OFFICE OF RAIL AND ROAD

ORR's annual report on HS1 Ltd 2016-2017

July 2017

Contents

Foreword

This report outlines the work we have done under the terms of the HS1 Concession Agreement, the Railways Infrastructure (Access & Management) Regulations 2005 and health and safety legislation. Separately, we will shortly be commencing the next periodic review of HS1's next control period and will publish an initial consultation in September.

In summary, HS1 Ltd's performance improved in 2016-17, with only 0.26% of services being delayed by HS1 Ltd-attributable incidents. This year also saw a recovery in performance (as measured by average seconds delay) from 2015-16, with HS1 Ltd outperforming its stretch target by the end of the year.

Billed train paths on the network decreased by 1.5% in 2016-17, in part due to a fall in the number of timetabled international trains.

Overall performance of the HS1 assets has improved on last year and continues broadly to meet key asset performance metrics, and good progress continues to be made improving asset management capability.

HS1 Ltd generated regulated income of £68.1m, £1.5m higher than assumed in PR14, which set the level of HS1 Ltd's regulated charges for 2015-2020. This was largely due to the income recovered from operators being £1.7m higher than assumed in PR14 because of higher than expected billed train paths. The company spent £67.4m operating, maintaining and renewing its rail infrastructure in the year, which was in line with PR14 assumptions. Overall, HS1 Ltd's income exceeded expenditure by £0.6m, which represents £1.4m of financial outperformance relative to the ORR's determination.

The report also contains sections on preparations for the upcoming periodic review of HS1 (PR19) and health and safety, including details of our proposed health and safety regulation activities for 2017-18.

Graham Richards

Director, Railway Planning and Performance

July 2017

Background

This document is ORR's annual report on HS1 Ltd for 2016-17. Previous reports are available on our website.

HS1 Ltd has a 30-year concession from the Secretary of State to operate and manage the HS1 network. ORR is the health and safety regulator for HS1 Ltd, and has economic regulation responsibilities through the Concession Agreement and the Railways Infrastructure (Access and Management) Regulations 2005 ("the Regulations").

HS1 Ltd is responsible for the overall management and operation of the HS1 network, and subcontracts delivery of operations, maintenance and renewals to Network Rail (High Speed) Ltd ("NR(HS)"). NR(HS) is also a safety duty holder for the HS1 network.

This report focuses on the following key areas:

- performance and data monitoring;
- asset management;
- finance and efficiency;
- the 2019 periodic review of HS1 (PR19); and
- health and safety.

We monitor train service performance through data provided by HS1 against key performance targets. Asset management is monitored through delivery of HS1 Ltd's Asset Management Strategy. The Asset Management Annual Statement, along with asset stewardship key performance indicators, is used to assess HS1 Ltd's performance in maintaining its assets.

Further questions or comments on this report should be directed to:

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1. Performance and data monitoring

Overview

HS1 Ltd's performance during 2016-17 has been good and much improved since last year, with only 0.26% of services (194 trains) being delayed by HS1-attributable incidents. Nearly three-quarters (74.7%) of the services delayed attributable to HS1 Ltd were due to non-track assets, with point failures affecting 70 trains in 2016-17. Billed train paths on the HS1 network fell by 1.5% in 2016-17, partly due to the decrease in the number of timetabled international trains.

Performance

1.1 We monitor HS1 Ltd's operational performance against the performance floor measures set out in the Concession Agreement. The performance floor threshold sets out the minimum operational standards for HS1 Ltd. For an asset the age of the HS1 network, we would expect performance to be at a much higher level than the performance floor measures, which state that the proportion of services delayed by HS1 Ltd in a quarter should not exceed 15% and in a year must not exceed 13%. HS1 Ltd sets NR(HS) a separate target of 5.5 average seconds delay per train. A summary of performance for the financial year ending 31 March 2017 is provided here:

Figure 1 – HS1 performance in 2016-17[1]

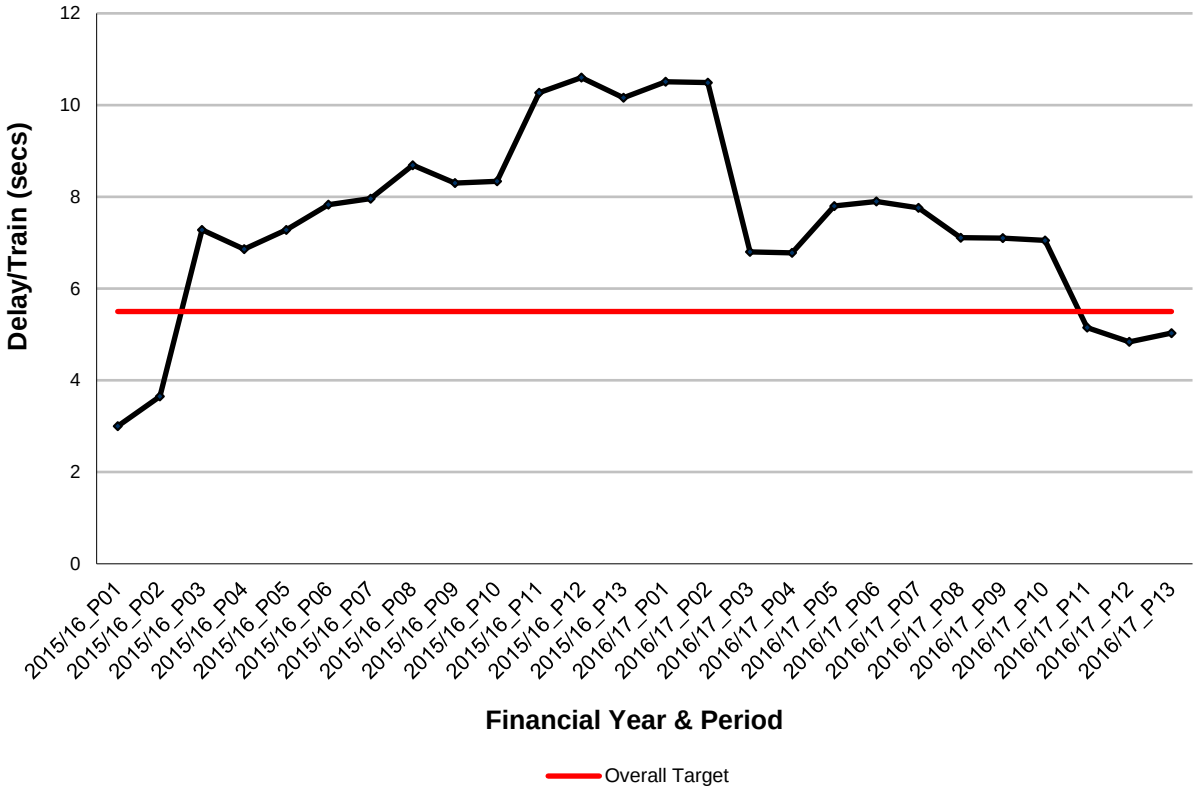
	Total number of trains timetabled	Total number of services delayed	Total number of services delayed (attributable to HS1)	Percentage of services delayed (attributable to HS1)	Total number of services delayed (unknown incident)
Domestic (St Pancras - NKL via Ebbsfleet)	26,645	2,231	51	0.19%	10
Domestic (St Pancras - Ashford)	28,814	3,197	83	0.29%	9
International	18,233	4,237	58	0.32%	4
Freight	439	77	2	0.46%	-
Total	**74,131**	**9,742**	**194**	**0.26%**	**23**

1.2 The proportion of trains delayed by HS1 Ltd-attributable incidents in 2016-17 was 0.26%, which showed an improvement compared to the previous year. It is the second lowest percentage of services delayed in the last seven years and remains significantly better than the performance floor target of 13%.

[1] Please note that some of the figures included in this chapter are subject to revisions due to various factors including the re-classification of some delay incidents.

1.3 As can be seen in Figure 2, by the end of 2016-17 average seconds delay per train was 5.03, just beating the internal stretch target of 5.5 seconds.

Figure 2 – Moving annual average seconds delay per train on the HS1 network (delays attributed to HS1 Ltd), by period 2015-16 to 2016-17



Source: NR(HS)

1.4 Further information on how asset performance and condition affected average seconds delay per train can be found in chapter 2 of this report.

Figure 3 - Delayed trains broken down by causes for which HS1 Ltd are wholly or mainly responsible

Category	Incident description	Total number of services delayed (attributable to HS1)						
		2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
Track	TSRs due to condition of track	2	0	0	0	0	0	0
	Track Faults including Broken Rails	0	49	1	60	0	0	0
	Reactionary delay to P-coded TSRs							1
	Track (total)	2	49	1	60	0	0	1
Non-track assets	Points failures	10	4	115	13	25	95	70
	OLE/Third Rail faults	8	25	6	50	5	52	2
	Signal Failures	45	0	19	1	0	14	9
	Track Circuit Failures	88	38	17	5	27	41	41
	Signalling System & Power Supply Failures	13	12	6	0	4	35	14
	Other Signal Equipment Failures	10	0	0	2	3	15	5
	Telecoms failures	0	0	4	0	0	1	4
	Non-track assets (total)	174	79	167	71	64	253	145
Network management	Problems with trackside signs including TSR boards	0	1	2	0	0	0	0
	Other infrastructure	13	27	0	0	6	3	0
	Track Patrols & related possessions	0	0	1	1	0	0	1
	Possession overrun & related faults	4	37	4	4	3	5	8
	Other possession related delay	1	0	0	39	0	0	8
	Network Rail Operations - signalling	47	48	65	36	32	36	20
	Network Rail Operations - control	1	1	4	1	0	18	1
	Network Rail Operations - other	17	140	15	6	5	11	1
	Timetable Planning	6	15	10	0	6	6	7
	Network Rail commercial takeback/other	2	0	0	0	0	0	0
	Uninvestigated delay	0	4	0	0	0	0	0
	Network management (total)	91	273	101	87	52	79	46
Severe weather	Civil Engineering structures, earthworks & buildings	0	0	0	0	0	0	1
	Wheel slip due to leaf fall	0	0	0	0	0	0	1
	Other weather	0	0	0	2	0	0	0
	Severe weather (total)	0	0	0	2	0	0	2
External fires	External fires	45	0	0	0	0	0	0
	External (total)	45	0	0	0	0	0	0
All	**Grand total**	**312**	**401**	**269**	**220**	**116**	**332**	**194**

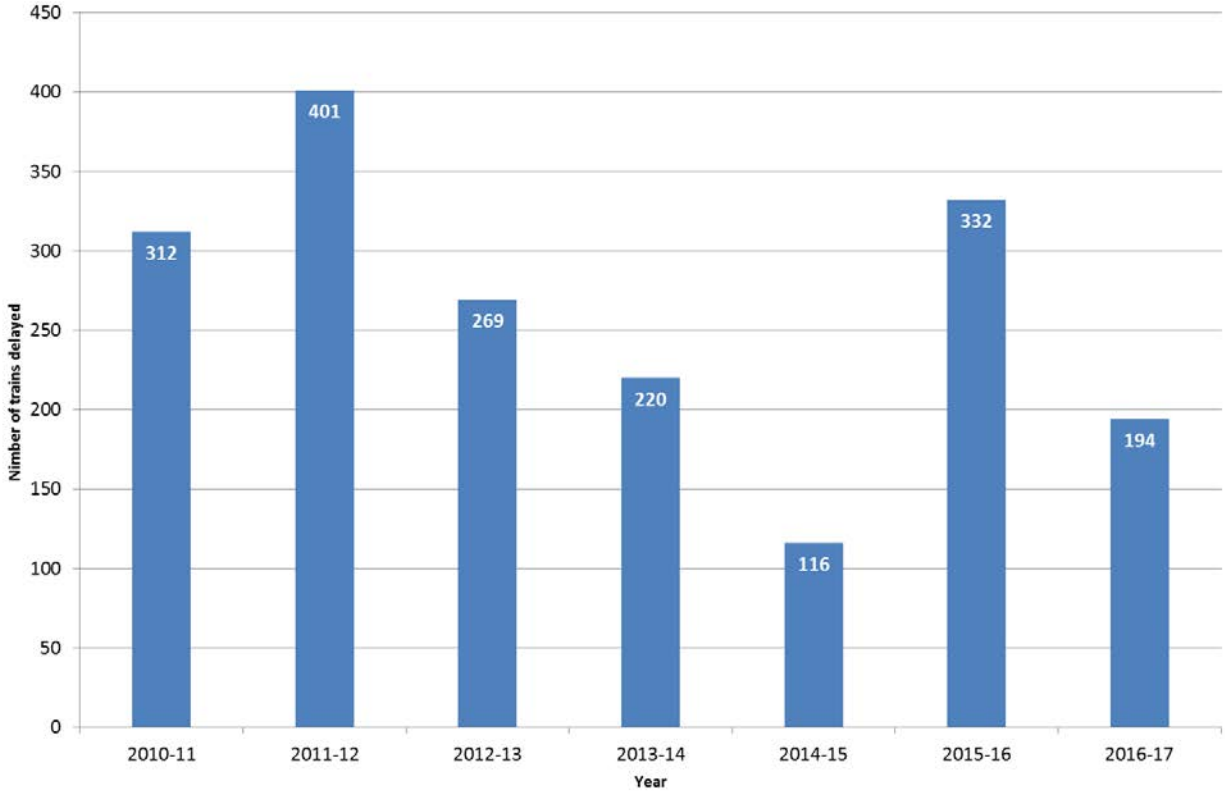
Note: Please see caveat on revisions of figures

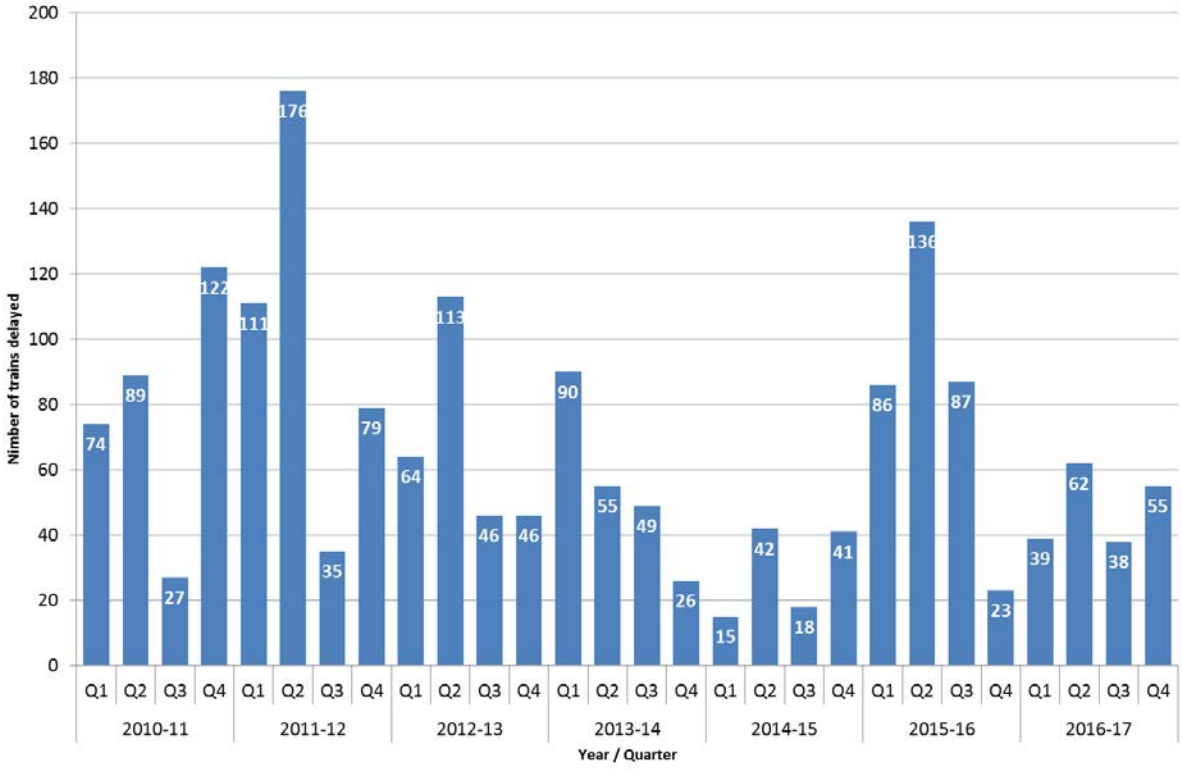
1.5 Figure 3 above shows the number of trains delayed by an incident wholly or mainly attributable to HS1 Ltd, displayed by cause. There were a total of 194 trains delayed in 2016-17, which is a significant improvement on 2015-16 and was the second best result over the last seven years.

1.6 Nearly three-quarters (74.7%) of the delays were attributable to non-track assets, with point failures which affected 70 trains. More than half of these point failures occurred in Quarter 2 (26 June – 17 September 2016) which accounted for 41 delayed trains. The point failure incident which occurred on 25 August 2016 at Crismill Crossover caused delays to 23 domestic services.

1.7 The number of trains delayed by network management issues was at its lowest since the time series began in 2010-11, with a total 46 trains delayed for the year 2016-17. This accounted for just under a quarter (23.7%) of the total delays and around half of these (20 trains) were due to signal operations during the year.

Figure 4 - Number of trains delayed wholly or partly due to HS1 Ltd, 2010-11 to 2016-17





Note: Please see caveat on revisions of figures

1.8 Figure 4 above shows an improvement in performance in 2016-17, compared to the previous year. It is also the second best performing year for HS1 Ltd in the last seven years. Performance in 2015-16 suffered from a small number of large incidents, particularly caused by non-track assets, which affected many trains. There were fewer of these large incidents in 2016-17, and to tackle areas of poor asset performance, HS1 Ltd have successfully established an Infrastructure Reliability Group from experts within HS1 Ltd and NR(HS) to understand the root cause of failures and instigate improvement measures. More detail on asset performance can be found in chapter 2 of this report.

1.9 Figure 4 shows the number of trains delayed by HS1 Ltd by quarter. Quarters 1 to 3 in 2016-17 showed a marked improvement when compared to the corresponding quarters in the previous year. On the other hand, Q4's performance deteriorated, with 55 trains delayed, 18 of which were down to track circuit failures and 14 due to signalling system and power supply failures.

Traffic volume

1.10 The total number of trains timetabled to run on the HS1 network fell since last year, to 74,131 in 2016-17. This represents a fall of 1.5% on 2015-16. This is partly attributed to the reduction in the number of timetabled international trains (down 884) compared to 2015-16.

Figure 5 – HS1 traffic volume 2010-11 – 2016-17

	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
Domestic (St Pancras – North Kent Line via Ebbsfleet)	27,696	27,843	32,291[2]	27,591	27,333	26,759	26,645
Domestic (St Pancras - Ashford)	25,212	25,466	25,857	26,326	26,874	28,885	28,814
International	18,319	18,232	18,408	18,707	19,011	19,117	18,233
Freight	-	43	137	286	704	509	439
Total	71,227	71,548	76,693[1]	72,910	73,922	75,270	74,131

Note: Please see caveat on revisions of figures

Data assurance

1.11 The most recent 2016 data review was carried out by DNV GL. It incorporated a high-level review of the performance and asset management measures and a review of HS1 Ltd's asset register. The overall outcome of the review was positive, and included an assessment of all the key indicators, an identification of what progress had been made since the 2014 review, together with a set of minor recommendations for further improvements. All HS1 Ltd data assurance reviews are available on our website.

[2] Spike in traffic volume due to 2012 London Olympics.

2. Asset management

Overview

The Concession Agreement requires HS1 Ltd to secure the operation, maintenance, renewal, replacement, planning and carrying out of upgrades in accordance with best practice and in a timely, efficient and economical manner, to the greatest extent reasonably practicable having regard to all circumstances.

Overall performance of the assets has improved on last year and continues broadly to meet the key asset performance metrics included in the CP2 determination.

HS1 Ltd has initiated improvements in the governance of renewal activities and project work is progressing to plan, although there has been some re-assessment of requirements based on improving asset knowledge.

Good progress continues to be made improving asset management capability and work has started on the preparation for the CP3 periodic review.

Asset performance and condition

Asset Performance

2.1 HS1 Ltd uses a Key Performance Indicator (KPI) of average seconds delay per train to measure its performance. For 2016-17, the overall performance was 5.03 seconds (see Figure 2) which is better than their internal stretch target of 5.5 seconds. From an asset performance perspective, the contribution to this figure from infrastructure failures is 1.55 seconds against a target of 2.14 seconds, the details of which are shown in Figure 6.

Figure 6 – Moving Annual Average of seconds delay per train on the HS1 network caused by infrastructure failures

Infrastructure Failures		
Target	Actual	Var
2.14	1.55	-0.59

OCS			M&E			S&T			Civils & Environment			Track		
Target	Actual	Var	Target	Actual	Var	Target	Actual	Var	Target	Actual	Var	Target	Actual	Var
0.64	0.00	-0.64	0.43	0.00	-0.43	0.86	1.51	0.65	0.11	0.05	-0.06	0.11	0.08	-0.03

Delay Minutes (13 periods)	Delay Minutes (13 periods)	Delay Minutes (13 periods)	Delay Minutes (13 periods)	Delay Minutes (13 periods)
5	0	1865	59	94

2.2 As can be seen from Figure 6, the vast majority of asset groups are beating their internal performance targets, however, it is noted that performance of S&T assets has been worse than target due to reliability issues with point operating equipment.

2.3 To tackle areas of poor asset performance, HS1 Ltd have established an Infrastructure Reliability Group from experts within HS1 Ltd and NR(HS) whose aim is to understand the root cause of failures and to instigate measures to address poor performance within the identified assets.

2.4 When comparing actual performance to the internal targets set by HS1 Ltd for CP2 for the number of faults by asset group (see Figure 7), the targets have all been met with the exception of Signalling where the number of service affecting failures is greater than target. This broadly represents an improvement in the position attained last year.

Figure 7 – Asset group performance against HS1 Ltd's internal CP2 targets

Asset Group		CP2 Target Ave/Period	2014-15 Actual Ave/Period	2015-16 Actual Ave/Period	2016-17 Actual Ave/Period
Signalling	Fault Level	18	9	12.31	12.46
	Service Affecting	1	4	10.77	1.46
Telecoms	Fault Level	4	0.92	1.15	0.92
	Service Affecting	1	0.85	1.08	0
M&E	Fault Level	9	5.92	4.46	2.31
	Service Affecting	1	5.92	4.38	0
OCS	Fault Level	2	0.38	0.31	0
	Service Affecting	1	0.08	0	0
Track	Fault Level	0.2	0	0	0.08
	Service Affecting	0.1	0	0	0
Civil	Fault Level	2	0	0	0.23
	Service Affecting	0	0	0	0.08

Asset condition

2.5 HS1 Ltd continues to refine its approach to the condition assessment of assets through improving understanding of failure mechanisms and improved condition data capture in its management systems.

2.6 The current condition profile for the core asset groups is shown in Figure 8, which also compares the current profile against the condition profile established in 2013 contained within the CP2 Five Year Asset Management Statement (5YAMS).

Figure 8 – Comparison of current assessment of asset condition against the position stated in the CP2 5YAMS

	Percentage of assets in each condition band											
	1 (New)		2		3		4		5		Not Scored	
Department	CP2 5YAMS	2017	CP2 5YAMS	2017	CP2 5YAMS	2017	CP2 5YAMS	2017	CP2 5YAMS	2017	CP2 5YAMS	2017
CIVILS	0.00%	0.16%	40.68%	40.56%	59.30%	59.25%	0.02%	0.03%	0.00%	0.00%	0.00%	0.00%
M&E	0.00%	0.09%	0.00%	0.00%	100.00%	99.91%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
OCS	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
SIGNALLING	0.00%	0.00%	96.85%	97.28%	1.20%	0.77%	1.95%	1.94%	0.00%	0.00%	0.00%	0.00%
TELECOMS	0.00%	1.64%	7.87%	8.46%	62.62%	58.74%	29.51%	31.16%	0.00%	0.00%	0.00%	0.00%
TRACK	12.80%	14.02%	78.49%	76.14%	8.71%	9.74%	0.00%	0.10%	0.00%	0.00%	0.00%	0.00%

There has been some movement in condition over the intervening period, which reflects the managed decline of the assets and the impact of asset interventions within CP2.

Asset planning

Asset management capability improvement

2.7 HS1 Ltd continues to review and improve its asset management capability and has concluded an independent review of the organisations capabilities against the requirements of ISO55000[3].

2.8 From this work, they have developed a roadmap to move towards asset management excellence, with work identified to enhance key areas including asset management capability, organisational structure, work force support and competence.

2.9 As part of this road map, HS1 Ltd has updated its Asset Management Policy and has developed a set of core asset management objectives and is working in partnership with NR(HS) to revise asset criticalities and review the status and structure of asset specific policies.

2.10 In addition, HS1 Ltd together with NR(HS) have embarked on a development programme to increase knowledge and capability in asset management, which has culminated in over 40 staff receiving training in asset management to prepare them to undertake the Institute of Asset Management Certificate in the Principles of Asset Management.

Progress with CP2 key outputs & initiatives

2.11 HS1 Ltd has continued to work on the key outputs it identified in its CP2 submission which for asset management covered three key areas:

- Stewardship

[3] ISO55000 series is a suite of standards that cover asset management outlining its principles and what constitutes best practice in asset management systems.

Work has continued on the development of asset information and HS1 Ltd are currently developing a Common Data Environment to align its data to good asset management practises.

Work is also underway to develop a performance dashboard to assist in management and reporting of real time asset performance to support decision-making.

- Innovation

HS1 Ltd continues to invest in innovation and has over 20 projects on going in 2016-17, which are primarily focused on two key areas:

  - Inspection & Monitoring
  - Maintenance Tools

- Whole Life Cost

HS1 Ltd have developed their Whole Life Cost Model (WLCM) created to support the CP2 submission into a new Asset Decision Support Tool (ADST) which is integrated within HS1's systems thereby link the tool to real time asset data and allowing wider access to the tool across relevant parts of the organisation.

2.12 HS1 Ltd has continued to work on the key initiatives and improvements it identified in its CP2 submission against the key asset areas. The status of this work is summarised below.

Figure 9 – Progress against key initiative identified in HS1 Ltd's CP2 submission

Asset Group	In Progress	Met	Discounted
Track	1	3	1
SC&C	3	0	0
EP	4	0	1
Civils	3	0	0

2.13 It should be noted that two initiatives have been discounted following more detailed assessment either because the technology is not ready for implementation or where there is no business case for the proposed change.

Preparation for CP3

2.14 All the work being undertaken to develop HS1 Ltd's capabilities in Asset Management should lead to an improved approach to the next periodic review.

2.15 HS1 Ltd is establishing its team to manage the development of the next submission. Initial work streams have begun including early engagement with stakeholders to understand their priorities for CP3 and to address concerns raised by the ORR as part of the last periodic review.

2.16 A key element of work that HS1 Ltd are embarking upon that will support both the work on CP3 and to improve overall asset management is the role benchmarking can play in identifying asset management best practise in other organisations and industries that can be applied on HS1.

2.17 Work is also underway with NR(HS) to update the methodology for capturing and forecasting Maintenance Unit Costs (MUCs) as this was seen as an area for development in the last periodic review.

2.18 ORR will continue to be closely involved in the development of the CP3 submission as part our duties in the Concession Agreement.

Renewals programme

Project governance

2.19 HS1 Ltd has been developing its project management capability to improve management and reporting of the growing number of projects in the portfolio.

2.20 A core part of these improvements is associated with implementing revised governance and reporting arrangements for the work bank and improvements in the authorisation process involving HS1 Ltd, DfT and ORR.

2.21 The review has also highlighted a number of issues around risk management and the definition of renewal vs maintenance that will need to be considered as part of the next periodic review.

Summary of 2016-17

2.22 HS1 Ltd has completed 4 schemes during 2016-17:

- Renewal of Stratford Box de-watering control system
- Renewal of RRV boom controls
- Replacement of HPSS Gear Boxes
- Renewal of the initial phase of Boundary Fencing

2.23 Work has also continued in developing/delivering other schemes initiated in 2015-16 including:

- UPS Replacements
- Drainage Sump Pump Replacements
- Medway River Headwall Repairs
- Wheel Impact Load Detector Installation
- Signalling POE Modifications (MCEM91)
- RCC & EMMIS Control System Replacement
- Data Transmission Network Renewal

2.24 This development work has led to the rationalisation of the scope of a number of these schemes based on a better understanding of asset condition or a re-evaluation of future requirements.

2.25 In addition, three schemes (previously identified in the 5YAMS) have been initiated for development/delivery:

- Equipment Room Air conditioning renewals
- Ventilation Control System Replacement
- Repairs to Bridge Viaduct Expansion Joints

Proposals for 2017-18

2.26 HS1 Ltd are continuing to develop and deliver the schemes identified within the 5YAMS with implementation due to start on two significant schemes associated with the replacement of the Signalling & Electrification control systems and replacement of the system wide Data Transmission Network. These renewals are critical to ensuring the long-term safety and reliability of the network and between them, they form around 45% of the anticipated renewal expenditure in the control period.

2.27 HS1 Ltd anticipates that all currently identified schemes for delivery within this control period will be launched into development in 2017/18 to ensure that the work can be developed and delivered in a timely manner within the control period.

2.28 As part of its ongoing asset management, HS1 Ltd have identified a number of schemes contained within the 5YAMS that can either be removed or the level of required intervention reduced based on improving asset knowledge or by developing revised maintenance practises to address the risks that the proposed renewal was designed to address. Changes include:

- Ballast exchange – review of asset condition has identified that only localised interventions are required, thus the scope has been reduced;
- MCEM91 Point Operating Equipment – Initial interventions have been targeted at the assets with high utilisation and further work will be undertaken to understand the extent of the reliability issues and how it could potentially impact on the assets with lower utilisation;
- Work on Choats Manor Bridge and the viaducts on the route can now be managed through a revised maintenance regime so the capital works have been de-scoped;
- Further phases of the Boundary Fencing renewal work is on hold pending re-evaluation; and
- Increased asset knowledge has reduced the scope required for the Stratford de-watering equipment.

2.29 However, improving asset knowledge has also identified additional work, not foreseen at the time that the 5YAMS was published, that may need to be added to the programme of work. The items that have been proposed to be added to the plan include:

- Renewal of lineside acoustic barriers due to unforeseen rapid deterioration; and
- Replacement of fibre optic signal heads due to deteriorating asset condition and obsolescence issues.

2.30 HS1 Ltd has also identified a number of emerging items that may need to be added to the renewals plan, however, they are still investigating these issues to determine the most appropriate intervention before making a formal proposal for their inclusion. The areas of emerging concern include:

- Condition of paintwork at 11 structures;
- Concrete spalling issues on the Medway and Thurrock viaducts; and
- Settlement issues with a bridge at Ebbsfleet station.

3. Finance and efficiency

Overview

In 2016-17 (the second year of the second control period (CP2)), HS1 Ltd generated regulated income of £68.1m, which was £1.5m higher than assumed in PR14, largely due to more billed train paths than we expected in PR14.

HS1 Ltd spent £67.4m operating, maintaining and renewing its rail infrastructure in the year, which was in line with what we assumed in PR14. This includes the following variances:

- £0.7m less than we assumed on insurance due to a renegotiation;
- £0.1m less on rates;
- £0.2m less on regulatory costs;
- £0.2m more on non-traction power;
- £0.3m more on staff costs; and
- £0.5m more on 'Other costs' (including overheads and recruitment expenditure).

Overall, HS1 Ltd's income exceeded expenditure by £0.6m, which represents £1.4m of financial outperformance relative to our determination.

HS1 Ltd overspent by £1.2m on the GSM-R capital upgrade in the year due to a different delivery timetable than assumed in our determination. On the same project, in the previous year, HS1 Ltd underspent by £3.2m for the same reason, and across the whole project the costs are in line with those assumed in our determination.

Our report in 2016-17 builds on improvements in the management information we receive from HS1 Ltd, facilitating our analysis of the costs HS1 Ltd and NR (HS) incur.

HS1 Ltd paid £11.9m into the route escrow account in 2016-17, and the total balance in the escrow account was £56.4m at 31 March 2017. HS1 Ltd improved its management of the escrow account, which has increased the return generated to 1.7% for 2015-16, an increase of 1.1 percentage points from the 0.6% achieved in 2015-16. In cash terms, the escrow account generated £900k interest income in 2015-16, an increase of £700k compared to 2015-16.

Financial overview[4]

Figure 10 – Financial overview

£m (2016-17 prices)

	Year ending 31/03/2017			Year ending 31/03/2016
	Actual	**PR14**	**Difference (b/(w))**	**Actual**
Income				
Pass through income	14.6	14.9	(0.3)	14.3
OMR charge	53.4	51.7	1.7	55.5
Additional performance income	0.1	0.0	0.1	2.1
Total income	**68.1**	**66.6**	**1.5**	**71.9**
Controlled track costs[5]				
HS1 Ltd	9.7	9.0	(0.7)	8.8
Network Rail (High Speed) Ltd	40.7	40.7	0.0	41.9
Network Rail Infrastructure Limited	1.3	1.7	0.4	2.2
Total controlled track costs	**51.7**	**51.4**	**(0.3)**	**52.9**
Pass through costs				
Power – non traction	1.5	1.3	(0.2)	1.3
Insurance	3.1	3.8	0.7	3.1
EdF Fees and Renewals	5.0	5.0	0.0	5.0
Rates	5.0	4.9	(0.1)	4.9
Total pass through costs	**14.6**	**14.9**	**0.3**	**14.3**
Freight costs				
Network Rail (High Speed) Ltd	0.3	0.3	0.0	0.3
Network Rail Infrastructure Limited	0.2	0.2	0.0	0.1
HS1 Ltd	0.1	0.1	0.0	0.1
Total freight costs	**0.6**	**0.6**	**0.0**	**0.6**
Opex-funded upgrades	**0.5**	**0.5**	**0.1**	**0.6**
Total OMRC costs	**67.4**	**67.4**	**0.0**	**68.4**
Performance related payments	**0.1**	**0.0**	**0.0**	**2.1**
Total costs	**67.5**	**67.4**	**0.0**	**70.4**
Net Income / (Expenditure)	**0.6**	**(0.8)**	**1.4**	**1.6**

[4] Note: This only includes information on HS1 Ltd's regulated income and excludes unregulated income and expenditure, such as income from the 'Investment Recovery Charge' (IRC), as well as income from commercial property.

[5] Note: some figures may not sum due to rounding.

Net income / (Expenditure)

3.1 In 2016-17, HS1 Ltd's income exceeded expenditure by £0.6m, but in our determination, we assumed HS1 Ltd's expenditure would exceed income by £0.8m. This financial outperformance of £1.4m is largely due to additional income (£1.7m) as a result of more billed train paths than we assumed in PR14.

Income

3.2 In 2016-17, HS1 Ltd recovered £14.6m of pass through income[6], compared to £14.9m assumed in our determination, a difference of £0.3m (2.0%). This reflects the lower pass through costs incurred in the year as explained below. In the year, HS1 also recovered £53.4m of income through charges for operating and maintaining the Network. This compared to the £51.7m assumed in PR14, and represents an increase compared to our assumption of £1.7m (3.3%). This is mainly due to more London & South Eastern billed train paths than we assumed in our determination for 2016-17 (3.8%), partly offset by fewer Eurostar International train paths (1.8% lower) and fewer freight train paths (45.1% lower) than we assumed[7].

3.3 HS1 Ltd also recovered £0.1m additional income from NR(HS) as part of a performance incentive mechanism. The additional income was subsequently paid on to operators as performance related payments and is analysed in the 'Performance related payments' section below.

Costs

3.4 HS1 Ltd's costs are split into those it, and its contractor NR(HS), incurs operating and maintaining track, pass through costs, freight-specific costs, performance related payments and the costs of upgrades.

Controlled track costs

3.5 Controlled track costs includes both HS1 Ltd's and NR(HS)'s costs. They include HS1 Ltd's own staff costs, and related back office costs and the cost of NR(HS) operating and maintaining track. In 2016-17, HS1 Ltd incurred £53.4m controlled track costs, compared to £51.7m assumed in our determination, a difference of £1.7m (3.3%).

3.6 As NR(HS) are responsible for the operations and maintenance of all track we have broken down in the following tables the actual costs that it has incurred. However, the

[6] HS1 Ltd's charges to train operators include an element relating to pass through costs HS1 Ltd incur running the railway that are largely uncontrollable by HS1 Ltd. These include non-traction electricity, electrical infrastructure costs, insurance and business rates. We review these costs in 'Pass through costs' on page 22.

[7] Although large in percentage terms (45.1%), the reduction in freight train paths is lower in absolute terms (361) than the increase in London South East Railway train paths (2,019).

financial overview presents separately the 'controlled track costs' and 'freight costs' incurred by NR(HS). Therefore, to reconcile the following tables back to the financial overview on page 19 requires summing up NR(HS) costs in both 'controlled track costs' (£40.7m) and 'freight costs' (£0.3m) in Figure 10. This gives a total of £41.0m, which is how much HS1 Ltd spent on NR(HS) costs in 2016-17 as shown below, in line with the fixed price contract agreed between HS1 Ltd and NR(HS).

Figure 11 - Network Rail (High Speed) costs 2016-17[8]

£m, 2016-17 prices	**Actual**	**PR14**	**Difference b/(w)**	**2015-16**
Staff costs	16.6	16.5	(0.1)	14.9
Agency costs	0.1	0.1	0.0	0.2
Consultancy costs	0.4	0.2	(0.2)	0.3
Corporate Functions & NRIL Services	5.0	4.6	(0.4)	5.2
Plant & Materials	4.2	5.3	1.1	4.6
Sub-Contractors	5.5	6.1	0.6	5.6
Research & Development	0.8	0.4	(0.4)	0.2
Overheads	2.2	3.0	0.8	3.3
Operating costs	35.0	36.2	1.2	34.2
Management Fee	2.9	2.9	0.0	2.9
Risk Premium	0.0	1.8	1.8	0.0
Outperformance	3.0	0.0	(3.0)	2.1
Total NR(HS) costs	**41.0**	**41.0**	**0.0**	**39.2**

3.7 Under HS1 Ltd and NR (HS)'s current contractual arrangement, NR(HS) reimburse HS1 Ltd for a portion of performance related payments, which are subsequently paid to operators. This complicates the presentation of HS1 Ltd's financial performance, as it reports both the additional income it receives from NR(HS), and the performance related payments it makes to operators, even though it is 'held harmless' to performance related payments at the current level. The £0.1m performance related payments paid by NR(HS) are included in NR(HS)'s calculation of outperformance.

3.8 In presenting these costs, we have followed conventional accounting practice, and have shown the gross amounts in both HS1 Ltd's income and expenditure. We have also not allocated NR(HS)'s £1.8m risk premium across individual line items, as it covers all components of the contract and the additional expenditure covered by the

[8] Note: some figures may not sum due to rounding.

risk premium has been included in the individual line items. This causes a large variance of £1.8m on the risk premium line.

3.9 Net of performance related payments, in 2016-17 NR(HS) reported £3.0m outperformance[9]. This outperformance is largely driven by plant and materials costs (£1.1m) due to lower amounts of materials used, and sub-contractor costs (£0.6m), as well as lower overheads due to deferring work and a different allocation of costs between NR(HS) and Network Rail Infrastructure Limited.

HS1 Ltd costs

Figure 12 – HS1 Ltd costs 2016-17

£m, 2016-17 prices	Actual	PR14	Difference b/(w)	2015-16
Staff costs	4.0	3.7	(0.3)	4.1
Technical support / Consultants	1.6	1.4	(0.2)	1.4
Office running costs	1.1	1.2	0.1	1.0
Regulatory costs and Safety levy	0.2	0.4	0.2	0.3
Other costs	2.9	2.4	(0.5)	2.6
Total HS1 Ltd Costs	**9.7**	**9.0**	**(0.7)**	**9.4**

3.10 HS1 Ltd own costs were £9.7m in 2016-17, compared to £9.0m in our determination, an increase of £0.7m (7.8%). This is mainly driven by HS1 Ltd incurring:

- additional staff costs of £0.3m as a result of increasing its engineering and project teams;
- higher consultancy costs of £0.2m from planning for the next control period than we assumed; and
- higher 'Other costs' of £0.5m, mostly incurred recruiting a Chief Executive Officer and interim executive costs.

This is partly offset by lower regulatory costs of £0.2m.

Pass through costs

3.11 Pass through costs in 2016-17 were £14.6m, £0.3m (2%) lower than the £14.9m we assumed in our determination. This is caused by lower insurance costs than we assumed, driven by a renegotiation with insurers.

[9] This outperformance is simply the difference between what NR(HS) spent and what we assumed they would spend in CP2. It is not ORR's or HS1 Ltd's assessment of financial performance.

Freight costs

3.12 Freight costs are the costs of freight specific infrastructure that HS1 Ltd is obliged to maintain and any business activities HS1 Ltd engages in relating to freight traffic.

3.13 In 2016-17, freight costs were £0.6m, which is in-line with our determination. This is because the costs of freight assets operated and maintained by HS1 Ltd are largely fixed costs that do not vary with the number of trains that run. So, even though the number of freight trains that ran on the HS1 network was 45% lower than ORR assumed this did not affect HS1 Ltd's freight costs.

Upgrades

3.14 In addition to the day-to-day operation of its rail network, HS1 Ltd also performs upgrades to ensure its network continues to meet the needs of customers.

3.15 HS1 Ltd spent £1.2m on capital[10] upgrades in 2016-17 for the GSM-R project, compared to £0.0m assumed in CP2. This overspend is due to a different delivery timetable than assumed in our determination and HS1 Ltd's total forecast project cost is still £7.3m, which is in line with ORR approvals.

3.16 In addition, HS1 Ltd also spent £0.5m on 'opex upgrades' for the GSM-R project, which are running costs associated with upgrades to the network infrastructure, which was in line with our determination.

Performance related payments

3.17 Performance related payments are payments made to train operators by HS1 Ltd to compensate operators for delays caused by HS1 Ltd or where HS1 Ltd takes unplanned possession of the network to undertake maintenance.

3.18 In 2016-17, performance related payments included £0.1m paid by HS1 Ltd to operators for delays, the majority were caused by a number of external events including trespass and objects on the overheads. This is offset by £0.1m received by HS1 Ltd from NR(HS) for the reimbursement of these costs.

Efficiency

3.19 HS1 Ltd does not currently report on efficiency. However, it is important that we understand how efficient HS1 Ltd is both to confirm how HS1 Ltd is performing compared to the efficiency challenge that we set it and to inform our next review of its charges.

[10] HS1 Ltd capitalise their costs when the expenditure creates an economic resource from which they expect to derive economic benefits.

3.20 In this report, we have calculated a very simple[11] measure of efficiency for 2016-17 for both NR(HS) and HS1 Ltd's own costs. In 2016-17, HS1 Ltd had negative[12] efficiency of 7.7% on its own costs[13] and NR(HS)'s efficiency was 4.3% on its own costs. HS1 Ltd have noted that the negative efficiency on its own costs relates to recruiting additional engineers which they think increases costs in the short-term but reduces them in the long-run.

3.21 Reflecting these complexities, we will continue to work with HS1 Ltd to develop its Cost Efficiency Plan in the coming year as it prepares for the next periodic review (PR19), and will develop the way we monitor efficiency accordingly.

Financial overview of HS1 Ltd's statutory financial statements

3.22 In addition to considering specific efficiency measures, we need to understand HS1 Ltd's broader financial position and understand its approach to risk. This section includes a description of the movements in HS1 Ltd's net assets, gearing and the debt service cover ratio for HS1 Ltd[14] based on recent credit rating agency reports on the bonds issued by the HS1 group.

3.23 As reported in its statutory accounts for 2016-17 HS1 Ltd reported an accounting loss of £78.9m. As discussed in the introduction, this loss is not directly comparable with the financial performance discussed above. This is because of a number of factors:

- statutory turnover in HS1 Ltd includes income received from the investment recovery charge as well as ancillary services;
- the costs of HS1 Ltd also include finance payments made by HS1 to external debt creditors and other companies in the group; and
- the statutory accounts include a charge for depreciation, which is not aligned to the renewals expenditure incurred by HS1 Ltd.

3.24 HS1 Ltd reported £185m earnings before interest, tax, depreciation and amortisation (EBITDA) for 2016-17.

3.25 As at 31 March 2017 HS1 Ltd's net liabilities were £172.6m, an increase of £94.4m since 31 March 2016, largely caused by the accounting loss HS1 Ltd reported in the

[11] In line with our approach to monitoring efficiency in Network Rail, our simple measure of efficiency expresses the variance between actual expenditure and the actual CP1 exit costs as a percentage of the assumption of the CP1 exit costs. In other words, if HS1 Ltd were to report actual costs of £80 against a CP1 exit cost of £100, the reported efficiency would be 100 – 80 = 20 / 100 = 20%.
[12] By negative efficiency we mean that the actual costs in 2016-17 were higher than the CP1 exit level.

[13] Our approach only includes those costs HS1 Ltd both controls and bears. This therefore excludes the impact of movements in pass through costs, as these costs are paid for by operators.

[14] Although HS1 Ltd operates the concession, High Speed Rail Finance 1 Plc and High Speed Rail Finance Plc are the subsidiaries of Helix Acquisition Limited (the immediate parent company of HS1 Limited) that raise debt in the group.

year. At 31 March 2017, HS1 Ltd's current assets were £45.4m, and current liabilities of £240m. Expressed as a percentage, HS1 Ltd's gearing[15] was 104% as HS1 Ltd has net liabilities on its balance sheet.

3.26 In analysing HS1 Ltd's financial position to understand the risks it is exposed to, we recognise that it is important to consider the position of the wider group of companies of which it is part. For example, debt for HS1 Ltd is raised at the group level by High Speed Rail Finance 1 Plc and High Speed Rail Finance Plc (subsidiaries of HS1's immediate parent company, Helix Acquisition Ltd). High Speed Rail Finance 1 Plc and High Speed Rail Finance Plc then provide finance to HS1 Ltd, which then pays finance charges.

3.27 Recent credit rating agency reports on High Speed Rail Finance 1 Plc, have confirmed its A-stable rating confirming it has an affordable and sustainable capital structure. The debt service cover ratio for 2016-17 was 2.1x (2.1 x in 2015-16). This means the group generated sufficient earnings to service its interest costs, which is a useful indicator of short-term debt affordability.

Route escrow account

3.28 As specified in the Concession Agreement, HS1 Ltd collects access charges from train operators and pays some of the money into the route escrow account each year to fund the renewal and replacement of the railway line in the future. This helps to protect intergenerational equity, and fulfils a similar function to the Regulated Asset Base (RAB) in Network Rail and other infrastructure providers.

3.29 The balance on the route escrow account at 31 March 2017 was £56.4m an increase of £11.0m from 31 March 2016. The main movements in the account were:

- HS1 Ltd paid £11.9m into the escrow account, compared to our determination assumption of £12.1m, a difference of £0.2m (1.7%). This is largely because of lower inflation[16] than we assumed in PR14, partially offset by additional train paths;
- it withdrew £1.8m in 2016-17 to fund the renewal of its rail network compared to the £1.0m we assumed in PR14 because of a different phasing of work to what we assumed in PR14; and

[15] In this report, we consider gearing as: $\frac{long\ term\ debt}{Long\ term\ debt + shareholder\ interest}$.

[16] Unlike in the rest of the report, where we report HS1 Ltd's financial performance in a consistent price base to our determination, for the escrow account we report the value of the escrow account, and our assumptions, on a simple cash basis. This means we do not update our PR14 assumption for the fact outturn (i.e 'actual') inflation differed from our assumptions at the publication date in May 2014.

- it earned £0.9m interest, compared to £0.8m assumed in PR14, because the average interest rate on the escrow account was 1.7%, compared to the 1.1% assumed in PR14.

3.30 The average interest rate on funds in the escrow account improved from 0.7% in 2015-16 to 1.7% in 2016-17. This is because of changes to the governance arrangements of the escrow account in the year, which now allows HS1 Ltd to invest in longer-term investments.

4. The 2019 Periodic Review of HS1 (PR19)

Overview

Under regulation 15 of The Railways (Access, Management and Licensing of Railway Undertakings) Regulations 2016, we have to ensure that HS1 Ltd is provided with incentives to reduce the cost of allowing access to its infrastructure and level of access charges. We perform this function through periodic reviews in the manner as set out in the Concession Agreement between the Secretary of State and HS1 Ltd.

The next periodic review will be the 2019 Periodic Review of HS1 (PR19) and will set track access charges for HS1's third control period (CP3) between 1 April 2020 and 31 March 2025.

Concession Agreement

4.1 Building on lessons learnt from the first periodic review of HS1 (PR14), DfT and HS1 Ltd, with our input, recently proposed changes to the Concession Agreement in order to improve the process of future periodic reviews. HS1 Ltd consulted stakeholders on these changes in March and April 2017, and the changes to the Concession Agreement are expected to be made in July 2017.

4.2 The changes made mean that, by replacing a lengthy iterative process at the end of the periodic review with the possibility for ORR to make a final determination, we have both allowed more time for us to review HS1 Ltd's submissions and allowed for the review to take place nearer the start of the next control period.

Our Approach to PR19

4.3 Under the process set out by the Concession Agreement, we have to begin our consultation on our proposed approach to the next periodic review by the end of September 2017, and publish our Periodic Review Process Document, setting out the timescale, process and approach for the conduct of the next periodic review by the end of January 2018.

4.4 We have already been discussing our proposed approach with HS1 Ltd, and presented our ideas with the industry at an HS1 stakeholder workshop in June 2017.

5. Safety

Overview

Under the Railways and Other Guided Transport Systems (Safety) Regulations 2006, the infrastructure manager, NR(HS), has duties to establish and maintain a safety management system as set out in the Regulations. NR(HS) was issued with a safety authorisation in accordance with the Regulations in October 2009, which was renewed in March 2012 for a period of five years.

Safety activities during 2016-17

5.1 During 2016-17 we carried out the following supervision activities;

- NR(HS) applied for a renewal of its safety authorisation in Autumn 2016. ORR carried out the assessment process and the renewed safety authorisation was issued in January 2017, within ORR's timescales for issuing safety certificates and authorisations;
- Babcock Rail applied for a renewal of its safety certificate to operate on HS1. ORR carried out the assessment process and the renewed safety certificate was issued in March 2017, within ORR's timescales for issuing safety certificates and authorisations;
- ORR worked with NR(HS) and HS1 Ltd railway undertakings to issue a number of exemptions from the Railway Safety Regulations 1999 during Summer 2016, relating to low speed movements of rolling stock not fitted with HS1-compatible train protection systems in the St Pancras station area;
- ORR has held routine liaison meetings with NR(HS) Head of Safety throughout the year; and
- The ORR Inspector for HS1 has also attended quarterly HS1 Ltd - ORR liaison meetings to discuss safety performance with HS1 Ltd's Head of Safety.

5.2 We have encouraged HS1 Ltd and NR(HS) to adopt the ORR risk management maturity model (RM3) as a tool to improve the capability of health and safety management on the HS1 network. ORR notes NR (HS)'s work to adopt RM3. Further information on RM3 can be found on the ORR website.

5.3 Further information on health and safety performance on all of Britain's railways in 2016-17 can be found in ORR's health and safety annual report for 2016-17 and on the mainline railway (which includes the HS1 network) can be found in the Rail Safety and Standards Board (RSSB) Annual Safety Performance Report 2016-17.

5.4 Further information on our approach to regulating health and safety risks created and managed by businesses in the railway industry can be found in our strategic risk priorities document.

Proposed health and safety regulation activities for 2017-18

5.5 The following health and safety regulation activities are proposed for 2017-18:

- An inspection of NR(HS)'s arrangements for the inspection and monitoring of track condition, to be carried out with the support of ORR's specialist track inspection team. This work was carried over from 2016-17;
- The consideration of a further application for an exemption from the Railway Safety Regulations, relating to low speed movements of rolling stock not fitted with HS1-compatible train protection systems;
- Regular liaison meetings with NR(HS) throughout the year; and
- The investigation of incidents in accordance with ORR's processes.