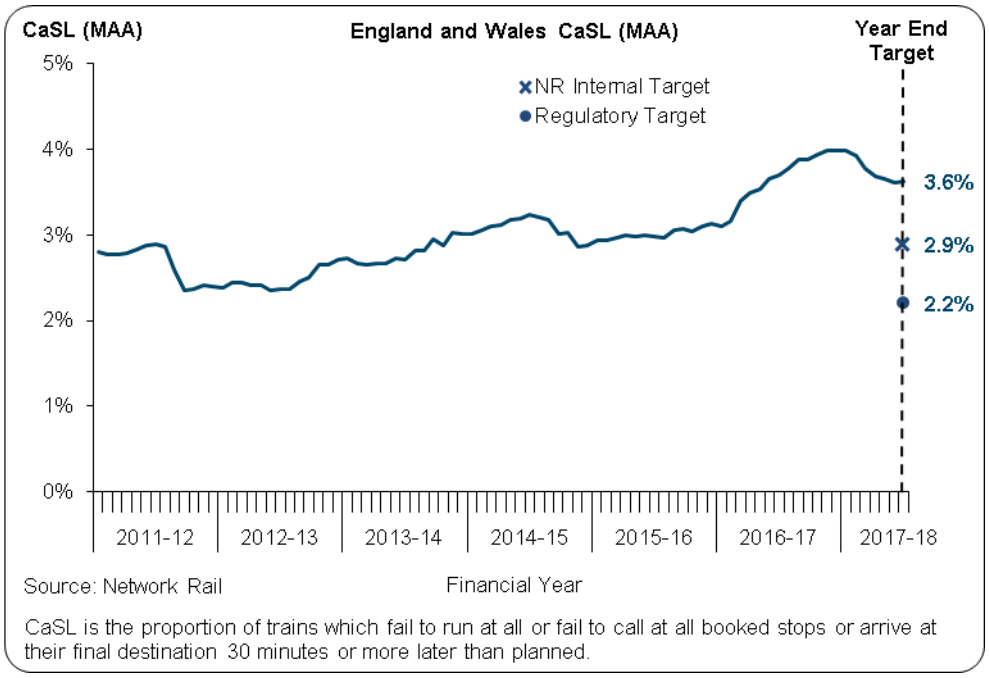
England and Wales performance

3.1 ORR regulates Network Rail's delivery of performance to its customers, the train operators. We assess Network Rail's performance by looking at the performance of the train service itself, primarily through the Public Performance Measure (PPM) and Cancellations and Significant Lateness (CaSL).

3.2 At a national level train performance has improved in the first half of 2017-18. At the end of Period 7 punctuality as measured by the Public Performance Measure (PPM) moving annual average (MAA) was 88.1%, an improvement of 0.7 percentage points (pp) since the end of 2016-17. This was 1.9pp worse than Network Rail's year-end internal target and 4.3pp worse than the year-end regulatory target.



3.3 Over the same period, Cancellations and Significant Lateness (CaSL) MAA decreased (i.e. improved) by 0.4pp to 3.6%. It is now 0.7pp above (i.e. worse than) Network Rail's year-end internal target and 1.4pp above the year-end regulatory target.



Underlying performance factors

3.4 We work closely with Network Rail and train operating companies (TOCs) so we can fully understand performance trends. We have also undertaken regular site visits to see at first hand the challenges Network Rail faces and how it plans to tackle them. At this stage, our principal concerns are as set out below.

1. The performance of Govia Thameslink Railway (GTR)

3.5 Network Rail's lead route for GTR is South East. GTR's performance remains well below passenger expectations. However, at the end of period 7 2017-18, GTR's PPM MAA had improved 4.9pp to 79.1%, although this is from a very low base last year and is still 4.3pp below the year-end Performance Strategy target. As GTR operates 18% of all services in England and Wales, this improvement has been one of the main reasons for the improvement in national level PPM MAA identified above.

3.6 The impact of the industrial relations difficulties has reduced this year, although these issues are still not resolved. The reliability of the new Class 700 fleet is also a concern. Network Rail has improved its delivery to the TOC and most categories of Network Rail-caused delay show improvements. Looking ahead, there are other areas of concern, notably the potential impact of the new Thameslink timetable. GTR remains a focus for the industry and we will continue to engage with South East route to maintain a focus on Network Rail's delivery to this TOC.

3.7 In our last Monitor we mentioned our concerns with Network Rail's management of Delay Attribution in the South East route. Although this problem is far from resolved, we have noted the effort and resource that has been put into it. Current trends are improving and we will continue to monitor it closely.

2. The performance of South Western Railway (SWR)

3.8 Network Rail's lead route is Wessex. Following a decline in PPM MAA in 2016-17, SWR's PPM MAA fell from 87.1% at the end of 2016-17 to 85.6% at the end of P7 2017-8. The proportion of Network Rail caused delay minutes is also high at 72%.

3.9 The biggest event impacting SWR performance so far this year was three-week partial closure in August of Waterloo, the UK's busiest station. This was to allow work to extend platforms 1 - 4 to accommodate longer trains and to enable the future return to use of the former Waterloo International Terminal. This complex programme of work imposed operational restrictions and required close collaboration between Network Rail's enhancements and operations disciplines. Even so, Network Rail's performance has not been as expected and areas where the company has direct control, such as track, non-track assets and network management, have all seen significant increases in delay in recent months. We will continue to engage with Wessex route to monitor Network Rail's delivery of performance to SWR closely.

3. The performance of Great Western Railway (GWR)

3.10 Network Rail's lead route is Western. Performance has declined over the last 18 months and at the end of period 7 GWR's PPM MAA was 87.5%, 2.5pp worse than its year-end Performance Strategy target.

3.11 While there have been some problems with GWR's fleet, Network Rail–caused delays have increased markedly. In addition, the *Great Western Route Modernisation Programme* has inevitably caused some disruption. We have seen some positive steps such as the generation of a joint performance improvement plan, but we have not yet seen evidence of the benefits from this. There will be some additional risk to performance with the introduction of the new timetable, as the route starts to realise the benefits from its modernisation programme. Working with Western route, we will continue to monitor Network Rail's delivery to this TOC closely in the second half of 2017-18.

4. The performance of Southeastern

3.12 Network Rail's lead route is South East. After a period of sustained poor performance, we undertook an investigation into Network Rail's delivery to this operator early in 2017-18. Although we found that the company was doing everything reasonably practicable to deliver train performance for Southeastern, we

made a number of observations designed to achieve an increased focus on certain key areas. We are continuing to monitor Network Rail's response to our observations but we note a significant uplift in performance, with PPM MAA increasing from 86.1% at the end of 2016-17 to 87.9% in Period 7 of 2017-18.

Our approach in year three of CP5 (2016-17)

3.13 We have held Network Rail to account for the delivery of Performance Strategy targets, outputs that are locally agreed between the company and its customers (the TOCs). When these are aggregated at a national level, this becomes Network Rail's internal target. But, for clarity, the internal target is not a regulatory target.

3.14 We set a 'regulatory threshold', outside which we will consider further action. For PPM, this is 2.0pp below (worse than) Performance Strategy target and for CaSL, this is 0.2pp above (worse than) the Performance Strategy target.

3.15 At the end of 2016-17, we considered regulatory intervention in respect of Network Rail's delivery to four TOCs (GTR, SWT, Southeastern and Virgin Trains East Coast (VTEC)) all of which finished the year outside the regulatory threshold, even after TOC-caused delays had been removed from the calculation. We decided to monitor Network Rail's delivery for these TOCs in 2017-18 more closely. Of the four, VTEC and Southeastern have seen performance improve so far this year.

Delivery of performance at TOC level

PPM

3.16 At the end of period 7 2017-18, three operators (Grand Central, TfL Rail, and Virgin Trains West Coast (VTWC)) had a PPM MAA that was ahead of their Performance Strategy targets. Merseyrail recorded the highest absolute PPM MAA score (95.2%).

3.17 As noted above, GTR was the worst performer. Hull Trains was the next worst with a PPM MAA of 80.5%, 3.7pp below its 2017-18 Performance Strategy target. After GTR, the worst performance by a franchised operator relative to its Performance Strategy was SWR – again as discussed above.

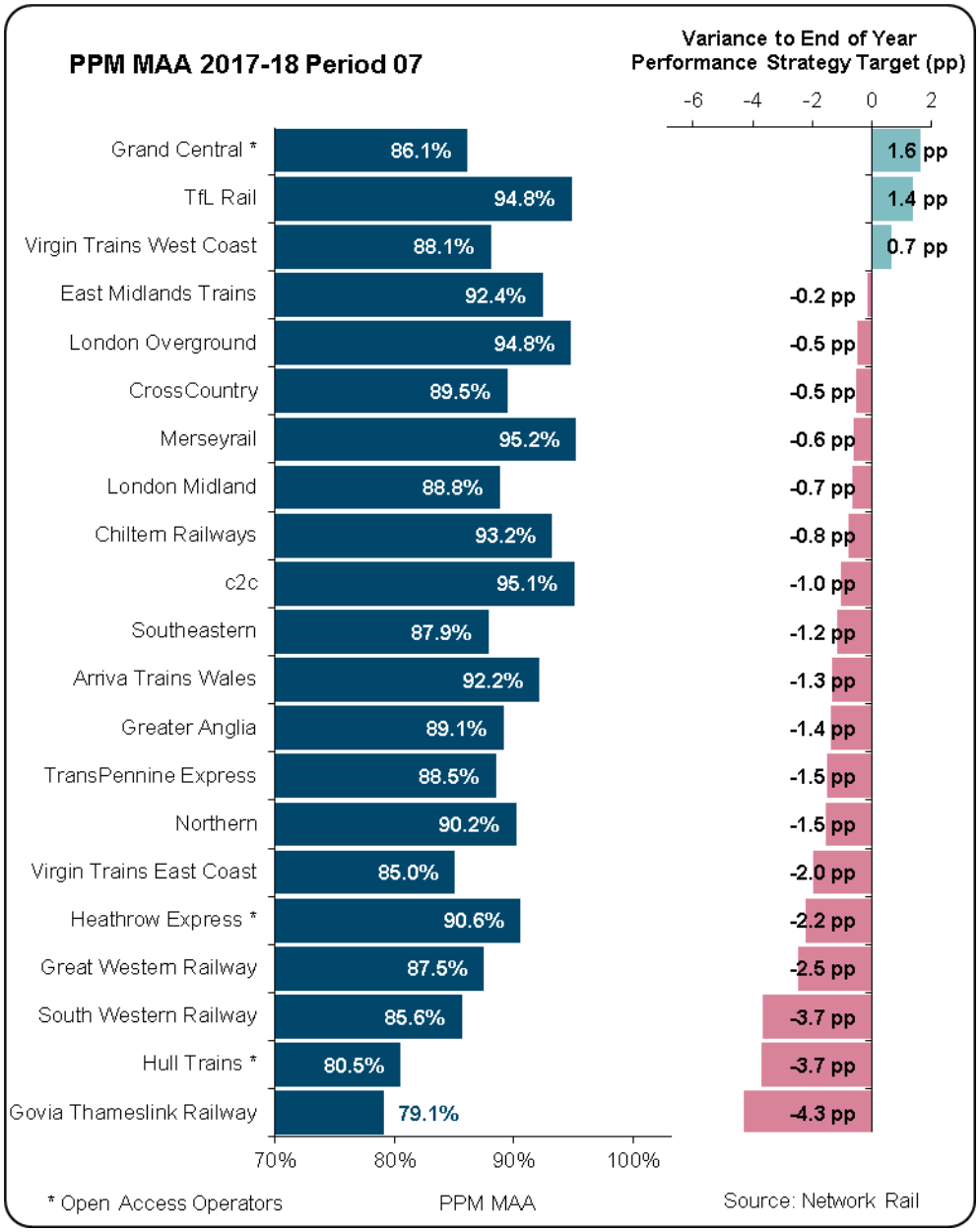
3.18 We continue to closely monitor Network Rail's delivery of performance to each of these TOCs. We attend liaison meetings with routes and TOCs, performance / Alliance Boards and quarterly reviews as appropriate.

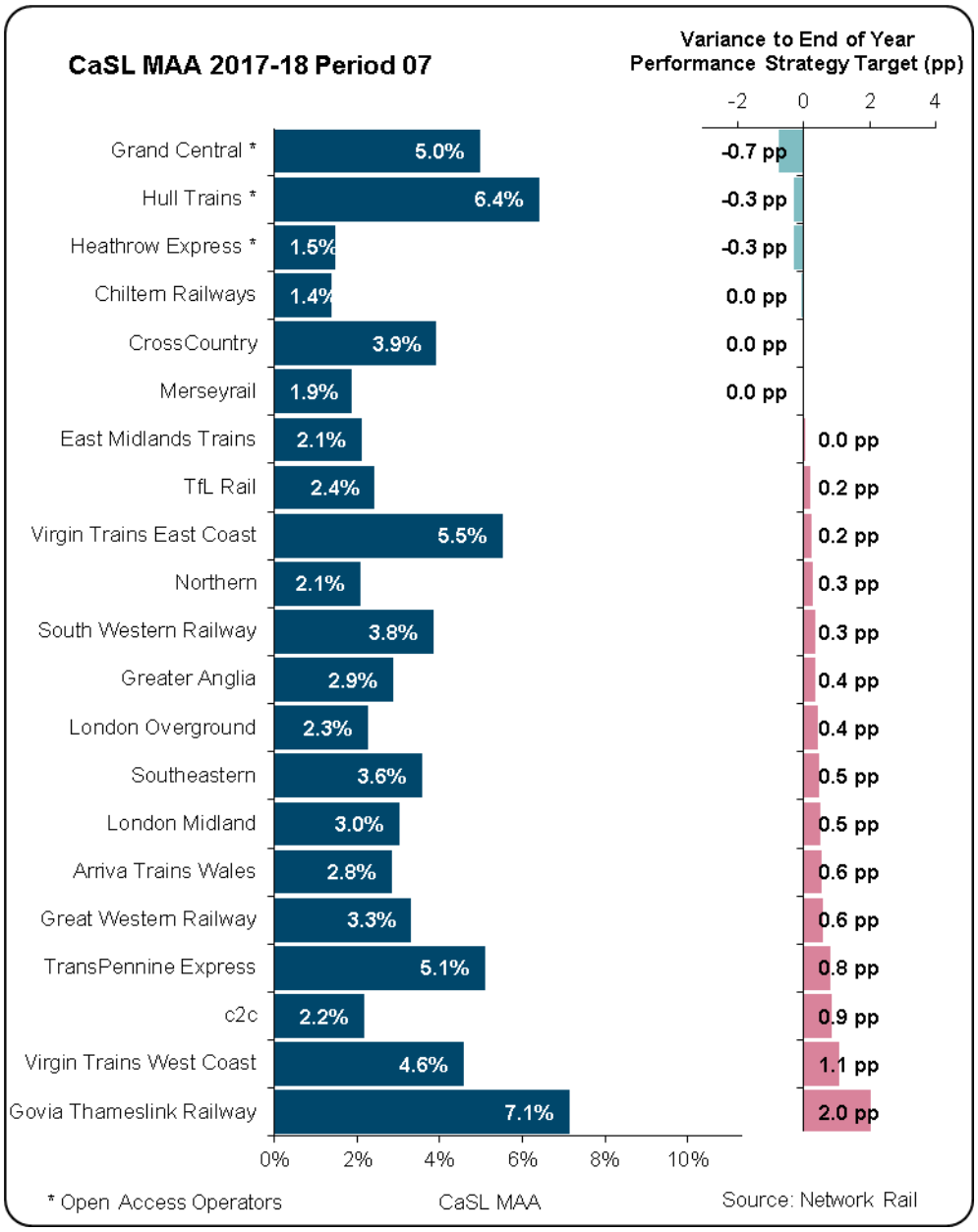
CaSL

3.19 At the end of period 7, six operators (Heathrow Express, Grand Central, Hull Trains, CrossCountry, Chiltern and Merseyrail) met or were ahead of the CaSL targets in their performance strategies. Chiltern recorded the lowest (i.e. best) absolute CaSL MAA score (1.4%).

3.20 Other than GTR, the worst performer in absolute terms was Hull Trains. CaSL MAA for this operator improved by 0.2pp in the first half of the year falling to 6.4% at the end of period 7. This was however 0.3pp worse than the 2016-17 Performance Strategy target.

3.21 The charts below show all operators' performance ranked by difference to their Performance Strategy targets at the end of period 7 of 2017-18.





Route scorecards

3.22 Network Rail introduced route scorecards in 2016-17 to monitor its Key Performance Indicators and to align its train performance targets more closely with TOC requirements. Most TOCs have agreed a PPM and CaSL target, while some, e.g. GTR and Southeastern have set out a Right Time metric. Train performance accounts for 20% of a route's overall score. We use the data in the scorecards as part of the evidence to determine whether Network Rail is doing everything reasonably practicable to achieve its regulated performance outputs.

3.23 Scorecards are developing as Network Rail prepares for CP6, and they are now a key part of the dialogue on performance. In the last Monitor we highlighted some areas of risk around the scorecards. For example, where it becomes apparent that a scorecard target has become unachievable, might this lead to a tendency to divert

effort and resource away from the area in question to focus on those targets which are still “in play”? That said, ORR’s view is that scorecards are a positive step towards a new environment where targets and outcomes are much more locally focused rather than centrally determined.

Other performance interventions and measures

Delay minutes

3.24 We monitor Network Rail delay minutes as a key indicator of train performance. As the chart on page 26 shows, at the end of Period 7, 61% of delay minutes in England and Wales were attributable to Network Rail, 28% were “TOC on Self” (delays to a passenger train operating company's services caused by that company) and 11% were “TOC on TOC” (delays to a passenger train operator’s services caused by another train company). The position is broadly consistent with previous years.

Network capability

3.25 ‘Network capability’ describes the capability of the network in terms of track mileage and layout, line speed, gauge, route availability and the amount of electrified track. Network Rail’s network licence requires the company to accurately describe and maintain (subject to network change) the baseline capability for which it is funded for the benefit of its stakeholders. For CP5, we said that the baseline capability of the network would be that in place as at 1 April 2014.

3.26 The industry’s Network Capability Steering Group is the forum for engagement between Network Rail and a range of industry stakeholders. Whilst we have not received any formal complaints, a number of operators have raised concerns and we have tasked Network Rail to improve its processes, so the information the company holds and that stakeholders rely on, adequately reflects the physical state of the network enabling those stakeholders to plan their businesses with a reasonable degree of assurance. Network Rail has carried out a review of its processes and developed improvement plans. We will scrutinise this area of performance more closely over the coming months, with a particular focus on the network change process.

Network availability

3.27 Measures of network availability are intended to provide an indication of the impact of planned engineering work on passengers and freight customers. Network availability is currently measures using the Possession Disruption Index (PDI) for Passengers (PDI-P) and Freight (PDI-F).

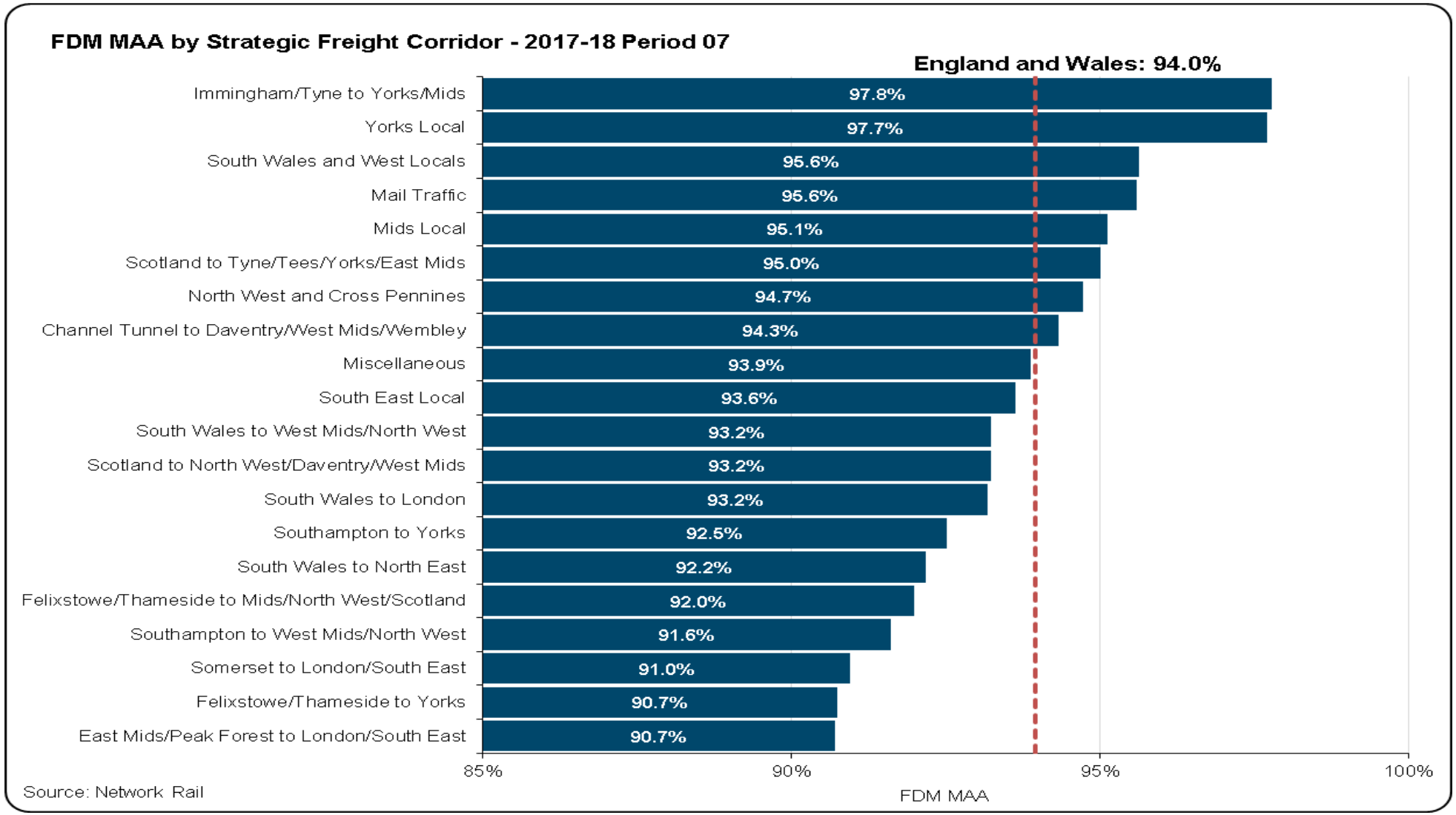
3.28 As reported in the previous Monitor, a number of inaccuracies have been identified in the calculation, for PDI-P in particular. As a result, the outturn does not necessarily reflect the impact on passengers during possessions.

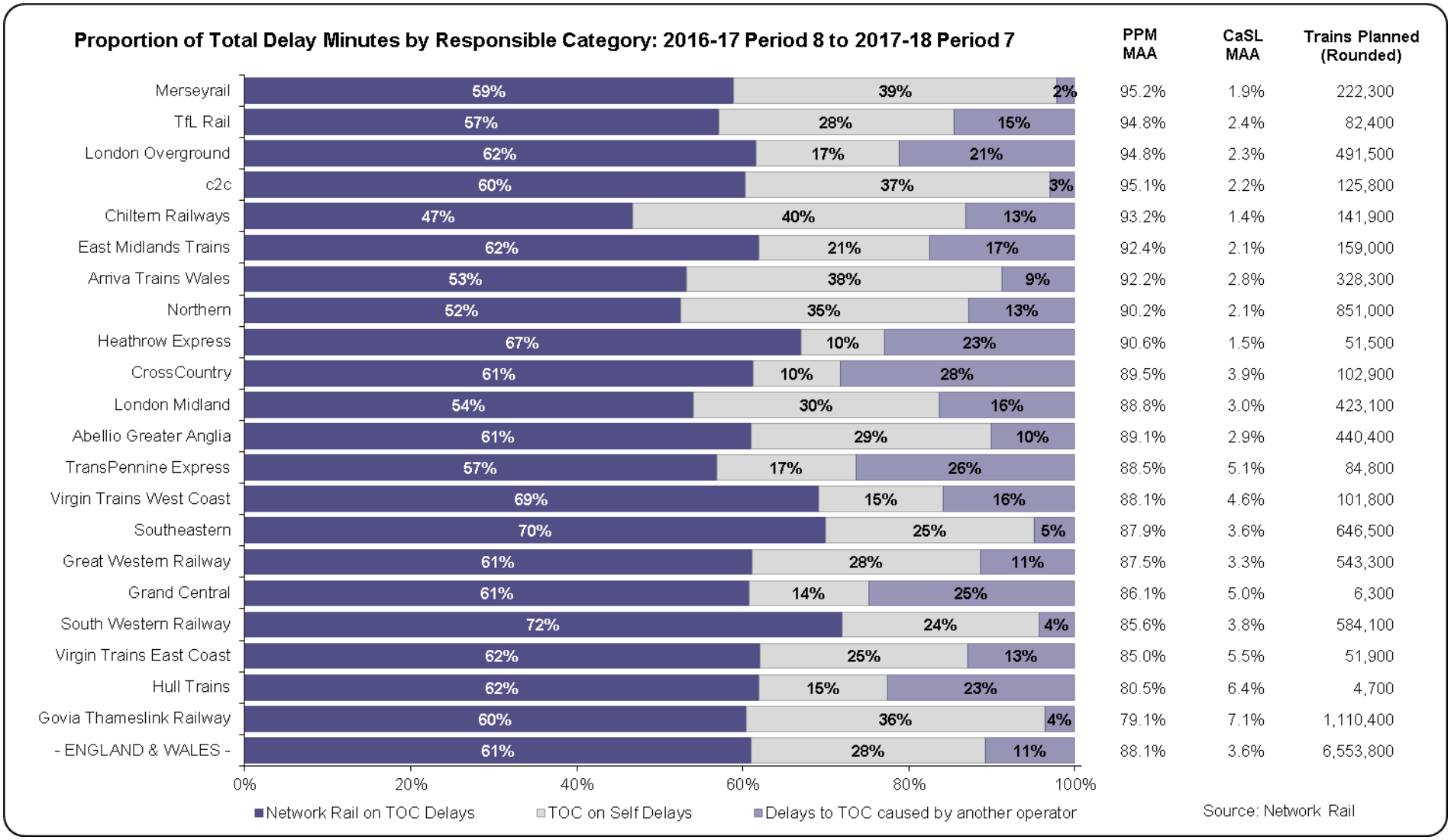
3.29 We required that Network Rail continues to report PDI, with some modifications, until it is possible to present appropriate and industry agreed measures for network availability. The measures proposed by Network Rail were included in our Outputs Framework Consultation and we are currently considering the responses received.

3.30 Network Rail also notified us that the CP5 exit target for PDI-P, and possibly PDI-F, is likely to be missed largely as a result of the identified issues. Network Rail has since set out to us how they have upheld the spirit of PDI and what steps have been taken to fulfil their obligations towards network availability. We are carrying out an industry wide engagement exercise to gather further information on Network Rail's behaviours. The results of this will be published in early 2018.

Freight performance

3.31 The regulatory performance measure for freight is the Freight Delivery Metric (FDM). This measures the percentage of freight trains arriving at their destination within 15 minutes of scheduled time. FDM covers delays for which Network Rail is responsible - i.e. not those caused by freight operators. The FDM MAA at the end of Period 7 of 2017-18 was 94.1% 1.6pp ahead of the annual target of 92.5%.

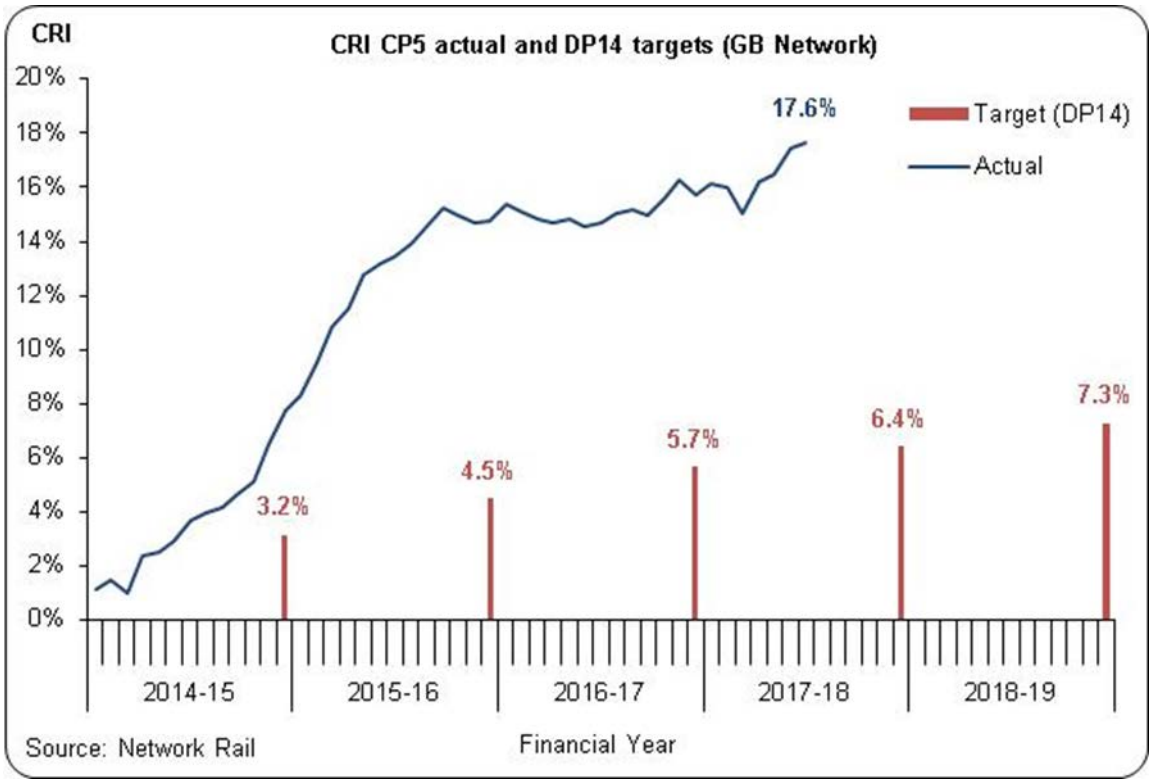

FDM MAA by Strategic Freight Corridor - 2017-18 Period 07
England and Wales: 94.0%
Immingham/Tyne to Yorks/Mids
97.8%
Yorks Local
97.7%
South Wales and West Locals
95.6%
Mail Traffic
95.6%
Mids Local
95.1%
Scotland to Tyne/Tees/Yorks/East Mids
95.0%
North West and Cross Pennines
94.7%
Channel Tunnel to Daventry/West Mids/Wembley
94.3%
Miscellaneous
93.9%
South East Local
93.6%
South Wales to West Mids/North West
93.2%
Scotland to North West/Daventry/West Mids
93.2%
South Wales to London
93.2%
Southampton to Yorks
92.5%
South Wales to North East
92.2%
Felixstowe/Thameside to Mids/North West/Scotland
92.0%
Southampton to West Mids/North West
91.6%
Somerset to London/South East
91.0%
Felixstowe/Thameside to Yorks
90.7%
East Mids/Peak Forest to London/South East
90.7%
85%
90%
95%
100%
FDM MAA
Source: Network Rail


Proportion of Total Delay Minutes by Responsible Category: 2016-17 Period 8 to 2017-18 Period 7
PPM MAA
CaSL MAA
Trains Planned (Rounded)
Merseyrail 59% 39% 2% 95.2% 1.9% 222,300
TfL Rail 57% 28% 15% 94.8% 2.4% 82,400
London Overground 62% 17% 21% 94.8% 2.3% 491,500
c2c 60% 37% 3% 95.1% 2.2% 125,800
Chiltern Railways 47% 40% 13% 93.2% 1.4% 141,900
East Midlands Trains 62% 21% 17% 92.4% 2.1% 159,000
Arriva Trains Wales 53% 38% 9% 92.2% 2.8% 328,300
Northern 52% 35% 13% 90.2% 2.1% 851,000
Heathrow Express 67% 10% 23% 90.6% 1.5% 51,500
CrossCountry 61% 10% 28% 89.5% 3.9% 102,900
London Midland 54% 30% 16% 88.8% 3.0% 423,100
Abellio Greater Anglia 61% 29% 10% 89.1% 2.9% 440,400
TransPennine Express 57% 17% 26% 88.5% 5.1% 84,800
Virgin Trains West Coast 69% 15% 16% 88.1% 4.6% 101,800
Southeastern 70% 25% 5% 87.9% 3.6% 646,500
Great Western Railway 61% 28% 11% 87.5% 3.3% 543,300
Grand Central 61% 14% 25% 86.1% 5.0% 6,300
South Western Railway 72% 24% 4% 85.6% 3.8% 584,100
Virgin Trains East Coast 62% 25% 13% 85.0% 5.5% 51,900
Hull Trains 62% 15% 23% 80.5% 6.4% 4,700
Govia Thameslink Railway 60% 36% 4% 79.1% 7.1% 1,110,400
- ENGLAND & WALES - 61% 28% 11% 88.1% 3.6% 6,553,800
0% 20% 40% 60% 80% 100%
Network Rail on TOC Delays
TOC on Self Delays
Delays to TOC caused by another operator
Source: Network Rail

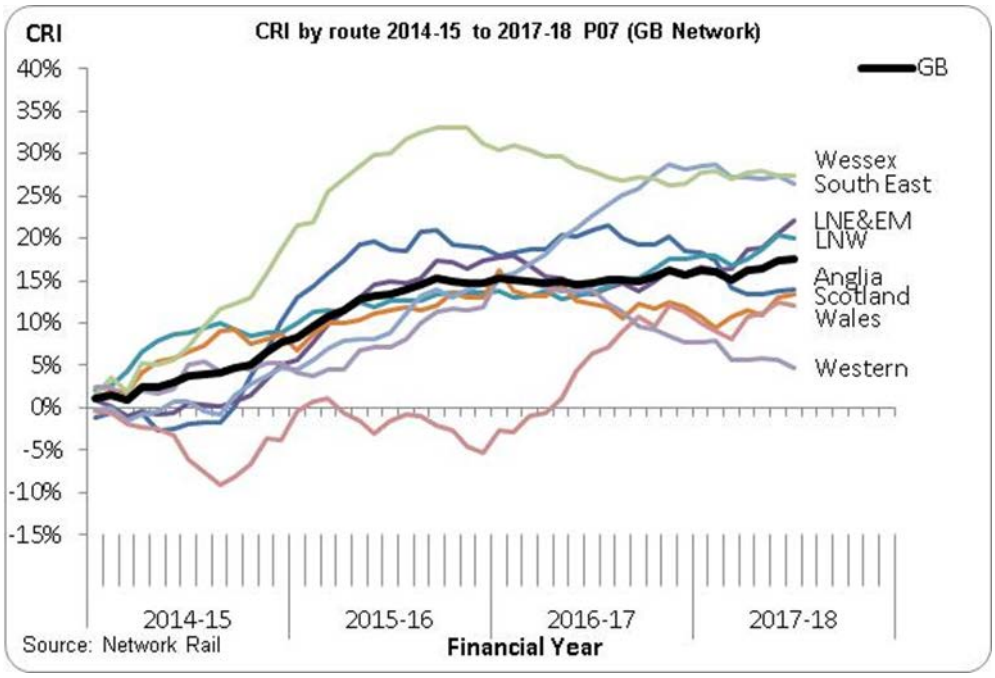
4. Asset management

Asset performance

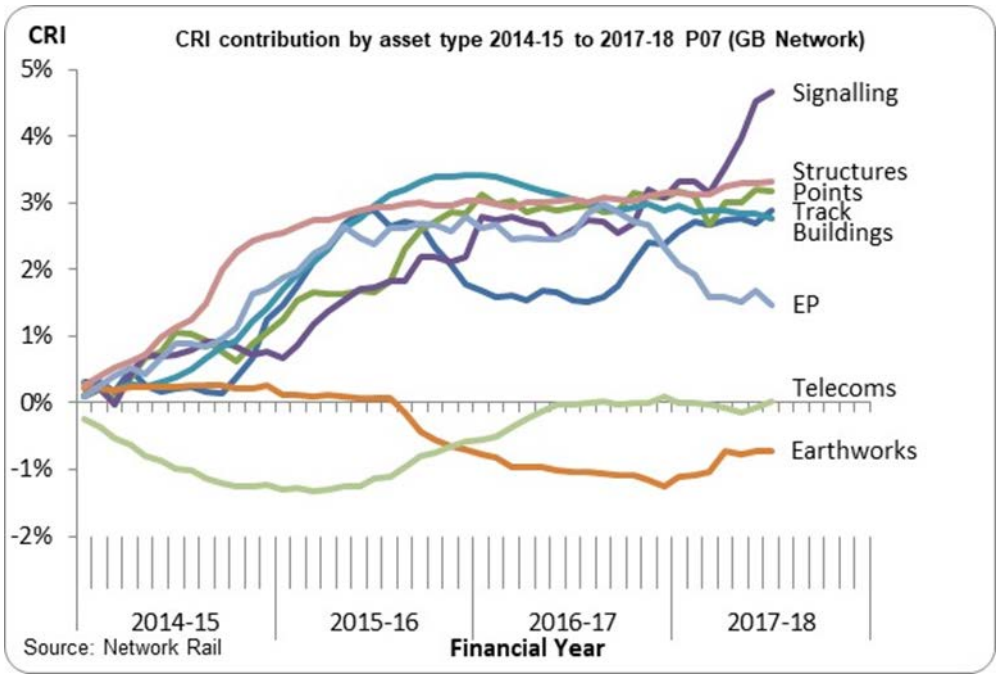
4.1 During the first two years of CP5, Network Rail achieved a significant reduction in service-affecting asset failures across the network, with the overall Composite Reliability Index (CRI) showing a 14.8% improvement relative to the end of CP4. So far this year Network Rail has continued to make incremental gains, with CRI rising to 17.6%, and Network Rail is forecasting CRI to remain at this level through to the end of the year. This is well ahead of the improvement trajectory Network Rail originally planned for CP5.



4.2 LNE/EM and LNW routes have improved the most so far this year, with in-year CRI gains of 6.3pp and 2.3pp respectively, whereas Anglia and Western have fallen back by 4.5pp and 3.0pp respectively. CRI for Western route is now only 4.8%. Wessex and South East continue to be the routes that have made the biggest gains during CP5.



4.3 All asset groups except earthworks made a positive contribution to the overall network CRI since the beginning of CP5. So far this year the contribution from earthworks has improved from -1.2% to -0.7%, but the recovery in telecoms performance has plateaued at the CP4 exit level. Signalling has made the biggest gain so far this year, with its contribution to overall CRI increasing from 3.1% to 4.7%, partially offset by a fall in electrical power from 2.3% to 1.5%.



Asset sustainability

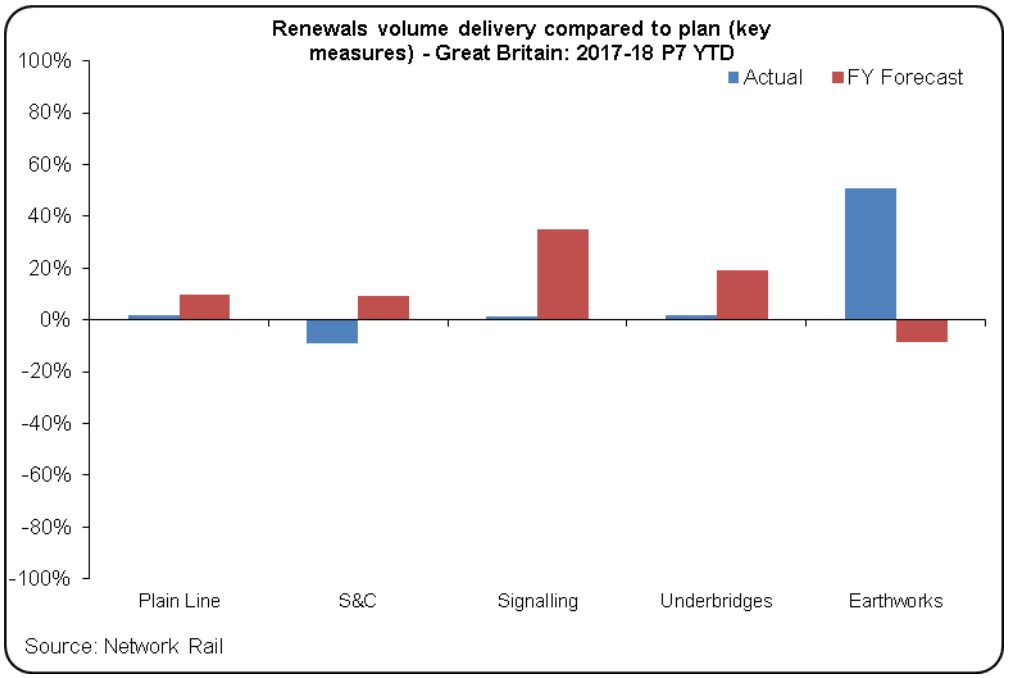
4.4 Maintaining and renewing the network is fundamental to Network Rail's responsibilities. Regular maintenance counters the incremental effects of wear and aging to keep the assets safe and performing as intended, but eventually it becomes uneconomic or impractical to maintain them any longer and they have to be renewed.

4.5 The company's asset policies set out the renewal work required to sustain the condition of the network assets at least whole life cost. The resulting volume of renewals required during CP5 was set out in Network Rail's 2014 delivery plan (DP14). However, the actual cost of delivering renewals during CP5 has consistently exceeded what we assumed in the PR13 settlement, so to remain within the borrowing limit agreed with government, Network Rail has reduced the volume of renewals it plans to complete in the control period.

4.6 We monitor the actual volume of work completed by Network Rail, to hold Network Rail to account for achieving its current plan, and to understand the volume of work deferred from the original DP14 plan, which will increase the cost of future control periods.

4.7 During the first year of CP5 (2014-15), the volume of renewals completed by Network Rail was significantly less than it had planned. The situation recovered during years 2 and 3, although the planned volume of work had been reduced due to affordability.

4.8 So far this year the volume of renewals completed by Network Rail is ahead of the current plan (DP18) in most areas. The volume of work completed on underbridges is currently 2% ahead of plan, and Network Rail forecasts this to increase to 19% ahead by year-end. Earthworks is 57% ahead of plan currently, although the forecast is for this to slip to 8% behind plan by year-end. Signalling renewal is currently 2% ahead of plan, and forecast to end the year 35% ahead due to the anticipated completion of the Port Talbot West re-signalling scheme this year rather than next. Plain line track renewal is currently 2% ahead of plan, whereas switches and crossings (S&C) is 9% behind plan. However, both plan line track and S&C are forecast to end the year ahead of plan, by 10% and 9% respectively. Overhead line renewal is currently 467% ahead of plan and forecast to reach 1,233% ahead by year-end, due to reprioritisation in Anglia and inadvertent omission from DP18 of planned work in LNE.



4.9 We have not yet assessed the efficiency of Network Rail's delivery of renewals for 2017-18. We expect to comment on this in our year end monitor to be published in summer 2018.

Asset data quality

4.10 The development and application of asset policy, and the use of advanced decision support tools, are heavily reliant on Network Rail maintaining a comprehensive and reliable dataset of information about all the network assets and their condition. In PR13 we assessed the quality of Network Rail's asset data and found it variable, so for CP5 we set Network Rail the objective of delivering an improved asset dataset, and we made it a regulated output to be achieved by April 2017, to support the PR18 planning process. We said Network Rail should demonstrate A2 data quality for the core asset data used in asset management decision making, which means it should be maintained by an overarching information management system (A), and that the data itself should be appropriately accurate and reliable (2).

4.11 Network Rail has responded by developing an approach that sees asset information itself managed as an asset, to be maintained and renewed, with assurance arrangements analogous to the arrangements for physical network assets, including the appointment of a professional head. This is a best practice approach, and reflects the requirements of the international standard for data quality, ISO8000. Network Rail has rolled out these arrangements in the routes, including organising the resources necessary to manage asset data quality at route level, and developing risk registers to focus action on priority areas.

4.12 We have assessed the new data governance arrangements at route level and have seen a consistent implementation of the new approaches across the business. We have therefore concluded that Network Rail achieved the requirement of “A grade” governance in April 2017 as set out in the CP5 determination. Network Rail is in the process of setting up an assurance project to demonstrate the accuracy and reliability of the data in its core asset dataset, with the results expected in December 2017.

5. Developing the network

5.1 Network Rail is required to set out its commitments for developing the network in the Enhancements Delivery Plan (EDP). The purpose of the EDP is to allow stakeholders to plan with a reasonable degree of certainty taking into account what Network Rail will deliver. We monitor Network Rail against the EDP for England and Wales and Scotland. Since the Hendy re-plan in 2015 for England and Wales Network Rail has encountered significant challenges to the plan which it has been addressing with its funders and stakeholders to remain within its funding envelope.

Delivery progress

5.2 We monitor Network Rail against two major milestones:

- the end of GRIP Stage 3 – this is the end of the development process where a single option for design and delivery is selected; and
- GRIP Stage 6 - Entry into Service (EIS) – this is when construction is substantively complete and services can begin.

5.3 Network Rail delivered eight of 18 (44%) EIS milestones it planned to deliver during the current reporting period. This included train lengthening between Reading, Ascot and Waterloo (excluding Feltham), the completion of the enhancements works at Doncaster Station, and a new station at Cambridge North.

5.4 There were five EIS (28%) milestones missed in the reporting period. These were:

- Bromsgrove Electrification – in April 2017
- Gospel Oak to Barking Electrification – in June 2017
- Kenilworth Station – in July 2017
- New Cross Grid – in August 2017
- IEP East Coast OLE – in August 2017 (currently undergoing change control).

5.5 Network Rail completed seven (70%) GRIP 3 development milestones on schedule, against a total of 10. The remaining milestones were revised to later dates following the change control process agreed between Network Rail, its funders, stakeholders and ORR.

5.6 More information on Network Rail's performance against its milestones can be found here.

Projects at risk

5.7 Network Rail is undertaking a number of complex, high profile projects and programmes which will support the delivery of new train services. The complexity of the projects and programmes that Network Rail undertakes mean that they are not without risk, for example there were performance problems on the Wessex Route linked to the works at Waterloo in August. As widely reported the electrification projects that were committed to for CP5 have proved particularly challenging across the network.

5.8 The *Great Western Electrification Programme (GWEp)* is one of the highest profile infrastructure projects in the country. During the reporting period, installation of overhead line equipment (OLE) on all four main running tracks between Maidenhead and Didcot was completed. There was some delay due to the need to address interface problems between the new trains and the infrastructure but these are largely resolved and a period of testing and commissioning is now underway. Despite the considerable effort that has been put into completing construction of the line between Maidenhead and Didcot, we consider that the December 2017 milestone remains at risk.

5.9 The deadline for the start of IEP passenger service, which ran on 16 October 2017 (not a 'regulated' milestone) imposed extra demand on the Network Rail delivery team at a time when they were fully engaged with GWEp and the need to have the newly electrified section ready for service on 2 January 2018. This diverted some resources to an extent that could not have been reasonably foreseen when the last major programme revision was undertaken at the start of 2017.

5.10 Nevertheless, Network Rail has coped well with the extra work and the operators have co-operated in allowing extra track access, often at short notice. We consider that the December 2017 deadline remains at risk. ORR has been keeping in close touch with the GWEp sponsorship and delivery teams throughout the reporting period, particularly tracking the likelihood of on time completion of the infrastructure works.

5.11 The Northwest Electrification Programme faces significant challenges in installing OLE in some difficult and relatively inaccessible parts of the North Western network. Completion deadlines have been deferred and scope reductions from Phase 5 (Manchester Victoria – Stalybridge) have affected Phase 4 (Preston to Manchester) where there had been a dependency for power supply.

5.12 As a result, the late running of NWEp phase 4, caused by construction problems (in crossing old mine workings) and access constraints, has had the knock on effect of requiring the West Coast Power Supply project to be re-phased to provide an increased traction power feed to the Euxton Junction area by November 2017.

5.13 NWEp Phase 6 (Windermere electrification) was replaced by a study of the use of the route and Oxenholme platform 3 for Class 769 bi-mode trains by the government during the summer.

5.14 In Scotland Key Output 1 (*electrification of the line between Edinburgh and Glasgow*) failed to deliver in line with the March 2017 Regulated Milestone of infrastructure being ready for passenger services. Although it falls outside this reporting period it is also the case that a revised date of October 2017 has subsequently been missed. Challenges remain around the process of authorising the line into service and Network Rail must demonstrate that it has managed the electrification safety risk appropriately for passenger services to commence. We will be leading a lessons learned review into the issues that have affected EGIP Key Output 1 once passenger services have begun in the New Year. We will report on this in our next monitor.

5.15 As reported above the *Gospel Oak to Barking Project* failed to reach a regulated milestone in June 2017. Electric trains are due to commence running in March 2018 and Network Rail is required to provide infrastructure to meet this date. To do this it plans a series of weekend possessions coupled with two additional longer periods of possession which will significantly disrupt freight and passenger services. This is further complicated by work taking place on other parts of the Anglia Route over the Christmas and New Year period. We will continue to monitor this project closely.

Enhancements capability

5.16 It is two years since we found Network Rail in breach of its licence with regard to its capability on enhancements. Following our decision, Network Rail implemented the Enhancements Improvement Programme (EIP) which we have been reporting on in previous monitors.

5.17 During the reporting period, Network Rail declared the EIP complete, having removed the Cost Planning Improvement elements from the programme. (We continue to monitor delivery of this work outside EIP). As reported in previous monitors, Network Rail has been unable to articulate the benefits of EIP in a way which has demonstrated that the changes made are having the required effects. We therefore consider it critical that we develop a mechanism that will allow us to transparently assess Network Rail's capability for delivering capital expenditure projects and programmes on railway infrastructure. We will comment further on this as part of our CP6 determination.

5.18 Also in the first half of 2017-18 we asked the Independent Reporter to look at the way that Network Rail was approaching complex major programmes. The report is published here. The reporter found that while there was still more work to do Network Rail had taken positive steps to improve the way it worked with its funders to develop, design, and deliver enhancements to the network.

5.19 In addition to the Independent Reporter work, we have been separately monitoring other areas of Network Rail's capability related to developing the network. The following are of particular note.

Project sponsorship and transition management

5.20 Sponsorship is a crucial capability for Network Rail's new approach to project and programme development, design, and delivery. In the reporting period the Sponsorship competency has been defined, measured and analysed. There is a gap between Network Rail's current and desired organisational capability. There is a resourced plan to develop sponsors sufficiently quickly to achieve the required competency and capability in time for the start of CP6. The plan involves delivering a modular approach to training and includes assessment of learning and ongoing capability. There have been successful appointments of Directors of Sponsorship across the organisation. We will continue to monitor this area.

Risk and value management

5.21 Network Rail is making further improvements following the publication of the Independent Reporter study that accompanied our previous monitor. The company has updated its processes governing the management and control of risk in its Infrastructure Projects function. It has set key points in the lifecycle of high priority projects when risk assessments must be completed. Improvements have also been made covering cost and schedule assessments, and assurance processes.

6. Expenditure and finance

6.1 This section examines Network Rail's efficiency and wider financial performance, including for each of the company's routes, debt and borrowing. It covers the first six of the 13 financial periods in 2017-18. For convenience, we refer to these as the first half of 2017-18.

Financial performance

6.2 We consider Network Rail's financial performance in two ways; firstly, by comparing income and expenditure to the company's budget and secondly using our regulatory financial performance measure.

Table 1: Network Rail's income and expenditure variances to budget

	Half-year			Full year		
£m	Budget	Actual	Variance b/(w)	Budget	Forecast	Variance b/(w)
Turnover	3,232	3,239	7	7,082	7,119	37
Schedule 4	(68)	(80)	(12)	(235)	(233)	2
Schedule 8	(18)	(30)	(12)	(121)	(145)	(24)
Operations	(255)	(251)	4	(590)	(589)	1
Support[2]	(260)	(246)	14	(540)	(519)	21
Maintenance	(647)	(634)	13	(1,380)	(1,395)	(15)
Capex – Renewals	(1,266)	(1,069)	197	(2,804)	(2,622)	182
Capex - Enhancements	(2,003)	(1,872)	131	(4,366)	(4,258)	108
Financing costs	(1,065)	(1,051)	14	(2,387)	(2,356)	31
Total	**(2,350)**	**(1,994)**	**356**	**(5,341)**	**(4,998)**	**343**

6.3 The main variance to budget in the first half of 2017-18 were:

- £197m of underspend on renewals. (However, Network Rail has overspent by £23m compared to budget on the renewals work that it has done.)
- £131m of underspend on enhancements to the network including £33m of outperformance against budget. Network Rail has attributed the outperformance to changes to the rolling programme of electrification and to scope value engineering on the Northern programme, partly offset by increased costs on the Edinburgh Glasgow Improvement programme. The additional underspends relate to changes to the scope of the depots and stabling fund including transfer of some of these funds to the Northern Programme, and deferral of work on the Great Western electrification programme.
- Schedule 4 and 8 compensation payments to train operators were £24m higher than budget due to Network Rail taking more track possessions, in part due to

[2] Support costs exclude traction electricity, business rates, RSSB and ORR fees because these either are offset by income (in the case of traction electricity) or are not within Network Rails control.

infrastructure failures on a number of routes and overruns to the upgrade of Waterloo Station.

6.4 The regulatory financial performance measure (FPM) provides a more comprehensive understanding of Network Rail's financial performance than simple income and expenditure variances to budget[3]. This is because FPM:

- ensures that Network Rail does not benefit from delaying work to a later date if that work will still need to be done;
- adjusts for the value of any outputs that Network Rail was funded to deliver, but has not delivered, such as reliability of train performance;
- compares to the income and expenditure assumptions in the PR13 determination which underpin the company's level of funding;
- excludes some income and expenditure that are not as controllable by Network Rail[4].

6.5 We currently expect Network Rail to financially underperform against its own budget by £0.1bn and by £2.0bn against the regulatory financial performance measure. This difference is largely because Network Rail's internal budget is £1.8bn higher than our PR13 financial assumptions for 2017-18. This compares to £0.6bn underperformance against its own budget last year.

Route-level analysis

6.6 Network Rail's routes are the geographic sub-divisions that have devolved responsibility for managing the rail network. Table 2 (below) summarises their financial performance in the half of 2017-18.

[3] For simplicity, in the monitor we are not applying the financial reward/penalty of 25% of the under/outperformance on renewals and enhancements. We will report net financial performance in our Annual Assessment. See http://orr.gov.uk/rail/economic-regulation/regulation-of-network-rail/network-licence/regulatory-accounts for further details.

[4] These include including network grant, fixed track access charges, traction electricity income and costs, and business rates.

Table 2: Routes' financial performance in the first half of 2017-18

	Out / (under) performance			
£m	Income	Expenditure	Variance b/(w)	Variance %
Anglia	(4)	(40)	(44)	(11%)
LNE/EM	8	(3)	5	1%
LNW	(16)	12	(4)	(0%)
South East	20	10	30	4%
Scotland	1	10	11	3%
Wales	0	(2)	(2)	(1%)
Western	(4)	(6)	(10)	(1%)
Wessex	(17)	(2)	(19)	(6%)
	(12)	**(21)**	**(33)**	**(1%)**
Central Units	0	61	61	11%
Total	**(12)**	**40**	**28**	**1%**

6.7 The South East route has performed strongly with £30m of financial outperformance in the first half of 2017-18 (7% of budget). This is mostly due to lower Schedule 8 costs than budget. Most other routes were close to budget, except for Anglia which was 21% worse due to additional costs of the Gospel Oak to Barking enhancement scheme5, and Wessex which was 11% worse due to higher Schedule 8 costs relating to the upgrade of Waterloo station.

6.8 In response to the company's increasing financial pressure (see below), Network Rail has committed to deliver £300m of additional efficiencies in CP5. Initially Network Rail specifically identified these initiatives at a company level. The recently established Transformation Directorate is responsible for assuring delivery of these efficiencies. These company level initiatives have been translated into route level initiatives which have been included in the routes' revised budgets for 2017-18 and 2018-19. Although Network Rail's central finance team is reviewing the routes' financial performance against their revised budgets, there is currently no systematic monitoring of route specific initiatives.

6.9 Network Rail is making progress in delivering these efficiencies. However, we are concerned about over-optimism in Network Rail's financial forecasts so far in and the lower level of central assurance on the way these additional efficiencies will be delivered than we expected.

[5] These costs were included centrally in Network Rail's 2015-16 financial statements therefore there is no overall affect for the business as a whole this year. We have presented this table in this way because in this section we are focusing on the route's underlying performance.

6.10 We are enhancing our direct monitoring of the routes' initiatives to deliver the additional efficiencies in order to assess whether the company is on track to deliver the required savings and we will maintain our frequent meetings with the Transformation Directorate.

Debt and borrowing – increasing financial pressure

6.11 Network Rail's debt increased by £2.6bn to £47.3bn in the first half of 2017-18 which was in line with the company's budget.

6.12 Network Rail has fixed borrowing limits with the Department for Transport for England and Wales (£27.0bn) and for Scotland (£3.3bn) in CP5. Financial headroom, i.e. the difference between forecast CP5 borrowing[6] and available borrowing, is forecast to be £80m for England and Wales and £139m for Scotland. Financial headroom has decreased by 38% in England and Wales, and by 21% in Scotland in the first half of 2017-18.

6.13 In light of the risks to the company's financial forecast, this headroom is low. In particular, the company may not achieve its planned efficiencies; movements in interest rates and inflation are uncertain as are the values of asset disposal proceeds.

6.14 Some risks are now starting to decrease as Network Rail gets nearer to the end of the control period. The company is now considering whether risk provision can be released, for example relating to Scotland enhancements. This would allow additional expenditure in some areas.

[6] I.e. on planned work. Network Rail intends to use the headroom where there is a business case.

7. The railway in Wales

Health and safety

7.1 Performance measures for safety management in Wales route show no significant variation to the national picture, but do reflect strengths and weaknesses indicative of the characteristics of the network and its operating environment.

7.2 There are areas where Wales route leads the way. In relation to drainage, for example, we have previously reported that Wales had pioneered the use of the 'My Work' app to improve its knowledge of its drainage assets and to plan appropriate inspection and maintenance. This is now paying dividends and Wales route scored very well in a recent Network Rail drainage audit. Whilst other routes are revisiting the completeness and accuracy of drainage asset registers, Wales has been able to concentrate on achieving volumes of work. It has had to be innovative on occasion. For instance, the route had planned to deliver drainage improvement works using the drainage RRV (road rail vehicle), but a technical fault with the RRV meant that other means had to be found. It has achieved the planned drainage volumes, and is forecasting significant outperformance by the end of the year.

7.3 Wales is also the only route to significantly outperform the corporate target for closing out close-calls. The target is to deal with 85% of all close call reports within 90 days; Wales, at period 7, stood at 93.7% closed within 90 days.

7.4 The route has dealt effectively with resource constraints. It is, for example, currently behind in delivering fencing inspection volumes required for the corporate train accident risk reduction programme. However, this is due to analysis that has led it to prioritise vegetation removal to improve risk control associated with sighting of level crossings and signals. The route has taken the risk-based decision to just miss the fencing target but over-achieve the vegetation volume target. Wales is also slightly behind target for scour risk reduction at priority sites – but confident it will achieve it by the end of the year.

7.5 During our inspections we found very significant non-compliances with legal requirements for managing HAVS risks, especially health surveillance. We believe there is a clear case for enforcement, but are taking note of the national problems associated with Network Rail's occupational health service provider (see section 2). We will monitor closely, seeking the quickest remediation reasonably practicable.

7.6 On 1 June 2017 a person was struck and fatally injured at Trenos footpath crossing near Llanharan, South Wales. A train had reported the presence of a member of the public to the signaller before she was struck by a second train. This incident has highlighted potential shortcomings in the information available to signallers to allow them to identify locations under their control and how this is communicated to and

from train crew. We are exploring these with Network Rail with a view to identifying improvements.

Assets

7.7 Assets in Wales have different characteristics, challenges and management history. The unique environment of the Severn Tunnel, for example, has driven considerable additional re-railing volumes to try to manage rolling contact fatigue. Our inspections suggest that Network Rail's asset management teams respond well often bringing a new and innovative approach to stewardship of their portfolios.

Track

7.8 In the course of our inspection activity we found:

- use of track recording vehicles could be improved – especially to underpin more extensive use of risk-based maintenance (RBM);
- adoption of RBM across Wales was patchy – although this is partly attributable to the prevalence of ageing track assets which are unsuitable for RBM;
- where RBM has been adopted, it has not always been carried out as thoroughly or extensively as the process requires and the full benefits have not always been realised; and
- track renewal deferral decisions were inspected as part of a national project. In common with other parts of the network, we found that original decisions to renew the asset had been justified – so deferrals would be expected to have an impact. We found that Network Rail could not always demonstrate a robust approach to mitigating the effects of deferral. In particular, the impact on maintenance was not fully assessed.

Signalling assets

7.9 Asset condition varies across the route. Recent renewal and enhancement activity as part of Cardiff area re-signalling and preparation for electrification has brought modern equipment to that part of the route, and removed many higher risk assets such as single-cut cables. In contrast, deferrals such as Newport-Shrewsbury bring the challenge of maintaining ageing assets beyond original plans.

Civils

7.10 Midway through the year the route appeared to be struggling to comply with required actions to reduce the risk from scour at bridges. However, closer scrutiny revealed that the bulk of the apparent backlog was due to data issues and poor communication between the route and Network Rail's centre. The action plan is back on track.

7.11 There has been under-delivery of underbridge renewals volumes but this is more as a result of problems securing road closures than difficulties with the assets themselves. Earthworks renewals volumes have also been below forecasts for the year.

7.12 We saw no evidence of inadequate risk control due to renewal deferrals. Network Rail in Wales has expressed interest in remote condition monitoring at one or more earthwork sites at risk of failure. This is despite the route not being part of formal RCM trials. We saw evidence of a move towards more renewal and refurbishment (de-vegetation and netting) of rock cuttings – on a risk basis. We understand that more of this type of work is planned for next year. Examinations of earthworks are generally up to date. Dedicated vegetation gangs have been created for both earthworks and structures – to prepare sites prior to examination. We note however, that vegetation was still reported as a reason why examinations could not be carried out as planned.

Off track

7.13 Wales route has been a pioneer in developing a risk-based, properly resourced approach to off-track asset management. 2016-17 saw the delivery of a new management structure for off-track, with drainage (see above) integrated into it.

7.14 Poor-condition fencing is one of a number of risks in respect of off-track assets. We have observed that MDU staff are starting to use the MyWork app for fencing and the intention is that this will lead to a 'cleaner', more accurate, asset register in Ellipse, aiding better management of fencing. Similarly, management of lineside vegetation raises challenges for the route. The MDUs have a Temporary Non Compliance (TNC) because they require three years to meet the relevant vegetation standard. We are pressing for vegetation management plans, which may include the use of new technology, to put vegetation management onto a more sustainable footing.

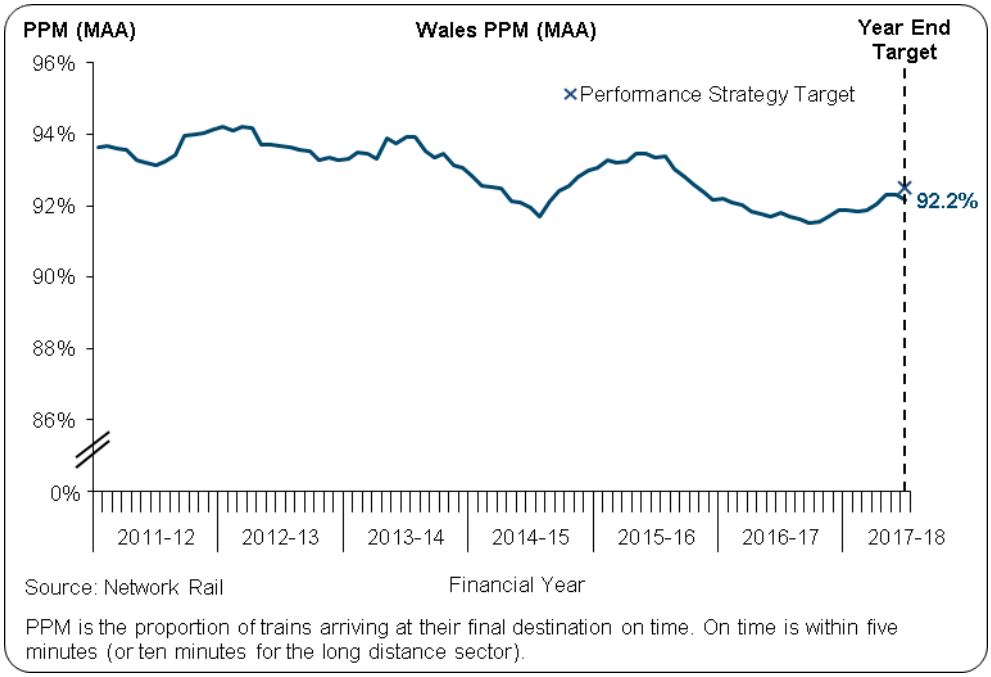
Construction issues

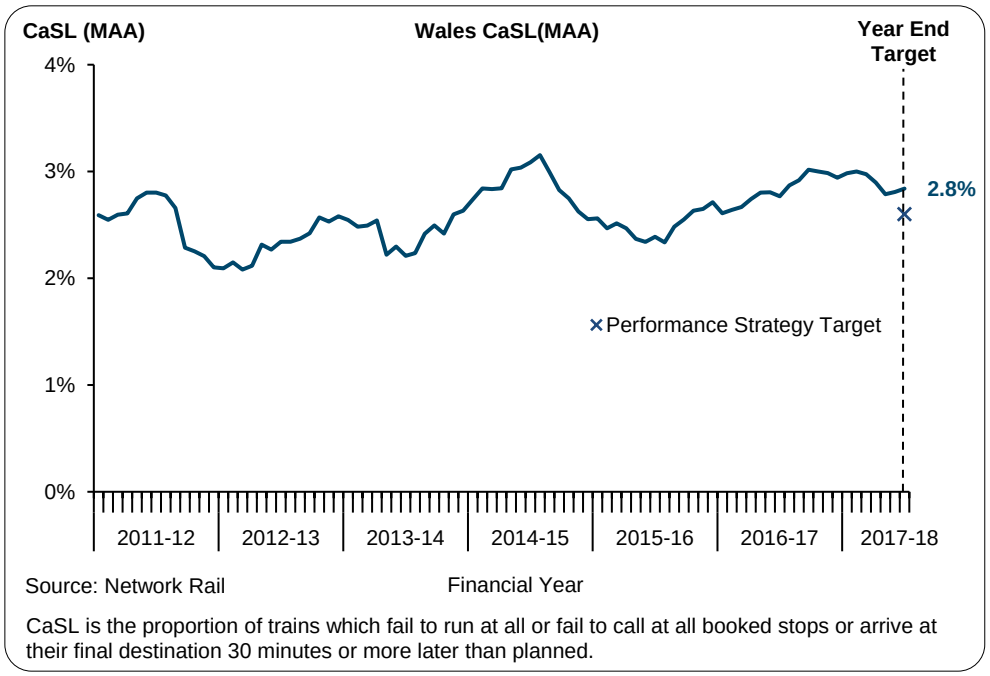
7.15 We meet Network Rail's central Infrastructure Projects team regularly and carry out joint site inspections. These often highlight basic improvements that could be made in site safety and in the interface with maintenance functions. We have promoted better adoption of *Construction, Design and Management* (CDM) regulation requirements.

7.16 Manual handling issues in Wales have recently been the subject of ORR enforcement action. This action complements some national improvement notices, and we note that the route is playing an active part in finding innovative, effective solutions that can be rolled out nationally.

Train performance

7.17 Arriva Trains Wales' (ATW's) Public Performance Measure (PPM) Moving Annual Average (MAA) was 92.2% at the end of period 7 2017-18, 0.2pp worse than the performance strategy target. CaSL MAA was 2.8%, 0.2pp above (i.e. worse than) the performance strategy target.



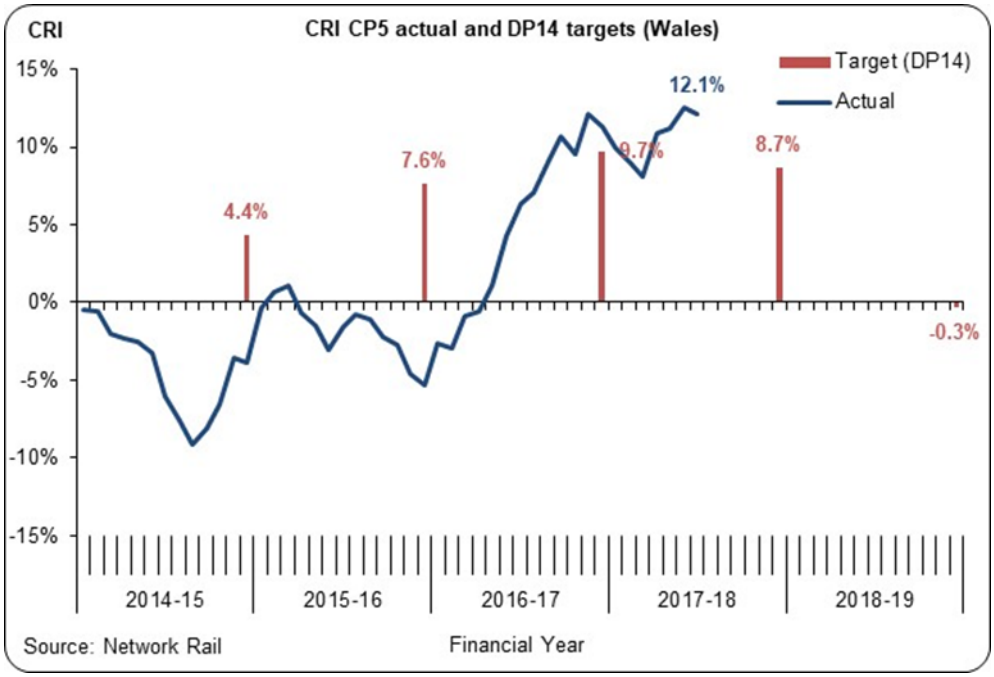


7.18 For England and Wales, we monitor Network Rail's delivery of the PPM and CaSL targets agreed with the operator in the local Performance Strategies. One of the ways we do this is by using the Network Rail Scorecards, which provide route based information based on targets agreed with the operators. Although behind

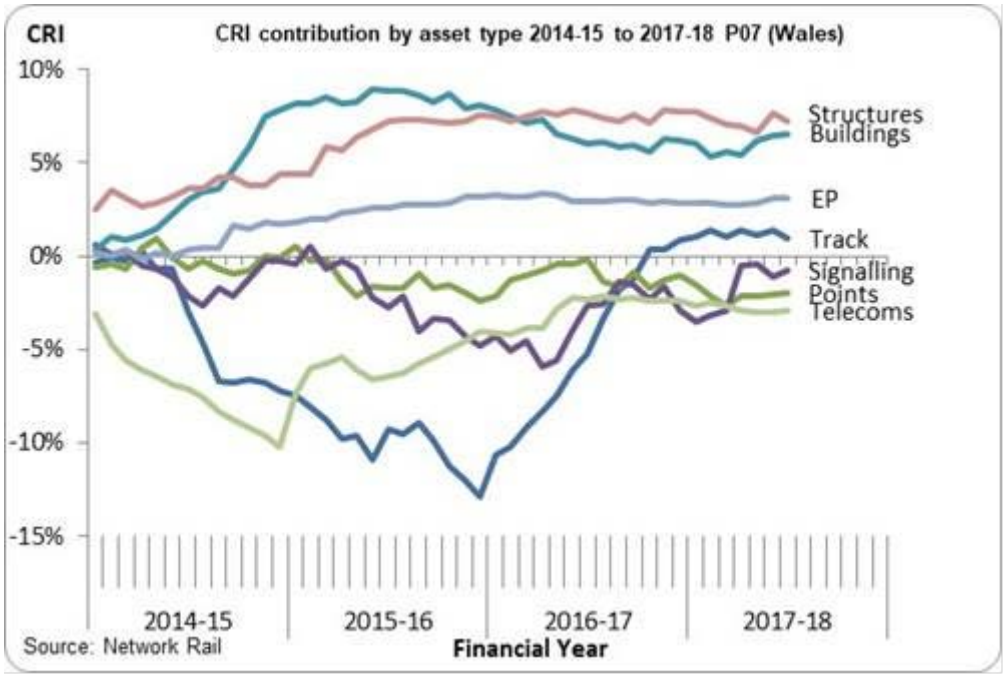
target for PPM and CaSL at the end of Period 7, PPM performance for Arriva Trains Wales (ATW) was within the threshold specified in the Final Determination.

Asset management

7.19 The improving trend in asset performance in Wales in 2016-17 has continued so far this year with CRI reaching 12.1%.



7.20 The continuing improvement reflects a recovery in signalling, with the signalling CRI contribution rising from -2.9% last year to -0.8%. This performance gain is partially offset by falls in points and telecoms, with falls in CRI contributions for points from -1.0% to -2.0% and from -2.4% to -2.9% for telecoms (see chart below).



Expenditure and financial performance

7.21 This section examines the Wales route's efficiency and wider financial performance, including debt and borrowing. It covers the first six of the 13 financial periods in 2017-18. For convenience, we refer to these first six periods as the first half of 2017-18.

Efficiency

7.22 The efficiency of the Wales route's core business activities[7] is forecast to improve by 4.5% in 2017-18 compared with a 7.5% decline across the first three years of CP5. The route is forecasting that efficiency will improve by 2.4% across the five years of CP5.

Wider financial performance

7.23 We consider Network Rail's financial performance in two ways; firstly, by comparing income and expenditure to the company's budget and secondly using our regulatory financial performance measure.

7.24 Wales route is reporting an underspend of £39m against its budget for the first half of the year and a full year forecast of £10m underspend.

Table 1: Wales route's income and expenditure variances to budget

£m	Half-year			Full year		
	Budget	Actual	Variance b/(w)	Budget	Forecast	Variance b/(w)
Turnover	165	165	0	356	356	0
Schedule 4	(3)	(3)	0	(11)	(10)	1
Schedule 8	0	(1)	(1)	(2)	(2)	0
Operations	(14)	(14)	0	(31)	(32)	(1)
Support	(24)	(22)	2	(49)	(45)	4
Maintenance	(32)	(31)	1	(69)	(72)	(3)
Capex - Renewals	(92)	(84)	8	(197)	(195)	2
Capex - Enhancements	(88)	(60)	28	(207)	(201)	6
Financing costs	(53)	(52)	1	(119)	(118)	1
Total	**(141)**	**(102)**	**39**	**(329)**	**(319)**	**10**

7.25 The main variances to budget in the first half of 2017-18 were:

- £28m of underspend on enhancements mostly due to £26m of deferral of work on the Great Western Electrification Programme (GWEP). Enhancements expenditure was in line with budget for the work delivered; and

[7] Excluding enhancements to the network, financing and some other costs.

- £8m of underspend on renewals. £10m of renewals work has been deferred, with £2m of underperformance on the work undertaken.

7.26 The regulatory financial performance measure (FPM) provides a more comprehensive understanding of Network Rail's financial performance than simple income and expenditure variances to budget. We currently expect the Wales route to financially underperform against its own budget by £1m and by £68m against the regulatory financial performance measure. This difference is largely because the route's internal budget is £67m higher than our PR13 financial assumptions for 2017-18.

7.27 Track renewals are forecast to be £6m higher than budget for the work done, which Network Rail has attributed to the Great Western electrification programme taking precedence on track possessions. This is partially offset by an underspend in schedule 4 costs and increased income from the volume incentive.

8. Y Rheilffyrdd yng Nghymru

Iechyd a Diogelwch

8.1 Mae'n dangos nad oes gwahaniaeth sylweddol rhwng mesurau perfformiad ar gyfer rheoli diogelwch ar y rheilffyrdd yng Nghymru a rheilffyrdd cenedlaethol. Fodd bynnag, mae'n dangos cryfderau a gwendidau oherwydd nodweddion y rhwydwaith a lleoliad / amgylchedd y rheilffordd.

8.2 Mae rheilffyrdd Cymru yn rhagori mewn rhai meysydd. Gan ddwyn i ystyriaeth draenio fel enghraifft, bu inni ddweud o'r blaen y bu i Gymru arloesi gyda'r defnydd o'r app 'My Work' er mwyn dysgu mwy am ei asedau draenio a threfnu arolygiad a gwaith cynnal a chadw priodol. Mae hyn yn talu ar ei ganfed erbyn hyn a bu i reilffyrdd Cymru ennill sgôr uchel mewn archwiliad draenio gan Network Rail. Tra bod rheilffyrdd eraill yn dal yn bwrw golwg ar gyflawnrwydd a chywirdeb cofrestri asedau draenio, bu i Gymru fedru mynd ati i ofalu eu bod yn cyflawni gwaith sylweddol. Roedd yn rhaid iddo fod yn arloesol ar adegau. Fel enghraifft, roedd cynlluniau i wneud gwaith gwella ar y draeniau yn defnyddio'r cerbyd ffyrdd-rheilffyrdd draenio. Fodd bynnag, oherwydd nam technegol gyda'r cerbyd ffyrdd-rheilffyrdd, roedd yn rhaid cyflawni'r gwaith yn defnyddio dull arall. Mae'r rheilffyrdd wedi cwblhau'r gwaith draenio sylweddol oedden nhw wedi ei gynllunio ac rydym yn rhagweld y byddan nhw'n perfformio'n llawer gwell na'r disgwyl erbyn diwedd y flwyddyn.

8.3 Rheilffordd Cymru ydy'r unig reilffordd i ragori cymaint gyda'r targed corfforedig ar gyfer osgoi digwyddiadau cael a chael. Y targed ydy i fynd i'r afael gyda 85% o'r digwyddiadau cael a chael caiff eu cofnodi ymhen 90 diwrnod. Yn ystod cyfnod 7, llwyddodd rheilffyrdd Cymru i fynd i'r afael â 93.7% ymhen 90 diwrnod.

8.4 Bu i'r rheilffordd ymdrin â chyfyngiadau adnoddau yn effeithiol. Mae, fel enghraifft, ar ei hôl hi gyda chynnal arolygiadau ffensio gofynnol ar gyfer y cynllun lleihau risg damweiniau trenau corfforaethol. Fodd bynnag, mae hyn oherwydd dadansoddiad - yn sgil hwnnw roedd yn rhaid blaenoriaethu cael gwared ar lystyfiant er mwyn gwella gwaith rheoli risgiau yn ymwneud ag archwilio croesfannau gwastad ac arwyddion. Mae'r rheilffordd wedi penderfynu peidio â chyflawni'r targed ffensio ond rhagori gyda'r targed yn ymwneud â'r gwaith llystyfiant. Mae Cymru hefyd ychydig ar ei hôl hi gyda'r targed lleihau'r risg o sgwriadau mewn mannau blaenoriaethol. Fodd bynnag maen nhw'n hyderus y byddan nhw'n cyflawni'r targed erbyn diwedd y flwyddyn.

8.5 Yn ystod ein harolygiadau bu inni sylwi ar anufudd-dodau hynod sylweddol yn ymwneud â gofynion cyfreithiol ar gyfer rheoli risgiau Syndrom Dirgryniad Llaw-braich (HAVS) yn enwedig goruchwyliaeth iechyd. Rydym yn credu fod achos amlwg ar gyfer camau gorfodi ond yn gwneud cofnod o'r problemau cenedlaethol yn

ymwneud â darparwr gwasanaeth iechyd Network Rail (gwelwch adran 2). Byddwn yn monitro hyn yn ofalus gan geisio adfer y sefyllfa mor gyflym â phosib yn y dull mwyaf rhesymol ac ymarferol.

8.6 Ar Fehefin y 1af 2017, cafodd person ei daro a'i ladd yng nghroesfan llwybr cerdded Trenos ger Llanharan, De Cymru. Bu i'r trên ddweud fod aelod o'r cyhoedd ar y rheilffordd wrth yr arwyddwr cyn i ail drên ei tharo. Bu i'r digwyddiad amlygu diffygion dichonol yn yr wybodaeth sydd ar gael i arwyddwyr er mwyn iddyn nhw adnabod lleoliadau o dan eu rheolaeth nhw a sut caiff hyn ei gyfathrebu i a gan staff y trenau. Rydym yn bwrw golwg ar hyn gyd Network Rail ac yn gobeithio adnabod gwelliannau.

Asedau

8.7 Mae gan asedau yng Nghymru wahanol nodweddion, heriau a hanes rheoli. Bu i amgylchedd unigryw Twnel Hafren, er enghraifft, olygu gwaith ail-gledru ychwanegol sylweddol er mwyn ceisio rheoli 'rolling contact fatigue'. Mae ein harchwiliadau yn awgrymu fod timau rheoli asedau Network Rail yn ymateb yn dda ac yn aml yn rhoi gweithdrefn newydd ac arloesol ar waith ynghylch stiwardiaeth eu portffolios.

Cledrau

8.8 Yn ystod ein hymchwiliad bu inni ddarganfod:

- buasai modd gwella'r defnydd o gerbydau cofnodi cledrau - yn enwedig i danategu mwy o ddefnydd o Waith Cynnal a Chadw ar Sail Risgiau (RBM);
- bu mabwysiadu Gwaith Cynnal a Chadw ar Sail Risgiau yn anghyson yng Nghymru - mae hyn yn rhannol oherwydd cyffredinrwydd hen asedau cledrau sy'n anaddas ar gyfer Gwaith Cynnal a Chadw ar Sail Risgiau.
- lle mae Gwaith Cynnal a Chadw ar Sail Risgiau ar waith, dydy'r gwaith heb fod mor drylwyr neu eang â gofyniadau'r broses ac ni chafodd y buddion llawn eu cyflawni; a
- fe gafodd penderfyniadau oedi ynghylch adnewyddu cledrau ei ymchwilio fel rhan o brosiect cenedlaethol. Yn gyffredin â rhannau eraill o'r rhwydwaith, bu inni weld y cafodd penderfyniadau gwreiddiol ynghylch adnewyddu eu cyfiawnhau - felly roedd disgwyl i oedi gael effaith. Bu inni weld nad oedd Network Rail bob amser yn cynnig gweithdrefn gadarn ynghylch lliniaru'r effeithiau yn sgil oedi. Yn benodol, ni chafodd yr effaith ar waith cynnal a chadw ei asesu'n gyflawn.

Asedau Signal

8.9 Bu i gyflwr yr asedau amrywio ar hyd y cledrau. Yn sgil gwaith adnewyddu a gwella fel rhan o'r gwaith adnewyddu ar y signalau yn ardal Caerdydd a pharatoi ar gyfer trydaneiddio cafodd offer modern ei osod yn y rhan hwnnw o'r daith. Hefyd bu iddyn nhw gael gwared ar lawer o asedau risg uwch fel ceblau toriad-unigol. Yn gyferbyniad i hyn bu'r oediadau fel Casnewydd-Amwythig yn golygu'r her o gynnal a chadw hen asedau am yn hirach na'r cynlluniau gwreiddiol.

Asedau Peirianneg Sifil

8.10 Hanner ffordd trwy'r flwyddyn mae'n debyg yr oedd y llwybr yn trafferthu i gydymffurfio gyda gwaith gofynnol er mwyn lleihau risg sgwriadau wrth bontydd. Fodd bynnag, yn dilyn craffu manylach, daeth i'r amlwg fod y rhan fwyaf o'r ôl-groniad yn sgil trafferthion data a chyfathrebu gwael rhwng y llwybr a chanolfan Network Rail. Mae'r cynllun gweithredu ar waith unwaith eto.

8.11 Bu diffyg yn y gwaith adnewyddu isbontydd ond mae hyn fwy oherwydd problemau gyda threfnu cau ffyrdd yn hytrach na thrafferthion gyda'r asedau eu hunain. Bu cyfanswm y gwaith adnewyddu gwrthgloddiau yn is na'r rhagolygon ar gyfer y flwyddyn hefyd.

8.12 Ni fu inni sylwi ar unrhyw dystiolaeth o waith rheoli risgiau annigonol yn sgil oedi gyda gwaith adnewyddu. Bu i Network Rail yng Nghymru ddatgan diddordeb mewn monitro cyflwr o bell un neu fwy safle cloddwaith mewn peryg o risg. Mae hyn er gwaethaf nad ydy'r llwybr yn rhan o'r profion Monitro Cyflwr o Bell. Bu inni weld tystiolaeth o fwy o waith adnewyddu ac adfer (clirio llystyfiant a rhwydo) toriadau cerrig - ar sail risg. Rydym ar ddeall fod mwy o waith o'r math hwn wedi ei drefnu ar gyfer y flwyddyn nesaf. Mae archwiliadau o gloddwaith yn gyfredol yn gyffredinol. Trefnwyd criwiau llystyfiant ymroddgar ar gyfer cloddwaith a strwythurau - er mwyn paratoi safleoedd cyn archwiliadau. Rydym yn datgan fodd bynnag y cafodd llystyfiant ei gofnodi eto fel rheswm pam nad oedd modd cynnal archwiliadau fel y cynlluniwyd.

Oddi ar y Cledrau

8.13 Bu llwybr Cymru yn arloesol gyda datblygu gweithdrefn ar sail risg gydag adnoddau digonol ynghylch rheoli asedau oddi ar y cledrau. Yn 2016-17 bu strwythur rheoli newydd ar gyfer gwaith oddi ar y cledrau, gyda draenio (gwelwch uchod) yn rhan ohono.

8.14 Mae gwaith ffensio gwael yn un o'r nifer o risgiau yn ymwneud ag asedau oddi ar y cledrau. Bu inni sylwi fod staff Uned Darparu gwaith Cynnal a Chadw wedi dechrau defnyddio'r app MyWork ar gyfer ffensio a'r bwriad ydy y bydd hyn yn golygu cofrestr asedau 'fwy trefnus' a mwy cywir yn Ellipse a fydd yn help i reoli ffensio yn

well. Yn debyg, mae rheoli llystyfiant ger y cledrau yn golygu heriau ar gyfer y llwybr. Mae gan yr Unedau Darparu gwaith Cynnal a Chadw Diffyg Cydymffurfio Dros Dro (TNC) oherwydd mae angen tair blynedd arnyn nhw i fodloni'r safon llystyfiant perthnasol. Rydym yn mynd ati i ofalu fod cynlluniau rheoli llystyfiant, mae'n bosib y bydd yn ymwneud â thechnoleg newydd, er mwyn gofalu fod gwaith rheoli llystyfiant yn fwy cynaliadwy.

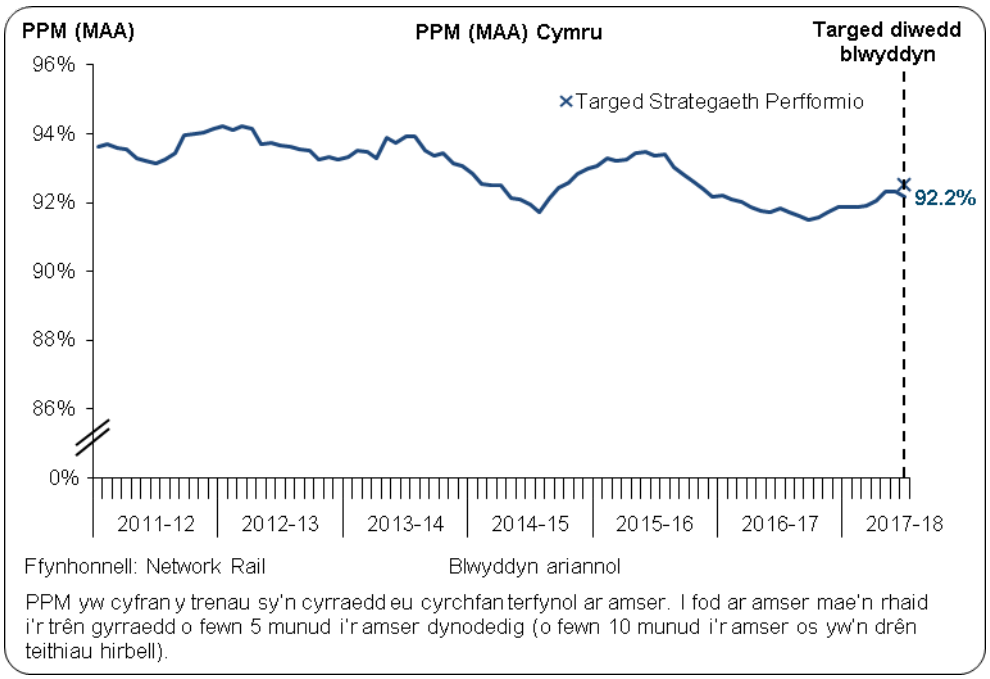
Materion Adeiladu

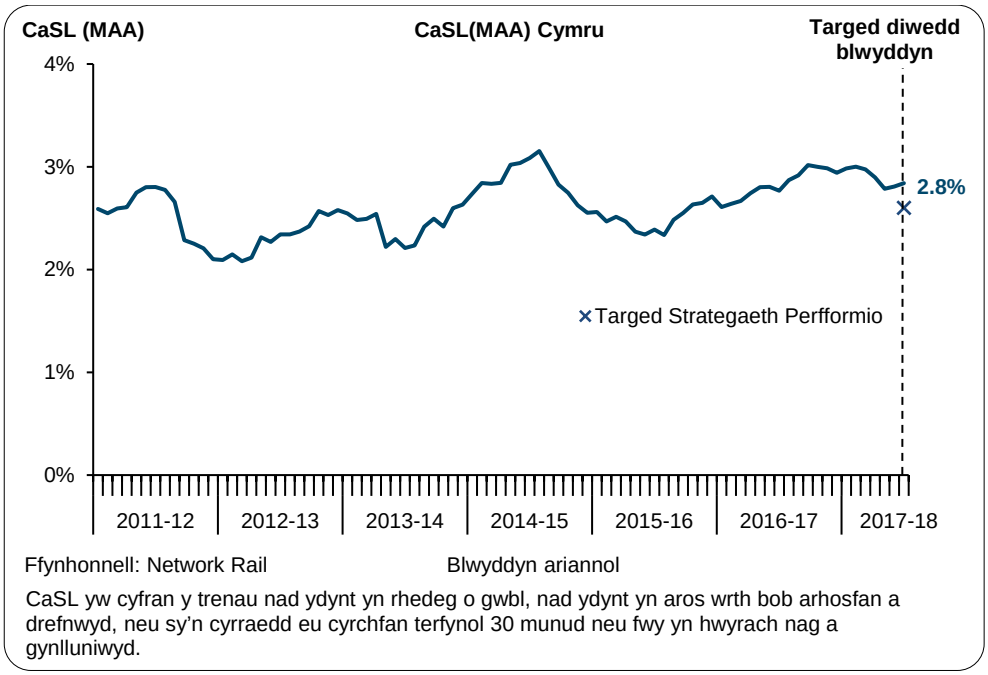
8.15 Rydym yn cyfarfod gyda thîm Prosiectau Isadeiledd canolog Network Rail yn rheolaidd ac yn cynnal arolygon safle ar y cyd. Mae'r rhain yn aml yn tynnu sylw at welliannau sylfaenol y gellir eu cyflawni fel rhan o waith diogelwch ar y safle ac yn y rhyngwyneb gyda gweithrediadau cynnal a chadw. Bu inni hyrwyddo mwy o ymdrech i fabwysiadu gofynion rheoleiddio Adeiladu, Dylunio a Rheoli (CDM).

8.16 Bu'n rhaid i ORR gymryd camau gorfodi yng Nghymru yn ddiweddar ynghylch materion codi a chario. Mae'r camau yn ategu at rai rhybuddion gwella cenedlaethol, ac rydym yn ymwybodol fod y llwybr yn chwarae rhan weithredol yn dod o hyd i ddatrysiadau arloesol ac effeithiol y gellir eu defnyddio yn genedlaethol.

Perfformiad y Trenau

8.17 Bu Cyfartaledd Symud Blynyddol (MAA) Mesur Perfformiad Cyhoeddus (PPM) Trenau Arriva Cymru (ATW) yn 92.2% ar ddiwedd cyfnod 7 2017-18, 0.2 pwynt canran yn waeth na tharged y strategaeth perfformio. Roedd Cyfartaledd Symud Blynyddol (MMA) Trenau a Ganslwyd neu a oedd yn Arbennig o Hwyr (CaSL) yn 2.8%, sef 0.2 pwynt canran yn uwch (hynny ydy yn waeth) na tharged y strategaeth perfformio.



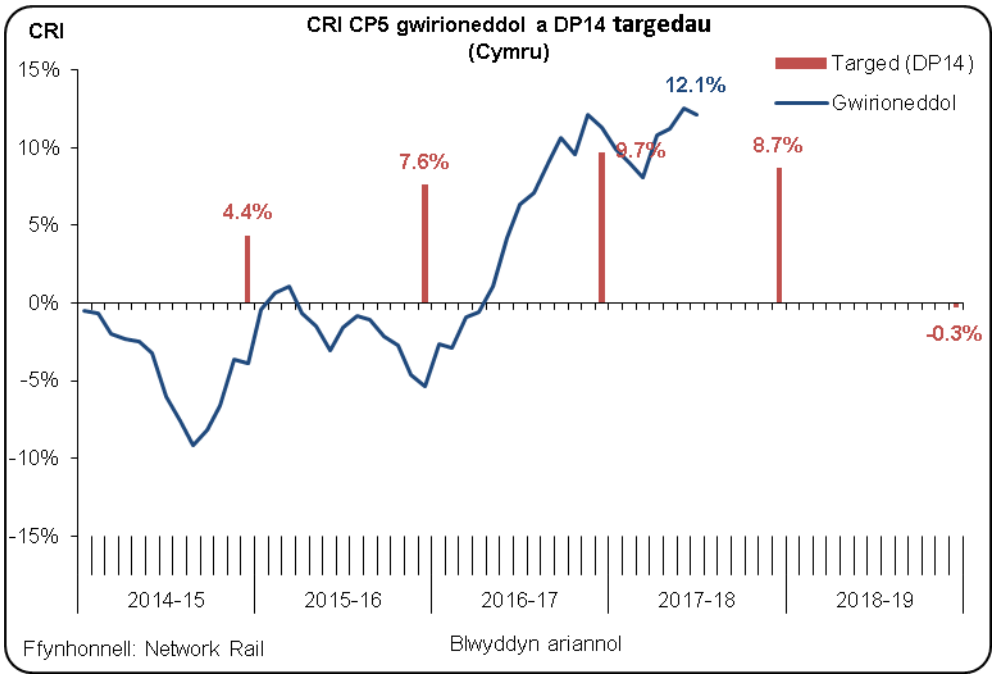


CaSL yw cyfran y trenau nad ydynt yn rhedeg o gwbl, nad ydynt yn aros wrth bob arhosfan a drefnwyd, neu sy'n cyrraedd eu cyrchfan terfynol 30 munud neu fwy yn hwyrach nag a gynlluniwyd.

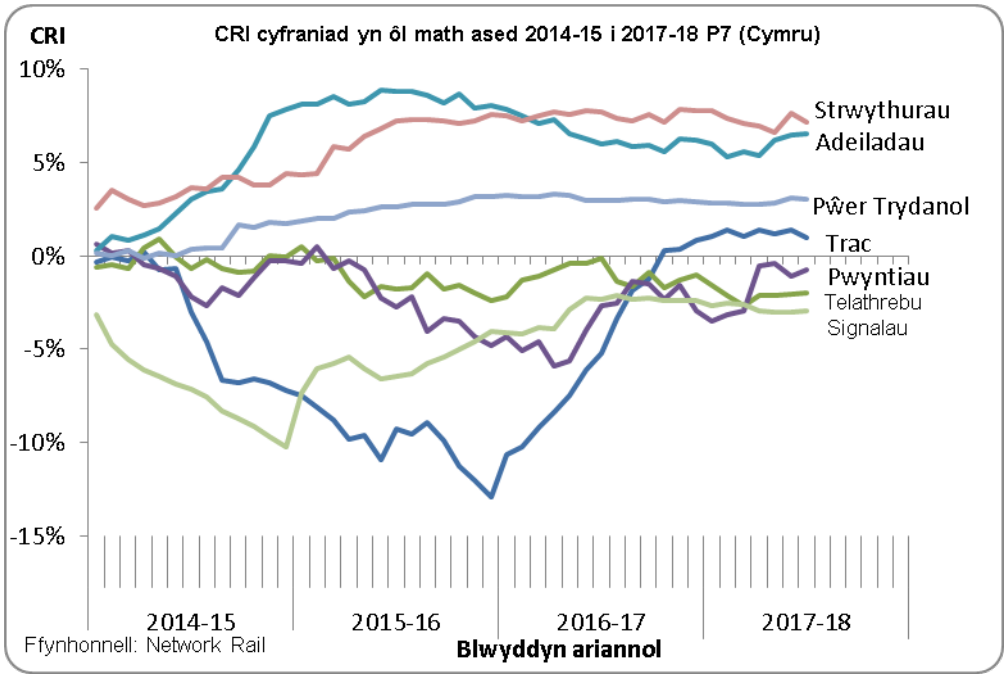
8.18 Ar gyfer Lloegr a Chymru, rydym yn monitro targedau Mesur Perfformiad Cyhoeddus (PPM) a Threnau a Ganslwyd neu a oedd yn Arbennig o Hwyr (CaSL) wedi eu cytuno gyda'r gweithredwr yn y Strategaethau Perfformiad lleol. Un o'r ffyrdd rydym yn mynd ati i wneud hyn ydy gan ddefnyddio Cardiau Sgorio Network Rail sy'n cynnig gwybodaeth am y llwybrau ar sail targedau wedi eu cymeradwyo gyda'r gweithredwyr. Er bod Trenau Arriva Cymru heb gyrraedd ei dargedau Mesur Perfformiad Cyhoeddus na nifer y Trenau a Ganslwyd neu a oedd yn Arbennig o Hwyr erbyn diwedd cyfnod 7, roedd ei berfformiad o fewn y trothwy sydd wedi'i nodi yn y Dyfarniad Terfynol.

Rheoli Asedau

8.19 Bu i'r tuedd cynyddol mewn perfformiad asedau yng Nghymru yn 2016-17 barhau eleni gyda'r CRI yn cyrraedd 12.1%.



8.20 Mae'r cynnydd parhaus yn adlewyrchu gwelliant gyda'r arwyddion, gyda'r cyfraniad arwyddo CRI yn cynyddu o -2.9% y llynedd i -0.8%. Mae'r cynnydd mewn perfformiad wedi ei osod yn erbyn gostyngiad mewn pwyntiau a thelathrebu yn rhannol. Bu gostyngiadau mewn cyfraniadau CRI ar gyfer pwyntiau o -1.0% i -2.0% ac o -2.4% i -2.9% ar gyfer telathrebu (gwelwch y siart isod).



Gwariant a pherfformiad ariannol

8.21 Mae'r adran hon yn bwrw golwg ar effeithlonrwydd rheilffordd Cymru ynghyd â'r perfformiad ariannol ehangach yn ymwneud â dyledion a benthyciadau. Mae'n ymwneud â'r chwe chyfnod ariannol cyntaf, o'r 13 cyfnod, yn 2017-18. Er cyfleustra, rydym yn cyfeirio at y chwe chyfnod cyntaf hyn fel hanner cyntaf 2017-18.

Mae'r effeithlonrwydd yn gwella

8.22 Rydym yn rhagweld y bydd gwaith busnes craidd rheilffordd Cymru yn gwella o 4.5% yn 2017-18 o gymharu gyda gostyngiad o 7.5% yn ystod tair blynedd gyntaf CP5. Rydym yn rhagweld y bydd effeithlonrwydd yn cynyddu 2.4% yn ystod pum mlynedd y CP5.

Mae'r perfformiad ariannol ehangach yn gymysg

8.23 Rydym yn ystyried perfformiad ariannol Network Rail mewn dwy ffordd. Yn gyntaf drwy gymharu incwm a gwariant gyda chyllideb y cwmni ac yn ail yn defnyddio'n mesur perfformiad ariannol rheoleiddiol.

8.24 Mae tanwariant o £39miliwn gyda rheilffordd Cymru yn erbyn ei gyllideb ar gyfer hanner gyntaf y flwyddyn ac rydym yn rhagweld y bydd tanwariant o £10miliwn yn y flwyddyn gyflawn.

Tabl 1: Gwahaniaethau rhwng cyllideb ac incwm a gwariant Rheilffordd Cymru.

£m	Hanner blwyddyn			Blwyddyn gyflawn		
	Cyllideb	Gwirioneddol	Amrywiant b/(w)	Cyllideb	Rhagolwg	Amrywiant b/(w)
Trosiant	165	165	0	356	356	0
Cynllun Atodol 4	(3)	(3)	0	(11)	(10)	1
Cynllun Atodol 8	0	(1)	(1)	(2)	(2)	0
Gweithredu	(14)	(14)	0	(31)	(32)	(1)
Cefnogaeth	(24)	(22)	2	(49)	(45)	4
Cynnal a Chadw	(32)	(31)	1	(69)	(72)	(3)
Capex - Adnewyddu	(92)	(84)	8	(197)	(195)	2
Capex - Gwelliannau	(88)	(60)	28	(207)	(201)	6
Costau Ariannu	(53)	(52)	1	(119)	(118)	1
Cyfanswm	**(141)**	**(102)**	**39**	**(329)**	**(319)**	**10**

8.25 Dyma'r prif amrywiadau i'r gyllideb ar gyfer hanner cyntaf 2017-18:

- Tanwariant o £28miliwn ar welliannau yn bennaf oherwydd cafodd gwerth £26miliwn o waith ar y Cynllun Trydanu Great Western (GWEP) ei ohirio. Roedd y gwariant ar welliannau yn cyd-fynd gyda'r gyllideb am y gwaith cafodd ei gyflawni; a

- thanwariant o £8miliwn ar waith adnewyddu. Cafodd gwerth £10miliwn o waith adnewyddu ei ohirio gyda gwerth £2miliwn o dangyflawniad ar y gwaith.

8.26 Mae'r mesur perfformiad ariannol rheoleiddiol (FPM) yn cynnig tystiolaeth fwy cynhwysfawr o berfformiad ariannol Network Rail yn hytrach nag amrywiadau incwm a gwariant syml i'r gyllideb. Ar hyn o bryd rydym yn disgwyl y bydd rheilffordd Cymru yn tangyflawni yn ariannol yn erbyn ei gyllideb ei hun o £1miliwn a £68miliwn yn erbyn y mesur perfformiad ariannol rheoleiddiol. Mae'r gwahaniaeth yn bennaf oherwydd bod cyllideb fewnol y rheilffordd yn £67miliwn yn uwch na'n tybiaethau ariannol PR13 ar gyfer 2017-18.

8.27 Rydym yn rhagweld y bydd gwaith adnewyddu i'r cledrau yn £6miliwn yn uwch na'r gyllideb am y gwaith sydd wedi ei gyflawni. Mae Network Rail wedi priodoli cynllun trydanu Great Western i gymryd blaenoriaeth ar feddiannau cledrau. Mae hyn wedi ei osod yn erbyn tanwariant mewn costau amserlen 4 yn rhannol ac incwm uwch o'r cymhelliad.

9. Glossary

Term	Explanation
Alliances	The term 'alliances' is currently being used to describe a wide range of different relationships from project-based partnerships through to potentially long-term and comprehensive commercial arrangements covering a wide range of activities carried out by Network Rail routes and train operators. The common factor is that Network Rail and a train operator reach agreement to work together more closely and share the benefits of doing so, within the framework of their existing individual accountabilities and responsibilities. As currently being discussed, alliances do not involve the creation of new legal entities such as formal joint ventures
Business Critical Rules	Business Critical Rules provide an overall structure for determining what Network Rail must do and who needs to do it. They are being designed from risk-based principles - understanding the things that can go wrong and what must be done to prevent them
Cancellations and Significant Lateness (CaSL)	The proportion of trains which arrive at final destination greater than 30 minutes from planned arrival, or full/part cancelled or missed calls
CAPEX	Refers to the funds used by Network Rail to acquire or upgrade physical assets on the railway and related infrastructure in order to maintain or increase the scope of their operations. Such expenditure is referred to as Renewals (of existing infrastructure e.g. works that will provide long term benefits such as replacing a section of track) or Enhancements (upgrading existing or building new infrastructure, e.g. electrification of a railway line).
CDM	Construction (Design and Management) Regulations 2015

Term	Explanation
Civils	A term describing only those responsible for structures such as bridges
Close Call	Any unsafe act or unsafe condition that in different circumstances could have led to an accident or personal injury, or could have resulted in damage to property or equipment, but would not introduce risk to the railway infrastructure.
Composite Reliability Index (CRI)	It provides an indication of the contribution of asset reliability to the safety and performance of the railway.
Control Period	A control period is the period to which an access charges review (e.g. a periodic review) applies. Control periods are typically five years in length, but maybe shorter or longer depending on what the regulator decides as part of the review. • CP6 covers from 1 April 2019 to 31 March 2024 • CP5 covers from 1 April 2014 to 31 March 2019 • CP4 covers from 1 April 2009 to 31 March 2014 • CP3: 1 April 2004 to 31 March 2009 • CP2: 1 April 2001 to 31 March 2004 • CP1: from the privatisation of Railtrack to 31 March 2001
CSAMS	Civils Strategic Asset Management Solution
DfT	Department for Transport
Earthworks	Natural earth slopes and earth-related structures such as cuttings and embankments
ECAM	Enhancements cost adjustment mechanism
Eddy Current Testing	A system using electromagnetism to detect and assess discontinuities in metal; adapted specialist technology to categorise maximum crack length and depth in every metre of rail.

Term	Explanation
EDP	Enhancements Delivery Plan
EGIP	Edinburgh to Glasgow Improvements Programme
EIS	Entry into service
Ellipse	Computer based asset management system used by Network Rail to record and prioritise the maintenance work required to be done and when.
Enhancements	Schemes to change to network outputs, usually involving construction, that improves network capacity or capability (e.g. enabling higher speeds, allowing heavier loads) relative to the level of network outputs funded at the last relevant periodic review. Usually outputs are required at specific times (in contrast to most renewals).
Fatalities and Weighted Injuries (FWI)	An index measuring relative risk from fatalities, major and minor injuries.
Final Determination	Our final determination sets out our overall package of decisions for the periodic review 2013 (PR13).
Fixed Track Access Charges	The fixed track access charge (FTAC) recovers Network Rail's net revenue requirement. The net revenue requirement is the revenue that we determined in a periodic review is required by Network Rail to run its business, after accounting for the income received from short-run variable track access charges, regulated station charges, other single till income and the network grant. The FTAC is only paid by franchised passenger train operators.
FPM	Financial Performance Measure

Term	Explanation
Freight Delivery Metric (FDM)	This measure tracks the punctuality of freight services at destination as well as taking into account Network Rail caused delays.
Gauge	Distance between the inner running faces of two rails on the same track. Also used to describe the "envelope" through which train profiles must fit; this is the structure gauge.
GRIP	Guide to railway investment projects. A Network Rail formal procedure through which every investment project on Network Rail's network must pass. It consists of a number of stages; at the end of these a review is carried out and if the project cannot meet the pass criteria it is stopped or held until it does.
GSM-R	Global system for mobile communications - railway. An international wireless communications standard for railway communication.
GWEP	Great Western Electrification Programme
HAVS	Hand Arm Vibration Syndrome
Hidden Critical Elements	components or elements which are critical to the structural or engineering integrity of an asset
High Output Track renewal	A system for renewing track in part or as a whole far more quickly than has been possible in the past.
HSE	Health and Safety Executive
HST	High Speed Train. Usually refers to the Class 43 diesel locomotive and attendant Mark 3 coaches, the Intercity 125

Term	Explanation
Independent Reporter	A consultant whose role is to provide ORR with independent, professional opinions and advice relating to Network Rail's (as the railway licence holder) provision or contemplated provision of railway services, with a view to ORR relying on those opinions or advice in the discharge by ORR of its functions.
Infrastructure Projects	Network Rail division in charge of overseeing the company's CP5 enhancements programme.
Iron Men	Pairs of small gantries fitted with chain hoists and rail wheels used to transport rails.
Linear Asset Decision Support tool	System used to consolidate Network Rail's complex engineering data and provide insight from that data to engineers, enabling them to make better decisions on managing the track.
Linespeed	The maximum safe speed for a train to travel on any section of railway line taking into account infrastructure limitations.
LNE/EM Route	London North Eastern / East Midlands Route
LNW Route	London North Western Route
Longitudinal timber	A bearer running parallel to the rails instead of at right angles to them, and supporting the baseplates or chairs
LSR	Life Saving Rules
LTIFR	Lost Time Injury Frequency Rate - a measure of the number of lost time injuries occurring in a workplace per 1 million man-hours worked.

Term	Explanation
MDU	Maintenance Delivery Unit
MOU	Memorandum of understanding
Moving Annual Average (MAA)	Moving annual average - the average of the last 13 four-week time periods.
Network Grant	A proportion of Network Rail's income in the past has been paid directly by DfT and Transport Scotland in the form of network grants. Over CP5, more than 60% of Network Rail's income is forecast to come from network grants.
Network Licence	Network Rail operates under a network licence. This licence contains a set of conditions under which Network Rail must operate. As the operator and owner of the national rail infrastructure, it has a key role to play in railway safety and improving railway performance and efficiency. The network licence is a tool we have for holding Network Rail to account.
Network Rail managed stations	Managed stations are the stations at which Network Rail is the station facility owner. There are currently 18 managed stations, these are all large stations. A list of the managed stations is available on the Network Rail website.
ONS	Office of National Statistics
Operational Property	Buildings, land and structures in use as part of the operational railway.
OPEX	Operating expense: as distinct from CAPEX (capital expenditure), OPEX refers to ongoing costs incurred by Network Rail to maintain the railway infrastructure.

Term	Explanation
	Examples of OPEX include routine safety checks on the railway tracks or repairing signalling when it fails.
ORBIS	Offering Rail Better Information Services. A Network Rail initiative, its aim is to make information available in all forms including a mobile access and a local view to avoid site visits.
Overhead Line Equipment (OLE)	An assembly of metal conductor wires, insulating devices and support structures used to bring traction supply current to suitably equipped traction units. The conducting wires are normally strung between masts or poles in some form of catenary arrangement but simple systems may have a single trolley wire.
Performance Strategy	Jointly prepared plans agreed between Network Rail and a train operator to improve performance.
Plain Line Track	Track without switches and crossings
Planning and Delivering Safe Work (PDSW)	PDSW is a wholesale reform of how infrastructure projects are planned and delivered safely and, ultimately, it makes clear who is responsible.
Possession Disruption Index (PDI)	'Possession disruption index – passenger' (PDI-P) and 'Possession disruption index – freight (PDI-F)': a graph indicating the level of disruption caused by possessions over a period of time. Network Rail needs to restrict access to the network to carry out many of its maintenance and renewals activities. These restrictions of access are referred to as possessions. Possessions are considered to be 'disruptive' if they impact on the running of passenger or freight operators' normal timetabled services.

Term	Explanation
Possessions	Network Rail needs to restrict access to its network to carry out many of its maintenance and renewals activities. These restrictions of access are referred to as possessions.
PPE	Personal Protective Equipment
Precursor Indicator Model (PIM)	A model which measures the underlying accident risk by tracking changes in accident precursors.
Public Performance Measure (PPM)	The Public Performance Measure (PPM) is the percentage of trains arriving at their final destination within 5 minutes of their scheduled arrival time (within 10 minutes for long distance services).
RAB	Regulatory asset base: The Office of Rail and Road's calculation of the value of Network Rail's assets.
RBM	Risk Based Maintenance
Regulated Outputs	These are outputs that we determine as part of our periodic review that Network Rail is required to deliver over the relevant control period.
Renewals	Major capital works or replacement of the network in order to maintain its required capability. These may be required at specific times but are more often carried out according to Network Rail's own timetable
RIDDOR	Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013.
Right Time	Performance measure measuring train arrival within one minute of the scheduled time

Term	Explanation
RM3	Rail Management Maturity Model: the tool we use to assess an organisation's ability to achieve excellence in controlling health and safety risks.
ROC	Route Operating Centres
Rolling contact fatigue	General term covering all types of damage incurred at the wheel rail interface.
Route availability	A code used to indicate which rolling stock can use which routes.
Safety Management System (SMS)	In essence, it is a formal arrangement for a safer working environment. All operators and duty holders are now required to have arrangements in place for managing safety risks. A safety management system defines roles and responsibilities, sets arrangements for safety mechanisms, involves workers in the process and ensures continuous improvement.
Schedule 4	Schedule 4 (the possessions regime) is the part of passenger and freight operators' track access contract with Network Rail that sets out arrangements for compensation to the operator in the event of planned disruption to their services.
Schedule 8	Schedule 8 (the performance regime) is the part of passenger, freight and charter operators' track access contract with Network Rail that sets out arrangements for compensation in the event of unplanned disruption to services.
Scour	The removal of material from a bed or bank of a watercourse or material from a beach by current or wave action. This is a particular problem where the removed material was providing support or restraint to a

Term	Explanation
	structure such as a bridge pier or retaining wall, ultimately leading to its collapse.
Section Manager	A supervisory post responsible for the day to day maintenance of the track within a permanent way section or area or division.
Single-cut cables	The provision of controls in only the feed or return side of a circuit, used only where there is no risk of false feeds or faults to earth.
Switches and Crossings (S&C)	Track consisting of switches (an assembly of two movable rails – the switch rails) and two fixed rails (the stock rails) and crossings (an assembly that permits the passage of wheel flanges across other rails where tracks intersect.
Temporary Non Compliance (TNC)	An approved time-bound derogation from a requirement in a company standard.
Temporary Speed Restriction (TSR)	Temporary speed restriction imposed for safety reasons. This can arise from the poor condition of track, structures, earthworks, hot weather effects, or following track relaying until the track bed is stabilised.
TIGER	Track Integrated Geometry Engineers' Report
TOC	Train operating companies: run the passenger trains and services on the network.
Track Geometry	The horizontal and vertical alignment of the track.
Train Accident Precursors Indicator Model (PIM)	RSSB's Precursor Indicator Model (PIM) provides a measure of the underlying risk from train accidents by tracking changes in the occurrence of accident precursors

Term	Explanation
Train Regulation	The management of the passage of trains on a route using junctions and loops so that slower trains do not impede faster ones.
Twist Faults	Where particular misalignments between the heights of rails which can cause the risk of train derailment.
Underbridge	Bridges that allow passage under the railway.
User- worked crossings	A level crossing where the barriers or gates are operated by the user.
Whistle Board	A white circular sign with a grey edge and black W in the centre indicating to a train driver that they must sound the horn or whistle. This is often used to provide warning to users of accommodation, footpath and occupation crossings.
Wrong-side failure	A failure that causes a piece of equipment to cease functioning in such a way as to cause danger to the safety of the line.

This publication is available at orr.gov.uk

Any enquiries regarding this publication should be sent to us at orr.gov.uk.