Assessment of the train performance trajectories in Network Rail's Route Strategic Plans for PR18

Mandate L4AR004: Phase 1 report

18 June 2018

[Issue for publication]

Prepared jointly with Winder Phillips Associates

ARUP

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1. Purpose of the Mandate and Arup Approach

Purpose of Mandate

To advise on

- level of NR assurance to performance trajectories
- whether performance targets are appropriate

Scope

What?	Detail	Level	Pax/freight
Comparable Route Measure (Network Rail caused delay minutes plus TOC on TOC delay minutes)*	Network Rail's proposed performance trajectory and assessment of the floor	Route	Passenger
Freight targets (FDM, FDM-R)	Network Rail's proposed performance trajectory and assessment of the floor	Route, FNPO	Freight
NR/Customer agreed 'top level' measures (various) – in particular where these are not agreed between Network Rail and its TOC customers	Network Rail's proposed performance trajectories	Route, FNPO	Passenger & freight
Cancellations	Do scorecards or Network Rail's plans provide sufficient protections against excessive cancellations	Route, FNPO	Passenger & freight
Scotland	Does Network Rail's proposal meet the HLOS targets	Network Rail Route	Passenger & freight
Network Rail's assurance process	How has Network Rail? Is the output from this process robust?	Network Rail	Passenger and freight

This report

This report describes our findings from Phase 1 of the study, namely to gain early familiarisation of Route Strategic Plans (RSPs) and assess NR internal assurance. Please refer to the Phase 2 report *(Assessment of train performance trajectories in Network Rail's Route Strategic Plans for PR18)* for our main assessment, conclusions and recommendations.

Approach to Phase 1

We have reviewed the December versions of the RSPs alongside the assurance reports produced by the National Performance Team. We have also held the following meetings. Note that we have not had time to assimilate findings from 31 Jan meetings in this report.

Date	Purpose
15 Jan	To understand ORR views of performance plans
25 Jan	To understand NR assurance by Business Review Team & National Performance Team
26 Jan	To understand planning & assurance in Wales
31 Jan	To understand planning & assurance in LNW
31 Jan	To understand planning & assurance in LSE

2. Summary of Phase 1 - Overview of Measures in Long-term scorecards

	FNPO	Anglia	LNE & Midlands	LNW	Scotland	South East	Western	Wessex	Wales
Freight Delivery Metric	FDM - National	Freight Delivery Metric (FDM)	Freight Delivery Metric (FDM-R)	FDM-R	FDM	FDM	FDM-R	FDM	FDM-R
Right Time Metrics	Right time departures (freight)				Right Time Departures				
	Caledonian Sleeper - Right time	Right Time Arrival	On Time at all recorded stations	Caledonian Sleeper Right Time Arrivals	Caledonian Sleeper Right Time Arrivals	Right Time MAA (final destination only)	Punctuality at all recorded stops [GWR]	Right-time arrivals at Reading [Cross Country]	GWR Right Time Departures leaving Wales Route at Severn Tunnel Junction
				On-Time Moving Annual Average			Right-time at destination [HEX]		
							Right-time departure at Bristol Parkway [Cross Country]		
Passenger Lateness			Average Passenger Lateness				Average passenger lateness		Average Passenger Lateness
Public Performance Measure (PPM)	PPM (Cross Country)	Public Performance Measure (PPM)	PPM MAA	PPM Moving Annual Average	PPM		PPM [GWR]	PPM	PPM
	Charter Trains - PPM							GWR - Amalgamated PPM on North Downs and Portsmouth Cardiff Route	
Cancellations	CaSL (Cross Country)	Cancelled and Significantly Late (CaSL)	Level of Cancellations		Cancellations	NR contribution to CaSL MAA	Level of cancellations	CaSL	
Delay Metrics	FOC on TOC delay (Delay Minutes/100 train km)		NR caused Delay Minutes by the route	Infrastructure Delay (Track & Non-Track Assets)	DPI Reduction	Delay minutes affecting TOC (NR caused, TOC on TOC & FOC on TOC not including TOC on self)	NR caused delay minutes		
Network Performance			Network performance - passenger	Network performance: Passenger			Network performance: Passenger		Network performance - passenger
Other				T3 Moving Annual Average (Euston-Watford Service Group)	%age improvmt in average minute per mile travelled [Abellio ScotRail]				

2. Summary of Phase 1 Findings (1)

Historic Performance

- 5 ‘common’ performance metrics reviewed (FDM, Cancellations, PPM, On Time, APL) as shown in the following slides.
- In general, CP6 trajectory start points (and end CP5 forecasts) look sensible compared to recent performance
- The “Consistent Route Measure – Performance” (CRM-P) is excluded from this phase
- As agreed with NR and ORR, we have also not focused on other metrics which are included in specific individual Route plans

Overview of Plans

- The draft plans currently contain little analysis or data
- The linkages between elements such as asset plans and performance outputs are limited – an overview of delays caused by asset type would help
- There is little historical performance context to most of the plans
- Risk is not quantified in most plans
- Use of waterfall charts would have assisted (we understand that this will be included in the next issue)

Target Setting

- CP6 targets are generally based on the CP5 outturn forecast
- Trajectories are generally flat (or show only very modest change), which we propose to investigate in more detail in Phase 2
- Major mismatch with DfT and TfL Franchise/Concession target setting process
- Plan narrative often does not align with new scorecard targets – they usually use PPM only.
- Evident from Route teleconferences that modelling has been done, but this has not been shared with us to date as RSP format does not require it
- Also evident that very different modelling approaches have been undertaken by the Routes.
- It is unclear how some targets have been set:
  - Definition of central target varies (e.g. changed from P50 to P80 in LSE)
  - Definition and treatment of Above and Below target threshold appear to differ between Routes

2. Summary of Phase 1 Findings (2)

Assurance

- The BRT checks have focused much wider than performance, looking at the plans in the round
- NPT checks described as qualitative rather than quantitative – no detailed challenge of numbers
- Route checks are varied with some being more about the process rather than independent scrutiny or challenge by independent party
- Of the 3 Routes reviewed, only LSE appears to have carried out structured assurance
- Should there be internal independent scrutiny of forecasts?

Situational Analysis

- Only FNPO, Wessex & LNW contain any historical analysis
- Good plans should contain or reference to a quality review of historical delivery
- Seeing how the plans link to this would assist ORR in understanding if the RSP will underpin the targets
- It will also support applications for additional funding by demonstrating gaps (Appendix D schemes)

Risk

- Risk is discussed in all plans, but given greater emphasis in some (e.g. Western)
- Particular focus on risks from projects and new rolling stock
- Not clear that the benefits of these schemes are included in all RSPs (Business Case may not be reflected)

Operator Agreement

- Only Scotrail has a signed agreement to targets
- State of discussions unclear
- Little linkage with TOC plans seen to date
- Impact on non lead TOCs not clear e.g. GTR impact on LNE/EM in the SE plan

Cancellations

- Very little mention in plans
- Don’t appear to take benefits from TOC fleet plans
- Cannot verify that they will be balanced against other measures

2. Summary of Phase 1 Findings (3)

Colour code for confidence rating
Reasonably high confidence
Some confidence
Low confidence
Reasonably high confidence gap
Insufficient information provided

FDM

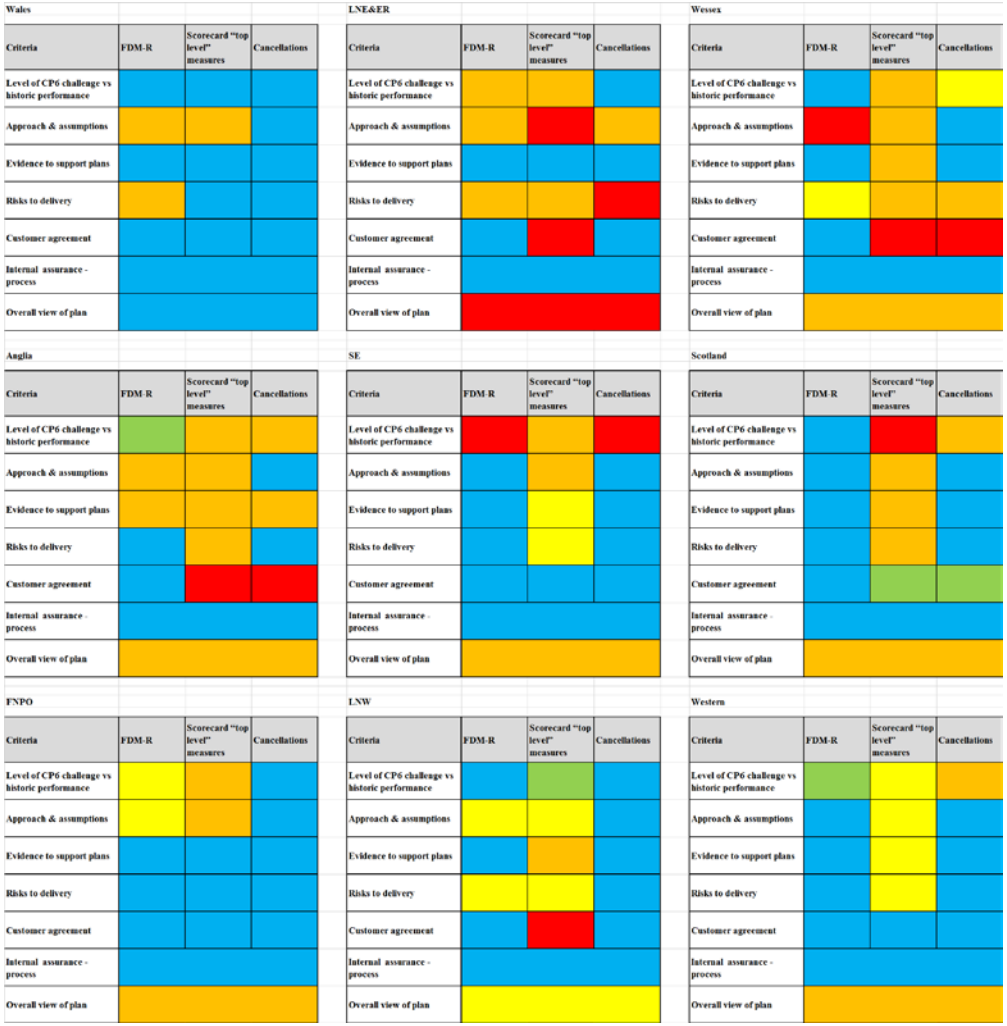
- FNPO plan does highlight historical causes of poor performance
- Target is flat through CP6 at similar levels to now
- Linkage to geographic Route plans is not clear
- Build up of actions to deliver target is not shown

Lessons mentioned by the Routes

- Clearer remit – metrics, report templates, tools
- Better management from the centre of TOC expectations of performance targets
- Additional analyst to make the modelling more granular (service groups / line of route)

Preliminary views of RSPs

Based on reading the plans only



3. Phase 2 – for discussion

Discussion on approach

It is clear that the Routes have adopted different approaches to developing their performance plans, also that the level of assurance carried out to date by the Routes is varied and by the Centre is qualitative rather than quantitative.

A key question is whether independent assurance should be carried out? And how best that should dovetail current ORR assurance.

A risk based approach is mentioned in the mandate. Part of this is the level of customer agreement, on which we are unsighted.

One approach is for the Arup team to carry out a deep dive assurance review of Wales, LNW and LSE for which we already have a better understanding. Based on findings, we can then decide if we should look at further Routes.

It may too be worth reviewing FNPO (to assess FDM-R) and Scotland (given HLOS requirement). There is also the question of whether we should review at a high level the System Operator RSP for consistency, given plans to improve timetabling.

Data required

- Performance models including inputs
- CRM-P calculations
- Any documentation of models, back-cast checks of model predictions vs historic performance, model forecasts for CP6 +, sensitivity tests, record of assumptions
- Any assurance documentation produced by / for the Routes; also any updated assurance from BRT and NPT
- Risk register held at Route
- Meetings with Route performance team and selected RAMs

What?	Detail	Level	Pax/freight
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Network Rail's assurance process	How has Network Rail? Is the output from this process robust?	Network Rail	Passenger and freight

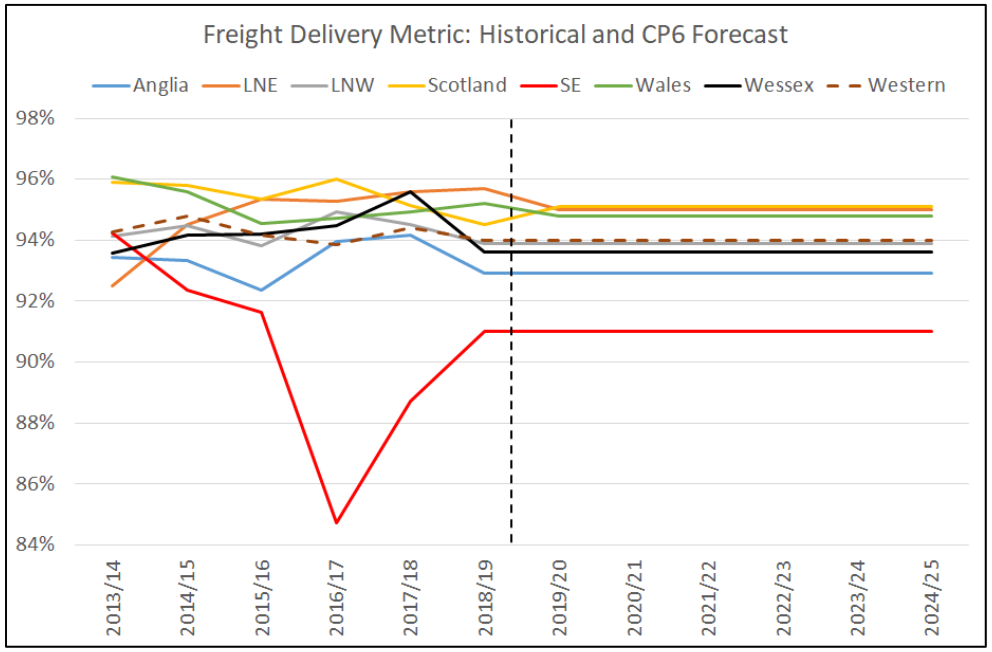
3. Phase 2 – for discussion

Menu of possible options

No.	Option	Notes
1	Review changes in Feb versions of all RSPs, update our findings	Doing so on its own will be insufficient to answer questions in the mandate
2	Deep dive on LNW, Wales, LSE, FNPO, Scotland to answer mandate questions	This sample covers a broad spectrum of approaches; can decide to expand to other routes after these reviews (~4 weeks) but if decide to do so then March reporting might be jeopardised (unless book all meetings now)
3	Deep dive on all routes to answer mandate questions	More time to set up meetings efficiently
4	Review System Operator RSP	To check for consistency with route assumptions
5	Carry out independent assurance of performance models	Should avoid repeating ORR reviews
6	Consider if investment options for performance represent good value	How will ORR consider and compare between routes?
7	CRM-P – review calculations	Possibly start with a sample and expand to all routes if deemed necessary
8	Assessment of performance floors	Are Network Rail or ORR proposing these?

4. Historical Performance – Freight Delivery Metric

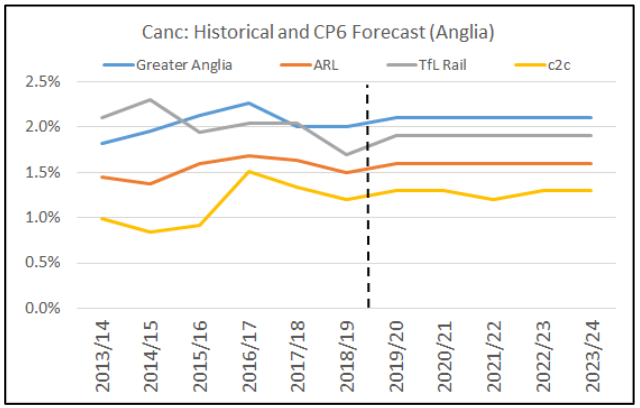
Comparison between routes



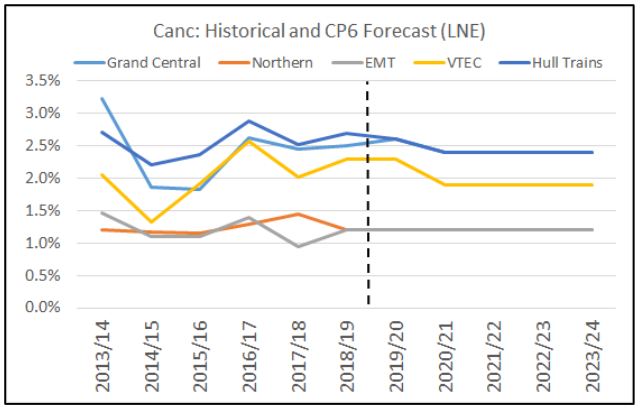
- CP6 forecasts generally reflect the end CP5 forecast, which appear sensible for most routes given current levels for this metric
- Wessex forecast (including end CP5) looks relatively pessimistic given recent performance (93.6% versus current MAA of 95.6%), which may reflect expected increase in traffic levels?
- For South Eastern, the CP6 forecast is based on FDM returning to pre-2015 levels by the end of CP5 – the MAA is still current ~2.5 percentage points below this
- The forecast FDM CP6 trajectory for "Scotland" in the FNPO plan (94.0%) does not match the FDM CP6 forecast in the Scotland plan (95.1%).
- The Scotland HLOS (July 2017) states the route should "*achieve an FDM of a minimum of 93% at the start of CP6 moving through staged improvements towards 94.5% at the end of CP6*", therefore the targets in the Scotland plan currently exceed the HLOS targets.

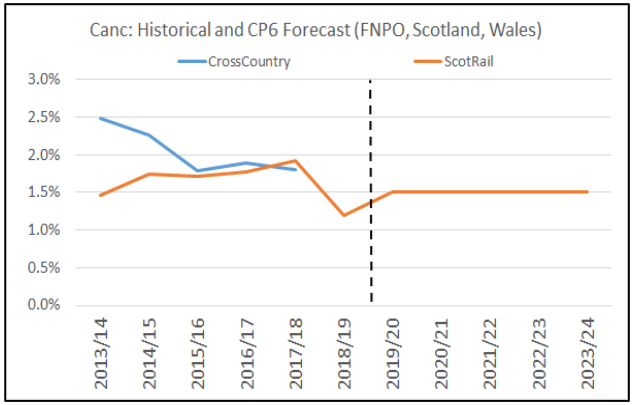
4. Historical Performance – Cancellations

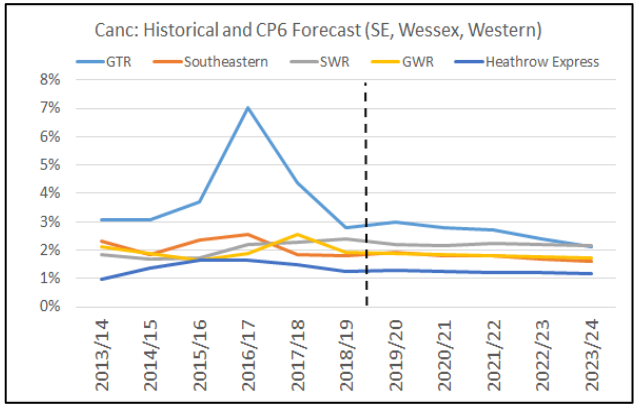
Comparison between routes



- Cancellation forecasts are not included in the LNW and Wales plans. Forecasts for CrossCountry in the FNPO plan are still “tbc”
- CP6 Year 1 targets all appear to be broadly in line with historical performance, with a couple of notable exceptions:
  - The target for GTR appears challenging compared to performance over the past 5 years. We assume this is to reflect the expected improvement once the Thameslink works are completed
  - The ScotRail CP5 outturn forecast (and CP6) requires notable improvement from today’s performance, and we note the CP6 forecast target is slightly lower than the target set by TS in ScotRail’s Franchise Agreement (1.6%)

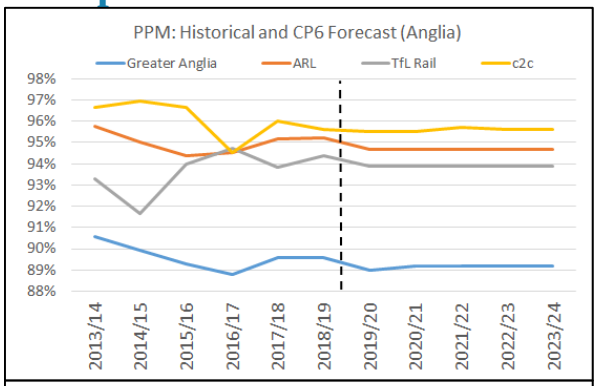


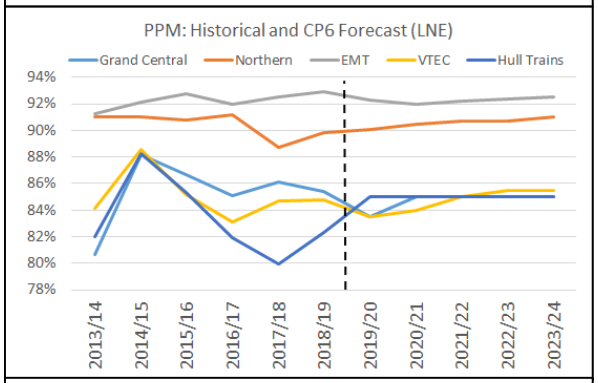


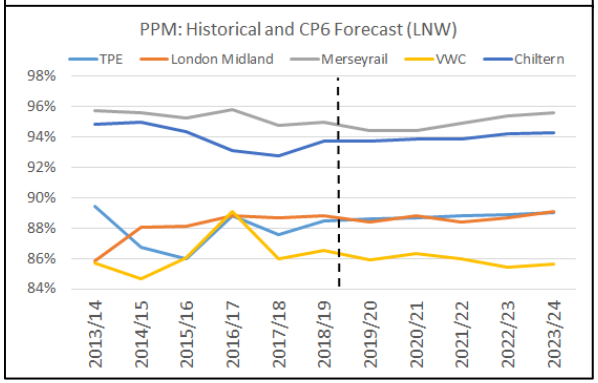


4. Historical Performance – NR/Customer Agreed Metrics: PPM

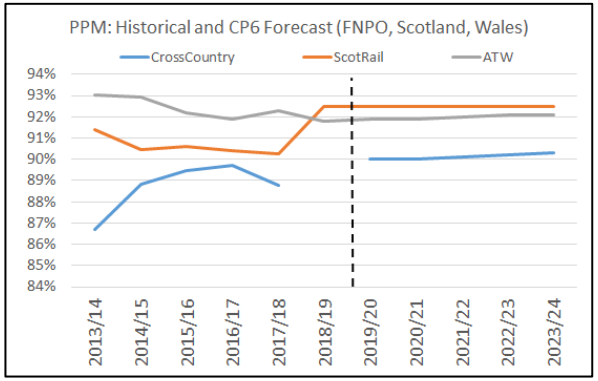
Comparison between routes

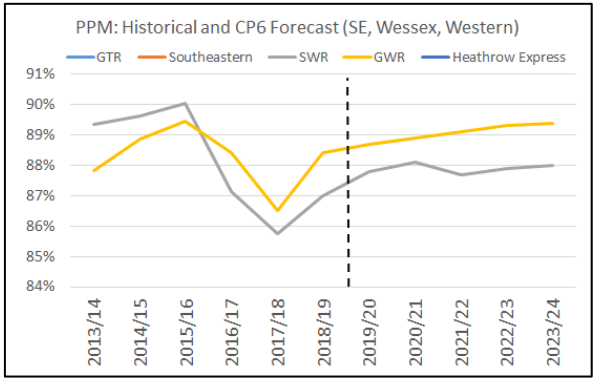






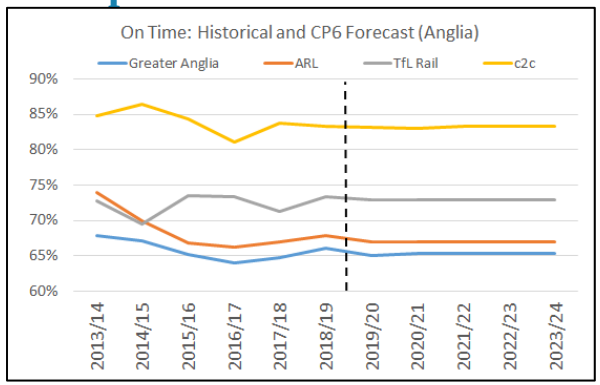
- PPM forecasts are not included in South Eastern route's plans (SE, GTR), nor for Heathrow Express
- The ScotRail forecast looks challenging given current performance levels, but is a reflection of Transport Scotland's HLOS target of 92.5% (and as specified in ScotRail's Franchise Agreement)
- The CP5 outturn forecast for SWR, GWR and Hull Trains looks challenging given current (declining) performance levels. If notable improvement is not achieved in the next year, this will put the early years of CP6 at risk
- Note, no PPM CP5 outturn forecast provided for CrossCountry in the FNPO plan

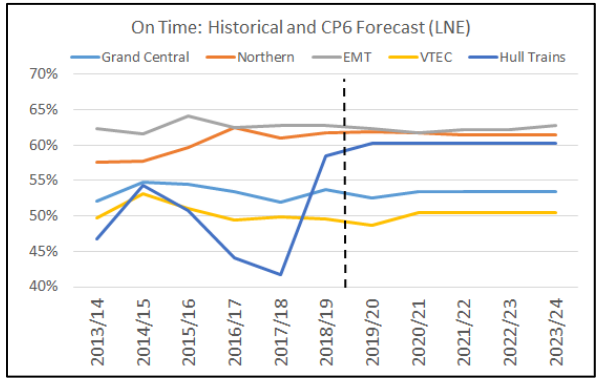


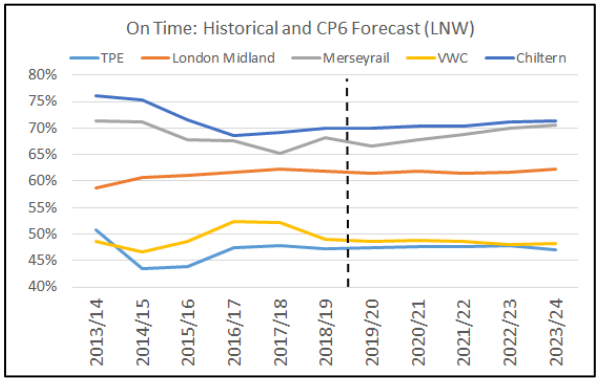


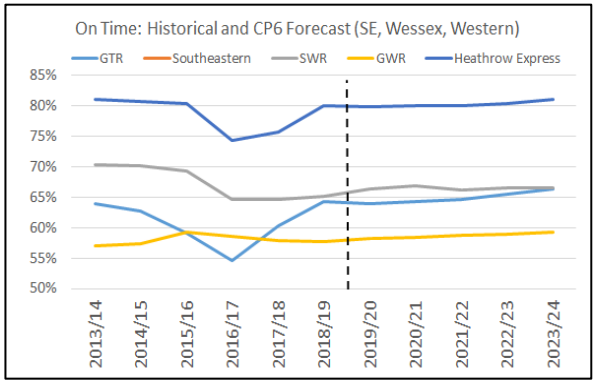
4. Historical Performance – NR/Customer Agreed Metrics: On Time

Comparison between routes





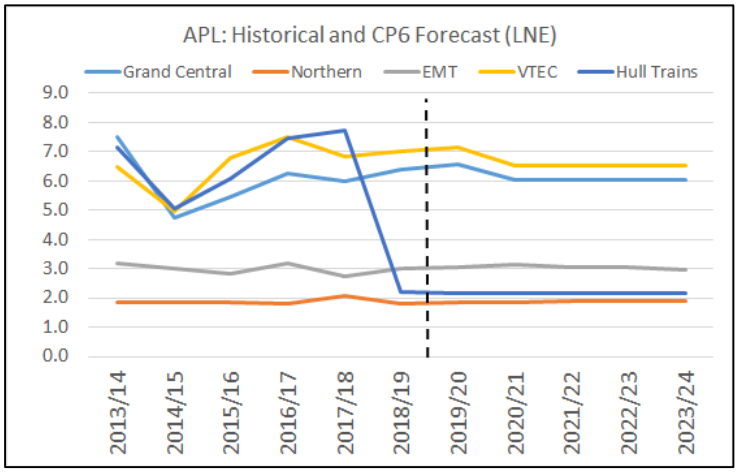




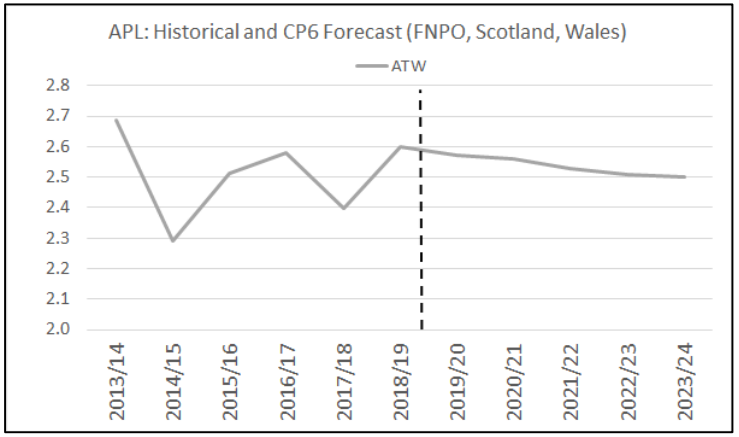
- On Time forecasts (based on proportion of trains arriving at each recorded station on time) are not included in the Scotland or Wales route plans, nor for the Southeastern TOC. Forecasts for CrossCountry in the FNPO plan are still "tbc"
- In each case, the CP6 trajectory is reflective of the CP5 outturn forecast. For most TOCs, the outturn forecast for CP5 appears sensible given recent performance levels
- One notable exception is Hull Trains where the average for last 5 years is 47%, while the end-CP5 target is 58.4% and the CP6 target is 60.3%
- As with cancellations, the GTR forecast is based on the On Time measure returning to the levels experienced pre-2015 by the end of CP5

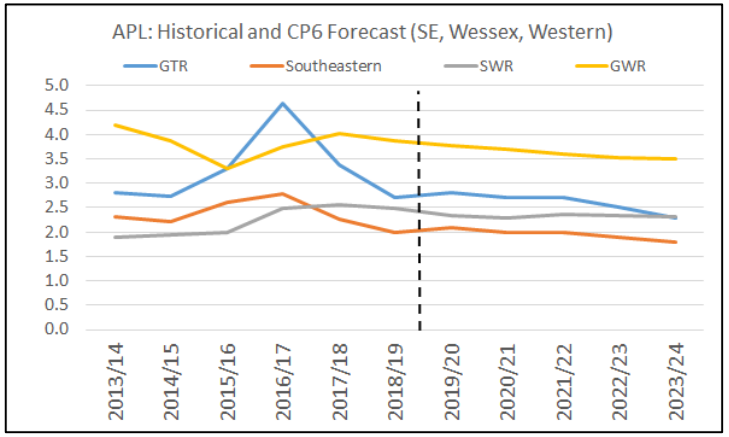
4. Historical Performance – NR/Customer Agreed Metrics: APL

Comparison between routes



- Average Passenger Lateness (APL) forecasts are not included in the Anglia, FNPO, LNW and Scotland plans
- Most CP6 targets look broadly in line with historical performance
- The notable exception is Hull Trains where we would suggest the CP5 outturn forecast (and subsequent CP6 figures) included in the draft plan are incorrect





Appendix A - Assessment of Route Strategic Plans

A.1	London North Eastern & East Midlands
A.2	Wessex
A.3	Wales
A.4	London North Western
A.5	Anglia
A.6	South East
A.7	Scotland
A.8	Western
A.9	Freight & National Passenger Operators

A.1 London North Eastern & East Midlands

Colour code for confidence rating
Reasonably high confidence
Some confidence
Low confidence
Reasonably high confidence gap
Insufficient information provided

Overview of findings by Route

Approach and assumptions

Freight actions are high level / supportive / exploratory. Confusion over FDM-R target (95.7% in App H or 95.0% in Scorecard?).

Approach is to accommodate +15% traffic growth with marginal performance improvements; also to improve VTEC PPM + 2% but not evident in targets.

Unclear benefits and assumptions of Digital Railway on Kings Cross – Peterborough & Moorgate Line.

Evidence to support plans

The only analysis of performance is provided for the Supplemental Plan, with 4 packages of investment options delivering performance benefits.

Risks to delivery

A key risk is the lack of timetables for increased traffic for GTR, Northern, VTEC, TPE, open access operators.

Condition of some assets will deteriorate – unclear what impact they will have.

The Route's plan to analyse GPS data to remove timetable allowances might adversely impact performance. Similarly, their plan to terminate short late trains could adversely impact cancellations.

Internal assurance

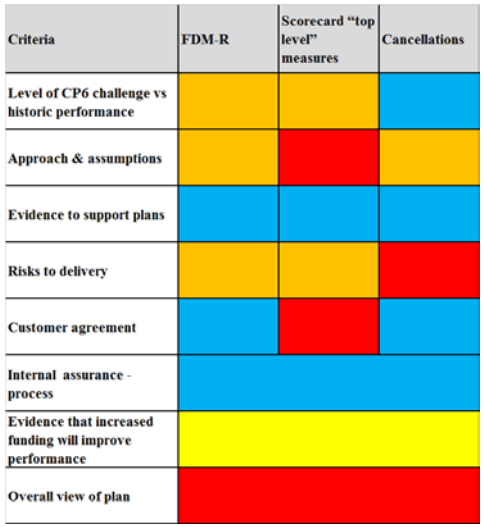
Only seen NPT assurance, graded as 3 out of 5

Level of customer agreement

Unclear, but targets don't match franchise commitments

Overall view of plan

There is some confusion over the performance aims and targets, as well as the impact of Digital Railways. The only performance analysis is provided for the Supplemental Plan, making it difficult to judge if the base plan is reasonable. The plans to reduce timetable allowances and terminate short late trains might adversely impact performance metrics.



A.2 Wessex

Colour code for confidence rating
Reasonably high confidence
Some confidence
Low confidence
Reasonably high confidence gap
Insufficient information provided

Overview of findings by Route

Approach and assumptions

Reduce Service Affecting Failures, focus on Waterloo & Portsmouth line; improve operational recovery capability with TOC; new technology for predict & prevent maintenance; isolated traffic management assuming Digital Railway is funded (Feltham).

Unclear if targets include optional funding. Some inconsistent targets eg FDM-R; others are missing

Evidence to support plans

Analysis of final 2 years of CP5 performance. A waterfall chart shows impact of CP6 performance initiatives but unclear if this is consistent with earlier table. Largest impact is passenger growth (-4.5% on PPM) without explanation. There is no evidence on FDM-R or cancellations. There is no specific analysis of capacity bottlenecks vs growth.

Risks to delivery

Asset condition will deteriorate mitigated by more targeted maintenance, but could result in more failures and TSRs. Additional trains in Dec 18 and Dec 20 could increase reactionary delays. SWR plan to reduce some dwell times (which could explain the -4.5% above). Wessex assessment of risk is “on boundary of risk appetite”.

Internal assurance

Only seen NPT assurance, graded as 2 out of 5

Level of customer agreement

Falls short of SWR franchise commitment

Overall view of plan

With available funding, asset condition will generally deteriorate but with more targeted maintenance. Analysis of impact on performance is presented giving some confidence in targets. However, they are not agreed with SWR and make more conservative assumptions. Some inconsistencies noted on targets.

A.3 Wales

Colour code for confidence rating
Reasonably high confidence
Some confidence
Low confidence
Reasonably high confidence gap
Insufficient information provided

Overview of findings by Route

Approach and assumptions

Managing performance risk by targeting critical assets (e.g. off track), improving incident response, predict and prevent maintenance, but some asset condition will slightly deteriorate. Improvements will be Port Talbot re-signalling, fewer level crossing failures & installing reliable axle counters. A new TM system will be installed and tested in CP5, but no performance benefit assumed for CP6.

Evidence to support plans

The plan states that "Trajectories are based on detailed modelling and are driven by initiatives associated with signalling, remote condition monitoring, operations that includes incident response and Operator improvement." No output from this modelling is presented.

Risks to delivery

There is little detail provided. Main risks mentioned are additional train service aspirations and interaction with Core Valleys Lines and insufficient renewal funding.

Level of customer agreement

No detail provided, although it is noted that the forthcoming Wales & Borders franchise change makes this difficult.

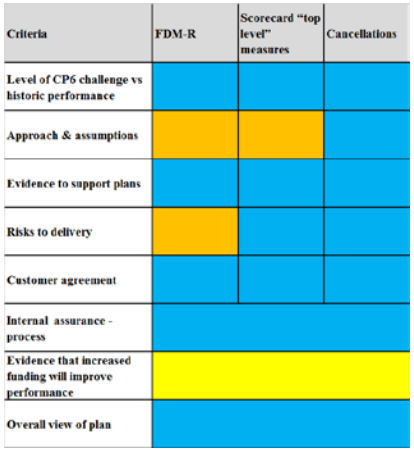
Internal assurance

Only seen NPT assurance, graded as 4 out of 5

Overall view of plan

It is difficult to judge without more analysis of forecast traffic, capacity bottlenecks, drivers of performance and the extent of the modelling undertaken. The main aim of the plan appears to be to maintain performance at broadly current levels by targeting renewals on critical assets. However, it is noted that the condition of some assets will deteriorate (slightly) throughout the Control Period which is a concern for the longer term.

Note that following discussions with the Route, there appears to have been detailed modelling and scenario testing, with extensive engagement with TfW but no sig-off. We have not reviewed these but note a key assumption is zero TOC traffic growth (+15% in 'worse than' targets).



A.4 LNW

Colour code for confidence rating
Reasonably high confidence
Some confidence
Low confidence
Reasonably high confidence gap
Insufficient information provided

Overview of findings by Route

Approach and assumptions

The challenge is to accommodate traffic growth, new fleets & major timetable changes, facilitate HS2 works, and improve performance.

Approach is to improve timetable techniques, response to disruption, and becoming the innovation hub.

The tone is upbeat with risk mitigations and looking for opportunities.

Evidence to support plans

PPM trend graphs with commentary covering CP5 and CP6 are provided for each TOC.

There is no line of sight from asset plans, nor analysis of traffic growth / capacity bottlenecks.

Risks to delivery

A good list is provided showing timing and impact on each TOC.

It is unclear if the Marylebone “golden 5 mile” renewal plan is included in the base plan.

More analysis of HS2 works would help.

Internal assurance

Only seen NPT assurance, graded as 4 out of 5

Level of customer agreement

None of the joint performance activities are signed off.

Franchise commitments will not be met for some TOCs.

Overall view of plan

A clear and focussed plan that appears to be realistic. Some performance analysis, increased line of sight to asset plans would help. A key concern is customer agreement, key omission is cancellations.

A welcome locally focussed description of freight plans rather than the more generic plans from FNPO.

Criteria	FDM-R	Scorecard “top level” measures	Cancellations
Level of CP6 challenge vs historic performance			
Approach & assumptions			
Evidence to support plans			
Risks to delivery			
Customer agreement			
Internal assurance - process			
Evidence that increased funding will improve performance			
Overall view of plan			

A.5 Anglia

Colour code for confidence rating
Reasonably high confidence
Some confidence
Low confidence
Reasonably high confidence gap
Insufficient information provided

Overview of findings by Route

Approach and assumptions

The plan has a base position delivered within the proposed settlement and a proposal for an additional £178m spend on Digital Rail systems to provide additional capacity and performance improvements. There is a clear statement that the current funded position does not deliver TOC performance targets but no modelled calculations are provided to support this.

Evidence to support plans

The plans for infrastructure and operating are described but there is no explicit data breakdown that shows the impact of each of these will have on performance through CP6 based on an assumed CP5 exit.

Risks to delivery

Significant focus on the risk from increased services, passenger growth and new fleets. These are seen as increasing DPI and increased station delays. New fleets likely to have implementation risks. However no quantification is provided to understand the scale of the risks against the measures.

Level of customer agreement

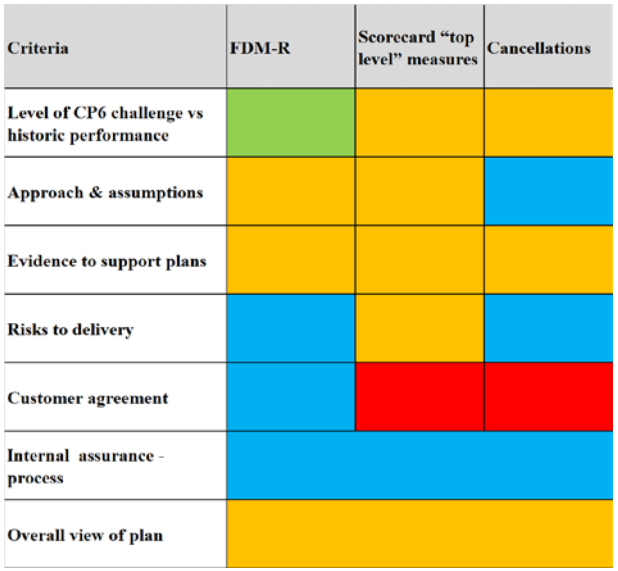
All customers clearly state they do not agree with the current targets

Internal assurance

No evidence of local review. NPT grade at 2 out of 5

Overall view of plan

The plan has little numerical support to how numbers have been generated and the way that activities will contribute to the forecasts in the scorecards. The statement that funding will not deliver customer aspirations is not supported by any analysis and it is difficult to understand how they will get TOCs to sign up to targets given the current gap. The RSP makes a case for an additional Digital Rail fund but does not set out what performance impact this will have on performance targets. There is very little focus on cancellations. It is not clear how FDM has been calculated with the FNPO plan.



A.6 South East

Colour code for confidence rating
Reasonably high confidence
Some confidence
Low confidence
Reasonably high confidence gap
Insufficient information provided

Overview of findings by Route

Approach and assumptions

The targets are described as being within the constrained plan. Most of the discussion within the plan is around PPM impact but this doesn't figure in the scorecard so there is no direct analysis which sets out how the scorecard has been derived. No historical analysis of performance failures are described to support. There is no explicit analysis of off route GTR performance. It does state that the projections are based on detailed modelling but this hasn't been shared.

Evidence to support plans

Within appendix A, a breakdown of projected delay minute savings is provided although not actually broken down by operator. As no cause data of current performance is provided it is difficult to verify that the right issues are being tackled. No explicit risk impact in delay minutes discussed.

Risks to delivery

A good discussion on key risk areas such as Thameslink and passenger growth. No mention of SE franchise change and the potential impact of new trains or timetable changes (positive or negative). No impact on PPM provided for the discussed risks.

Internal assurance

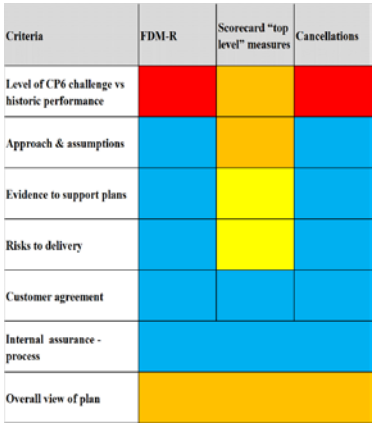
No evidence of local review. NPT grade at 4 out of 5

Level of customer agreement

No evidence provided

Overall view of plan

The narrative through the plan is consistent and strongly argued - in essence that the constrained plan will deliver a small improvement to current performance but at the cost of long term sustainability and will see performance suffer badly in CP7. The plan includes a bid for an extra £166m for performance improvements that will deliver a 2% PPM improvement by the end of CP6. However there is a lack of data to support this setting out how this will challenge the base causes of poor performance. Little evidence of any TOC improvements are included and there is no mention of the impact of South Eastern refranchising.



A.7 Scotland

Colour code for confidence rating
Reasonably high confidence
Some confidence
Low confidence
Reasonably high confidence gap
Insufficient information provided

Overview of findings by Route

Approach and assumptions

The Scotrail target is the primary focus of the plan. The activity prioritisation sets out actions but no quantification sets out how they will be achieved against historical performance. The actions in Appendix A are very high level and give little detail.

Evidence to support plans

Within the prioritised list a series of actions are set out that are linked to other areas in the RSP, for example weather resilience. In the main these look sound but no analytical support to demonstrate that the current key causes are being addressed.

Risks to delivery

A reasonably comprehensive overview of risks for Scotrail is set out in section 4, However no analysis supports the likely impact to offset against the improvements.

Internal assurance

Main focus of the NPT review was on the risk to achieving the CP5 exit given current performance. Described plan as asset focused and the linkages to performance as being unclear

Internal assurance

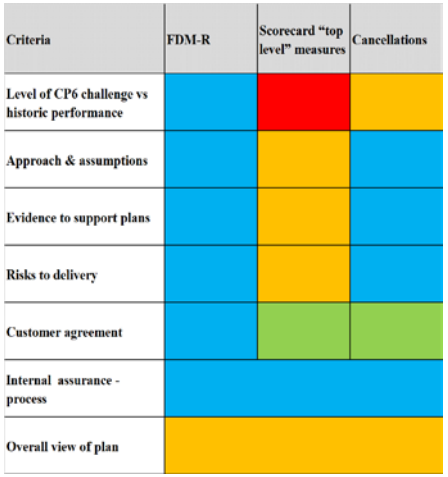
No evidence of local review. NPT grade at 3 out of 5

Level of customer agreement

The plan is jointly signed by the Alliance Head of Performance

Overall view of plan

The exit point from CP5 presents the single greatest challenge. 92.5% PPM for Scotrail is the TfS target. The actions set out in the plan across assets and culture as examples are all basically sound but the lack of any quantification, gives insufficient visibility of the impact the plan will have. Surprisingly there is also little information on how the TOC will deliver improvements beyond new fleets (which will be hugely significant). The cancellation measure looks very challenging as well with little explanation as to how it will be delivered.



A.8 Western

Colour code for confidence rating
Reasonably high confidence
Some confidence
Low confidence
Reasonably high confidence gap
Insufficient information provided

Overview of findings by Route

Approach and assumptions

This was one of the few plans to produce a very useful waterfall chart showing the relative impact of risks and improvement strategies to deliver the 89.4% PPM target for GWR. Whilst the detail behind the chart wasn't provided it is was helpful to have an overall picture of the forecasts. There isn't an equivalent for other measures or for the HeX targets

Evidence to support plans

There is a very good summary of how the performance targets will be delivered with a simple model explaining the interaction between asset strategies, operations and timetable all set in a framework of improved culture. The use of the waterfall gave substance to how each of these would deliver proportionally the PPM target for GWR (although the numbers don't quite add up).

Risks to delivery

The Route is due to see big changes (IEP rollout, electrification, Crossrail start up, growth) all of which are predicted to threaten performance (-4.63%age points)

Level of customer agreement

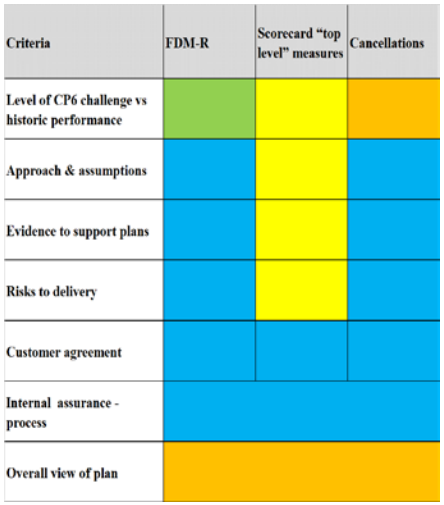
No Evidence provided

Internal assurance

The NPT report describes it as an asset plan with performance as an output rather than central to the plan. It does acknowledge the use of waterfalls but suggests more numeracy would be helpful. No visibility of local assurance. NPT grade at 2 out of 5.

Overall view of plan

The Plan does shows how the various elements have been brought together. Risk is a major focus given changes. Improvement plans are expected to deliver a 5.8% improvement giving an overall change of +1%. There is little mention of the impact on cross route TOCs in particular Crossrail. The assumption is that further modelling sits behind the plan to support the waterfall. There is no analysis aside from PPM for FGW. There is little inclusion of specific performance plans by operators.



A.9 FNPO

Colour code for confidence rating
Reasonably high confidence
Some confidence
Low confidence
Reasonably high confidence gap
Insufficient information provided

Overview of findings by Route

Approach and assumptions

The Freight Plan sets out likely growth forecasts given the changing nature of the freight market and describes how the priority freight routes will be managed in conjunction with the routes. Its focus is obviously different to the other routes with a much greater emphasis on coordinating across the organisation. Similar analysis is provided for XC but little for Caledonian Sleeper.

Evidence to support plans

The performance section provides useful analysis on causes of poor performance and the impact of the changing market and the challenge it presents (coal was a high performing sector so the huge reduction in coal traffic puts pressure on delivery of the target). No impact analysis provided for plans and it is unclear how these sit with the other Route plans.

Risks to delivery

Whilst risks are described there isn't an estimation of the relative scale, impact and mitigations against them. The impact of the changing freight traffic mix is described.

Level of customer agreement

No evidence in the plan

Internal assurance

The summary in the NPT report states there is less performance focus than the Route plans with no asset focus. It highlights the lack of risk focus. It does raise the issue of how the FNPO will tackle the transmission of delay around the network. No evidence of Route based assurance. NPT grade at 3 out of 5.

Overall view of plan

The focus of the FNPO plan differs from the other routes unsurprisingly. The plan does contain some historical analysis for both XC and Freight which have been used to support the target setting. However, there is no quantification of the improvement plans and no oversight of the risks and their impact. It is unclear how the targets have been built up from route plans (or indeed if they have) and how the relative importance of initiatives sit. There is virtually no detail for Caledonian Sleeper.

Appendix B – Documents provided

No.	Filename	Description
1	SBPT206_Capacity_and_performance_planning_framework.pdf	PR13 document relevant as background to this review
2	SBPT230_Performance_Plan_Summary.pdf	PR13 document relevant as background to this review
3	SBPT3312_Performance_Plan.pdf	PR13 document relevant as background to this review
4	SBPT3330_Freight_Performance_Measurement.pdf	PR13 document relevant as background to this review
5	14. Train Performance as submitted.xlsx	Central Performance Team Assessment of Route Plans - scoring
6	RF6 NPT Review of Route plans for ORR.zip	Central Performance Team Assessment of each Route Plan
7	Anglia - Route Strategic Plan.pdf	Dec 2017 Route Strategic Plan
8	FNPO - Route Strategic Plan.pdf	Dec 2017 Route Strategic Plan
9	London North Eastern and East Midlands - Route Strategic Plan.pdf	Dec 2017 Route Strategic Plan
10	London North Western - Route Strategic Plan.pdf	Dec 2017 Route Strategic Plan
11	Scotland - Route Strategic Plan.pdf	Dec 2017 Route Strategic Plan
12	South East - Route Strategic Plan.pdf	Dec 2017 Route Strategic Plan
13	Wales - Route Strategic Plan.pdf	Dec 2017 Route Strategic Plan
14	Wessex - Route Strategic Plan.pdf	Dec 2017 Route Strategic Plan
15	Western - Route Strategic Plan.pdf	Dec 2017 Route Strategic Plan
16	180125 Business planning process overview.pptx	Business Planning Process - presentation
17	RF6 BRT guidance.pdf	RF6 Business Planning Guidance version 1.0 (28 July 2017)
18	SBP Assurance Activity 25-01-2018.pptx	SBP Assurance Activity - by Central Performance Team
19	SFS - Operational Performance.pdf	Operational Performance - Short Form Strategy
20	Wales CP6 Performance trajectories slides reissued 050218.pdf	Wales Route slides - methodologies for performance trajectories
21	Wales Route CP6 Performance trajectory plan submission.xlsx	Wales Route - performance model
22	Wales Route Performance - MAA P10 to CP6 fishbone.pdf	Wales Route - fishbone analysis

Assessment of the train performance trajectories in Network Rail's Route Strategic Plans for PR18

Mandate L4AR004b: Phase 2

Summary Findings

18 June 2018

[Issue for publication]

Prepared jointly with Winder Phillips Associates

ARUP

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Purpose of the Mandate

Purpose of Mandate L4AR004b

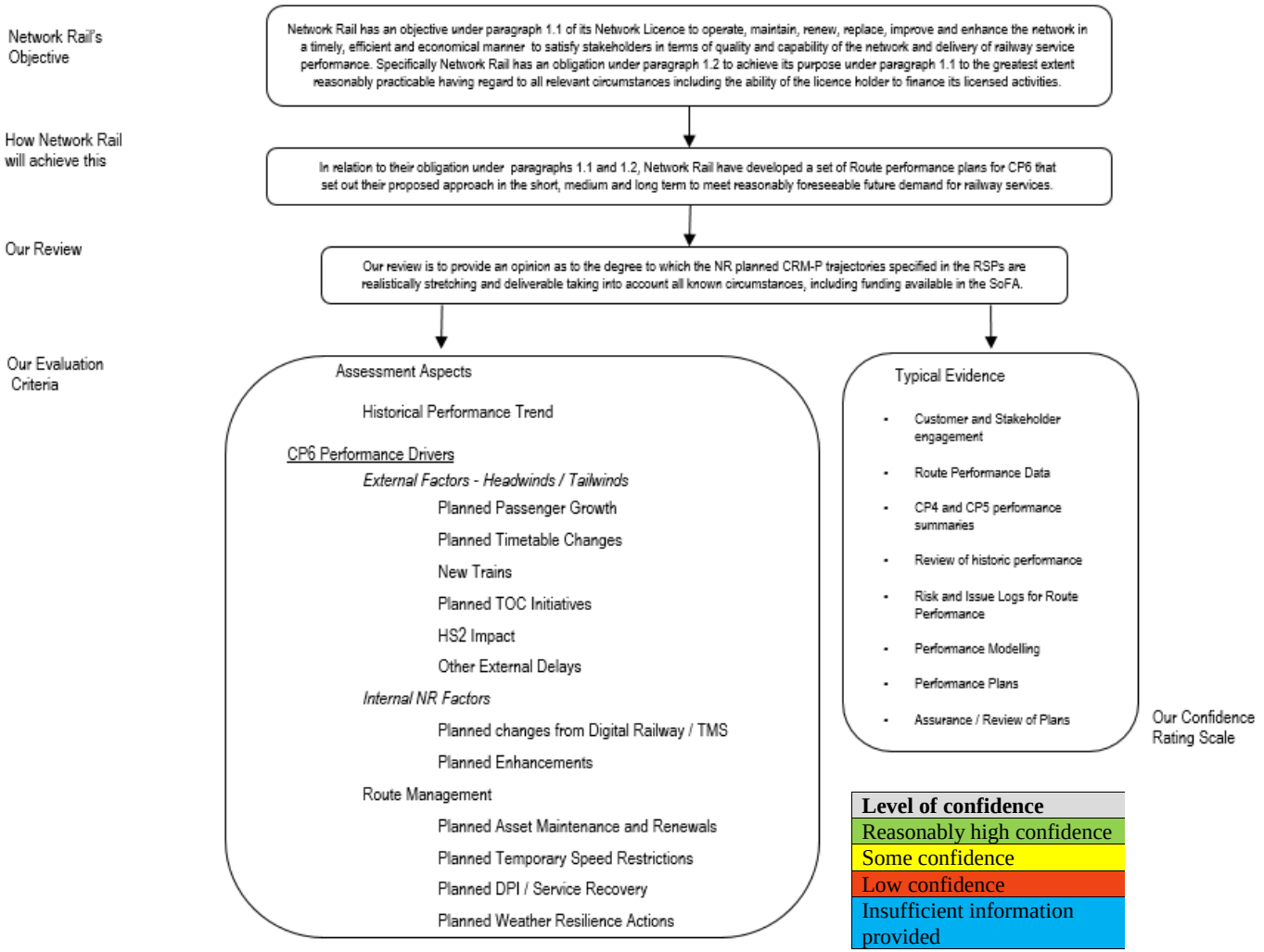
To use professional judgement to assess:

1. The process undertaken by the Routes to produce a robust performance plan
2. The credibility of the TOC train performance trajectories
3. The credibility of the CRM-P trajectories
4. Potential further train performance improvement, additional to what is in the plan.

This presentation

This presentation describes our summary findings in line with the final report produced (reference Issue v3, date 11 June 2018).

Our Review Approach



Key Performance Drivers

The table below lists the 12 key performance drivers that have been identified and their PPM impact for each TOC during CP6

Drivers		Anglia 1				LNE & EM					LNW					South East 3		Scotland	Wales	Wessex	Western
		c2c	GA	ARL	TFL Rail	Northern	VTEC	EMT	GC	HT	VT	WMR	TPE	Chiltern	Mersey	GTR	Southe-astern		ATW	SWR	GWR
External Factors	Planned Passenger Growth	-0.01%	-0.49%	-0.49%	-0.49%	NC	NC	NC	NC	NC	-0.10%	-0.10%	-0.40%	-0.10%	-0.10%	-1.00% [2]	-1.80% [2]	NC	-0.05%	-1.50%	-0.96%
	Planned Timetable Changes/Traffic Growth	-0.01%	-0.03%	NC	-0.01%	-0.13%	-0.48%	-0.45%	-0.54%	0.61%	-	0.20%	0.30%	0.20%	0.30%	0.30% [2]	-1.20% [2]	NC	-0.10%	-	0.22%
	New Trains	-0.06%	-0.02%	-	-0.01%	1.40%	1.25%	-	-	0.46%	-	-	0.30%	-	-	NC	NC	+ [4]	-	0.22%	0.56%
	Planned TOC Initiatives	NC	NC	NC	NC	0.56%	-0.03%	-0.13%	-0.03%	-0.05%	-0.05%	-0.20%	-0.10%	-0.20%	-0.40%	2.00%	1.80%	+ [4]	0.22%	1.90%	? [6]
	HS2 Impact	NC	NC	NC	NC	NC	NC	NC	NC	NC	-0.80%	-0.20%	NC	NC	NC	NC	NC	NC	NC	NC	-0.85%
	Other External Delays	NC	NC	NC	NC	0.01%	0.25%	0.04%	0.04%	0.20%	0.10%	0.10%	0.10%	0.10%	0.10%	NC	NC	NC	-	-2.10% [5]	? [6]
Internal NR Factors	Planned Changes from Digital Railway / TMS	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	1.10%	0.70%	NC	0.03%	NC	0.46%
	Planned Enhancements	NC	NC	NC	NC	NC	NC	NC	NC	NC	-0.10%	-	-0.20%	0.10%	-	NC	NC	+ [4]	-	0.20%	? [6]
Route Management	Planned Asset Maintenance and Renewals	0.01%	0.04%	0.01%	0.02%	0.03%	0.51%	0.09%	0.09%	0.98%	-0.10%	0.10%	-	-0.10%	0.10%	-	0.10%	+ [4]	0.09%	1.10%	0.90%
	Planned Temporary Speed Restrictions	NC	0.01%	0.00%	0.00%	0.00%	0.05%	0.00%	0.00%	0.25%	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	? [6]
	Planned DPI / Service Recovery	NC	NC	NC	NC	0.20%	0.25%	0.05%	0.05%	0.25%	0.15%	0.30%	0.30%	0.30%	0.35%	0.40%	0.50%	+ [4]	0.10%	1.20%	1.28%
	Planned Weather Resilience Actions	NC	NC	NC	NC	NC	NC	NC	NC	NC	0.05%	0.10%	0.20%	0.20%	0.15%	NC	NC	+ [4]	-	-	? [6]

1. The numbers for Anglia come from the waterfall chart, we are uncertain on some of their derivation.
2. The overall impact of the Thameslink programme, including the introduction of new trains, has been included in the "Planned Timetable Changes" figure.
3. South East provided waterfall charts based on the p50 level. (ie 50% confident of delivery)
4. The plus symbols indicate a positive change but impacts have not been quantified by Scotland.
5. Historical trend has been included in other external delays.
6. We have not seen the Western model, just summary waterfall charts. The figures in this table are therefore based on the detail supplied in these charts.

Key	
0.20%	PPM positive impact
-0.20%	PPM negative impact
NC	Not considered
-	No impact

We describe our findings for each of the four Mandate questions in the slides that follow

Q1. Summary of confidence in process of developing route performance plans

Confidence in Process	Anglia	LNE&EM	LNW	Scotland	South East	Wales	Wessex	Western
Reasonably high confidence					✓	✓		✓
Some confidence		✓	✓				✓	
Low confidence	✓							
Insufficient information provided				✓				

This table summarises our confidence in the process undertaken, including

- The approach taken by the Route
- If the OM&R plans support the performance trajectories
- Key assumptions made

Details can be found in the Appendix

Q2. Assessment of credibility in PPM trajectories

Route	TOC
Anglia	c2c
	Greater Anglia
	ARL
	TfL Rail
LNE & EM	Northern
	VTEC
	EMT
	Grand Central
	Hull Trains
LNW	VTWC
	WMR
	TPE
	Chiltern
	MerseyRail
Scotland	ScotRail
South East	GTR
	Southeastern
Wales	ATW
Wessex	SWR
Western	GWR
	Heathrow Express

This table shows the comparison of Arup and Route confidence to deliver the CP6 PPM trajectories for each TOC.

▲	Arup view
★	Route view

- If confidence is, say, 40% that implies that the trajectory is on balance slightly ambitious – and shown further to the right-hand side.
- We are unaware of Scotland's view on their confidence. During our review process we have not seen Scotland's models, consequently our confidence for Scotland is based on the waterfall charts that were provided for the first three years of CP6 and additional information.
- We have not seen any information on the Heathrow Express trajectory and so have not provided a view for it.

Q3. Consistent Route Measure – Performance (CRM-P)

CRM-P definition: Annual minutes of NR-attributed delay to in-service passenger trains from incidents occurring within the route boundary normalised by the actual distance travelled by in-service passenger trains within that route.

CRM-P Regulatory Floor is the point of which ORR is highly likely to formally investigate Network Rail

- The calculation approach for the Regulatory Floor is consistent for all Routes
- A performance buffer reflects maximum deviation (minutes) from Target in each year.
- Buffer calculated as 30% of CRM-P in period 10 of 2017/18 (MAA).

Sensitivity test

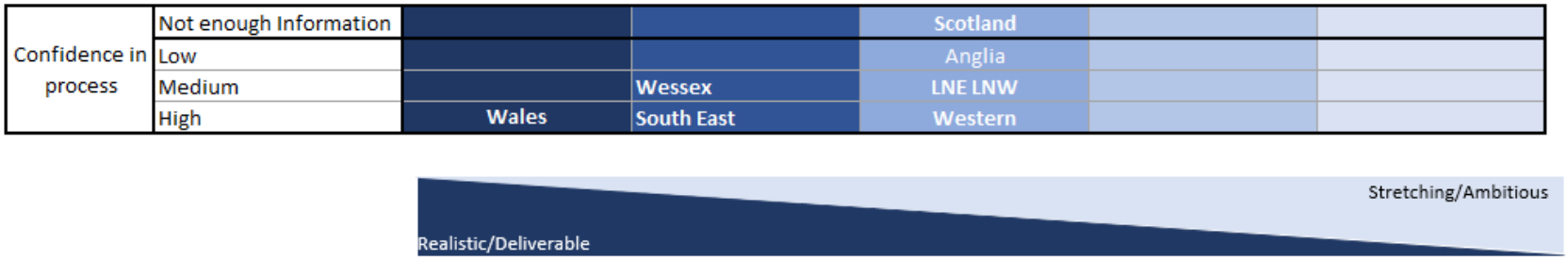
- How much does NR-attributed PPM on leading TOCs have to change for a Route to breach the Floor?
- The table below indicates that NR-attributed PPM on Wales has to fall by the least (2.2pp to breach the Floor and LNW by the most (3.8pp). (This is an indication only as we have made some simplifications.)

1% Reduction in PPM Applied to all Lead TOCs (based on 2023/24)			Average NR-Attributed PPM Change to breach floor
Route	**CRM-P Impact (Mins)**	**Proportion of Gap to Floor**	
Anglia	0.19	42%	2.4%
LNE/EM	0.10	28%	3.6%
LNW	0.13	27%	3.8%
Scotland	0.13	39%	2.5%
South East	0.26	27%	3.7%
Wales	0.21	46%	2.2%
Wessex	0.21	28%	3.5%
Western	0.18	30%	3.3%

Q3. Assessment of credibility of CRM-P

This figure summarises our confidence in each route's performance plan according to:

- The process for producing the plan (vertical axis) and shown in earlier table
- Its CRM-P trajectory and if we think it is realistic or stretching (horizontal axis)



The figure shows that we judge that Wales to be the least stretching but we have confidence in the process they have undertaken. Comparatively we judge Anglia to have produced realistic and stretching trajectories but our confidence in the modelling they have undertaken is low.

Q4. Addressing key constraints – Stakeholder interviews

We interviewed a number of people across the industry with the following agenda

Purpose of meeting

Setting money aside, what are the key constraints that if addressed, might materially improve the industry performance trajectory?

Taking an industry perspective, what are your opinions on the following topics

Overview

How is the GB rail network currently performing?

What are the key constraints to improving train performance?

Which of these constraints should be addressed first?

Incentives

What incentives within the industry currently work well?

Could the franchising process be adapted to incentivise improved train performance? If so, how?

Similarly, how might the Periodic Process be adapted to improve train performance?

What else could be done to better align infrastructure and train service elements?

How well do Schedules 4 and 8 incentivise performance improvement? What improvements could be made?

Has the growth of delay repay schemes improved performance?

Systems

Are the current systems in use across the industry for performance management a constraint to delivering improvement? If so, what improvements would you like to see?

Behaviours

What current behaviours within Network Rail and train operators constrain performance? Are there examples of good behaviours that optimise train performance delivery?

What about behaviours from other stakeholders?

Skills

Are there skills shortages that constrain performance? How might they be best addressed?

How should performance targets be set for both TOCs and Network Rail? Currently, of NR Routes, only Scotland has a specified target for CP6.

Lessons from elsewhere

Are there any lessons from overseas railways that could be adopted on the GB network to improve performance?

Are there any lessons from other industries?

Finally

From this discussion, what one improvement would you like to see to improve train performance?

Q4. High Level Outputs from Stakeholder Interviews

There were some consistent messages from stakeholders across the range

- Customer Centricity – need and opportunity for industry to become more customer centric
- Industry and ‘whole system’ alignment - notably the franchise and control period processes where performance should have a greater focus
- Pride in industry and the desire to deliver better for customers
- Most, if not all, challenges are systemic and cannot be addressed by one party alone; leadership is required to create industry wide standards.
- A strategic response is required to create a sustainable talent pipeline for the industry.
- Network Rail devolution is a good thing which had lead, largely, to positive outcomes

Q4. High Level Outputs by question (1/2)

Performance

- Degrees of negativity, with some forceful emphasis

Constraints

- Conflict of short term vs. long term (infrastructure investment/disruption)
- Profit vs. Reliability
- Over capacity in constrained areas
- Capacity for growth vs development
- Too many fleet types/lack of compatibility
- Disruption recovery
- Network management – root cause/marginal gains
- Major programmes/RAM focus
- NR not strategically focussed on performance – but rather safety and engineering
- Lack of funding to achieve 100% PPM

Incentives

- Need system wide incentives
- Performance fund to encourage collaboration
- Delay repay is symbolic and “doesn’t hurt enough”
- Others felt incentives broadly fine

Schedule 4

- Doesn’t support long term investment
- Doesn’t have root cause to original problem
- Indirectly impacts other TOCs
- Relies on steady state railway

Schedule 8

- Not front of mind for operational level staff (both parties)
- Supports blame/conflict
- Expensive to administer
- Sub threshold delays fall out of scope
- Not valuable enough to make a case for performance
- Not aligned

Targets

- Need to be bottom up NOT top down
- Need joint and aligned performance plans

Franchise

- More realistic targets needed
- Aligned period
- NR consultation
- Increased performance focus

Periodic process

- ORR & DfT not aligned
- Very high level
- Not focussed enough on performance
- Where targets should be discussed
- Need to be more ambitious

Q4. High Level Outputs by question (2/2)

Systems

- Modelling & train location need to be better
- Investment required to change legacy, inconsistent and complex systems
- Need industry wide standard where possible
- Need to be better to manage performance management in a granular fashion

Behaviours

- Functional silos still a challenge
- Pockets of great behaviour but still too reliant on individuals
- Projects present challenge to behaviours
- Not enough performance focus
- Risk aversion in planning (esp. in NR)
- Broader stakeholders need more realism and understanding of the impact on behaviour of their decisions.

Skills

- Need to encourage diversity of experience and opinion
- Under pressure the industry looks to past and grey haired expert
- Need for improved LEADERSHIP (consistent)
- Lack of Performance Professionals
- Technical skills transitioning from public to private sector
- Timetabling modelling talent
- Not enough operators or future pipeline – BR Scheme, Waitrose
- Apprenticeships

Overseas

- Could the UK be bolder in trading off revenue against economic value – the specific example suggesting making car parking free to encourage train travel
- Improving contingency resource (trains and crew) to recover from perturbation
- Improving the design of the infrastructure to support recovery from perturbation
- Making the network control fully and wholly accountable for the integrated system

Other industries

- Leadership/culture/talent focus
- Customer focus
- Moving people NOT running trains
- Collaboration
- System thinking
- Air travel cited 3 times

Priority Activity

- Root and branch review of franchise process – realism
- Build both capability and capacity to improve
- System wide view
- Hold NR to account (both DfT and ORR)
- Tackle sub threshold
- Balance performance and commercial focus

Recommendations

No.	Recommendation	Benefits	Evidence of implementation	Owner	Target date for completion
2018APR01	It is recommended that ORR consider advising NR of the required confidence level for the performance trajectories to allow NR to provide a consistent and comparable set of trajectories across the Routes	Improved consistency across Routes	ORR to consider providing confidence level to NR	ORR	July 2018
2018APR02	It is recommended that NR Routes each produce a single document of assumptions made, and share their approaches adopted to date. And that NR Central Team review the guidance on calculation of performance trajectories provided to the Routes and the degree to which the resulting performance trajectories are consistent and comparable across the Routes.	Improved consistency across Routes	Documentation of assumptions made by each Route	NR	Publication of Final Determination
2018APR03	It is recommended that disparities between Route performance trajectories and TOC Franchise commitments are identified and acknowledged.	Improved join planning	Joint planning	NR	CP7
2018APR04	Anglia to review its performance model and assumptions to check performance trajectories	Greater confidence in trajectories	Documented review	NR	July 2018

Assessment of train performance trajectories in Network Rail's Route Strategic Plans for PR18

Mandate L4AR004b: Phase 2

Summary Findings - Appendix

18 June 2018

[Issue for publication]

Prepared jointly with Winder Phillips Associates

ARUP

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Scotland	**34**

Wessex

Confidence in process: Medium

CRM-P

Objectives	The objectives for the RSP are clearly set out and linked back to stakeholder priorities
Approach	Performance impacts of high level factors assessed as changes to PPM. Based on analysis of historic data of similar events. Linear regression of 4 years data to convert PPM to other performance metrics, based on central tool
CP5	Analysis of CP5 identified a negative trend of -0.7pp PPM pa with 30% drop in SAFs but +20% DPI; analysis suggests -0.3pp pa due to passenger and traffic growth
Plans - External	
Passenger Growth	Passenger & traffic growth "uplifted" from NPAT March 2016 figures, in recognition of past passenger growth on route is higher than London & South East average
Traffic Growth	Based on NPAT March 2016 figures, similarly uplifted as above
Timetable change	Timetable changes in Dec 18 & Dec 20 performance neutral, but risk from reduced dwell times
New Trains	Follows a bathtub curve with net +0.2pp PPM (SWR thought to be more optimistic)
TOC Initiatives	Crew management +0.4pp (SWR thought to be more optimistic)
Other	Historic trend of -0.4pp pa continues Resolution of IA, residual risk of 0.1pp Other external delays constant at 2018/19 levels (forecast to be +0.5pp PPM from 2017/18 reflecting recent trend)

Plans - Enhancements	
TMS	None committed in CP6
HS2	N/a
Projects	None committed in CP6
Plans – Route Management	
M&R	Impact of Feltham and Portsmouth re-signaling based on Waterloo works in 2017, accounting for number of trains. Planned and predictive maintenance will reduce reactionary delays for NR incidents. Impact is based on analysis of historic delay by individual incident category. Improvements recently seen on the inner routes rolled out to outer routes (method not reviewed by us)
TSRs	No specific plans seen
Service recovery	Considered with planned and predictive maintenance
Weather resilience	Continue at 2018/19 level during CP6
Opportunities for improvement	
• Collate all relevant analysis into a single spreadsheet • Review SWR vehicle and traffic forecasts to check NPAT assumptions are still valid • Review Industrial Action (IA) residual risk	

CP6 trajectory

Easy or challenging?

Based on the information reviewed, a 1pp improvement in PPM over CP6, seems neither ambitious nor stretching, although the likely CP5 exit point may result in a stretching target early in CP6 especially without early resolution of the current IA on SWR.

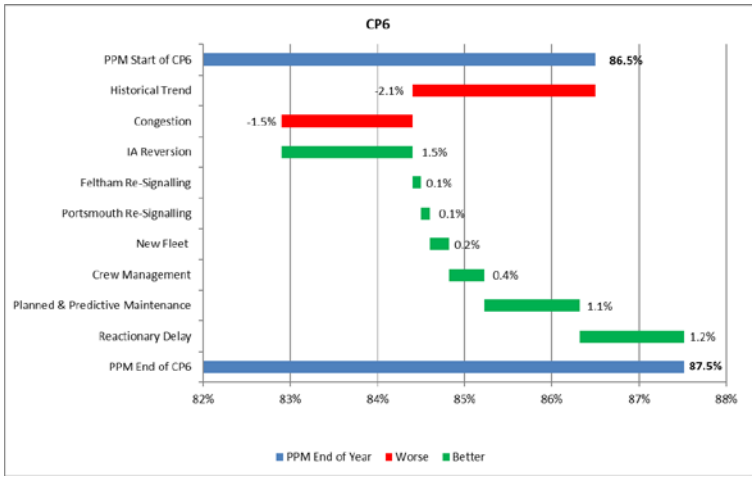
The introduction of new fleets with greater capacity early in CP6 will have a greater performance impact than what seems to have been cautiously built into the plans. The performance strategies within the SWR franchise plans such as a greater focus on dwell time management through better door configurations and automatic door release on metro services do not appear to have been factored in. The major resignalling schemes at Portsmouth and Feltham should have a significant impact on route performance which appear to have been understated.

With the Route also investing heavily in first response training and provision as well as continuing to reduce service affecting failure, the plans seem coherent and well-structured but without a large improvement in performance.

Possible additional factors for consideration

A clearer understanding of the key drivers of performance over CP5. The link between passenger growth and crowding impacting on route performance seems to be the key driver on the route and the impact of these linkages during CP6 should form the basis of plans for the period. This needs to be offset against the operators plans for dealing with the growth through train and system design.

The route appears to have a coherent strategy to deal with improving the response to incidents which should help control the larger impacting events. A clearer understanding of why these larger events are occurring could help to further increase performance in the next control period.



Western

Confidence in process: High

CRM-P

Objectives	The objectives balance stakeholder requirements of improved performance, accommodate +12% passenger train miles, open Elizabeth line with delay risk from other routes, new IEPs, HS2 works
Approach	Model based on GWR franchise model (only route we know to have used TOC model), delay minutes at service group level – not reviewed by us; understand HEX modelled similarly; output reviewed by GWR and Alliance Board
CP5	Drivers in CP5 include +8% trains, asset failures associated with works, removal of GWR public differentials (~-0.3pp PPM), TC & points care teams, fleet and train crew issues; increase in unexplained delay – explore use of GPS data to understand
Plans - External	
Passenger Growth	GWR figures by service group and agreed impact on delay minutes. Overall -0.96pp PPM (vs NPAT estimate of -0.23pp)
Traffic Growth	IEPs: traffic growth (-0.61pp) + fleet reliability (+1.17pp) calculated by GWR
Timetable change	Considered with traffic growth
New Trains	Considered with traffic growth
TOC Initiatives	None considered explicitly
Other	Assume current impact following investments in CP5

Plans - Enhancements	
TMS	TMS trial: hope for -12% reactionary delays but none assumed (prudently)
HS2	Based on Crossrail at OOC (-0.85pp)
Projects	Crossrail: uncertain, transfer of Connect improves GWR (+1.18pp) but loss of flexibility in disruption (-0.96pp) Other projects (e.g. Filton 4-tracking): disruption (-0.75pp) + benefits (+1.21pp) based on data analysis
Plans – Route Management	
M&R	Impact of asset plans agreed with RAMs; based on historic delay analysis; considers delivery unit, service group, asset type, change in congestion (+1.4pp) OLE: new failures (-0.5pp)
TSRs	Example seen within projects
Service recovery	Response improvements (+1.28pp) - considered alongside SAFs based on discussion with RAMs and data analysis
Weather resilience	Assume current impact
Opportunities for improvement	

- Uncertain on HEX as we have not seen the model or output
- Worth checking for consistency with other Routes (e.g. Anglia for Crossrail)
- Consider inclusion of specific TOC initiatives

CP6 trajectory

Easy or challenging?

Given current levels of performance the GWR target for the end of CP5 / start of CP6 will be challenging. In addition, there is significant change to navigate at the start of CP6 with the introduction of Crossrail creating the probability of delay transfer from Anglia Route as well as the completion of electrification works. New operating strategies will need to develop to maximise recovery from disruption.

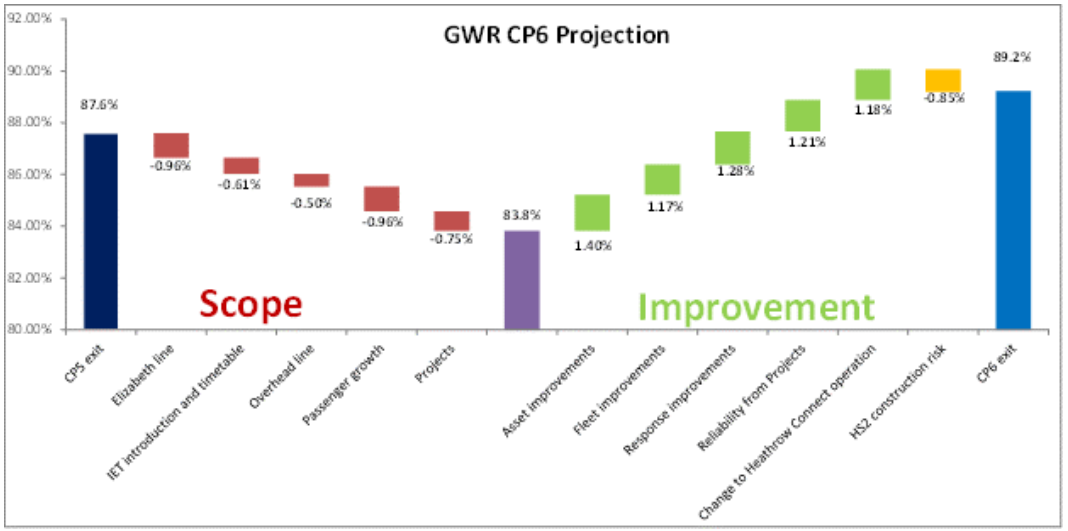
By the end of CP6 the main risk issues will have been addressed with new fleets in place and all infrastructure works delivered. On that basis the end of CP6 target of 89.2% PPM should be deliverable, with focus on the identified actions.

HEX targets look challenging although we have little information to review. PPM targets for calculation of CRM-P are:

Target							
		18/19	19/20	20/21	21/22	22/23	23/24
HM	HEX	90.8%	92.0%	92.2%	92.3%	92.6%	92.6%

Possible additional factors for consideration

Change in contingency planning will need to be managed given the recognised change in service priorities. Working with GWR to develop and evaluate the effectiveness of TOC initiatives would help deliver the trajectory.



Anglia

Confidence in process: Low

CRM-P

Objectives	They summarise the need to accommodate substantial growth, new fleets and timetables early in CP6, journey time improvements, better performance with only marginal asset reliability improvement. Stakeholders also mention access planning.
Approach	High level performance model, forecasting changes in PPM failures from 2017/18 base. Each year treated independently. We believe some factors are meant to roll forward (e.g. reduced TSRs, timetable change, intelligent infrastructure) whereas they are lost the next year. So all 2019/20 gains are lost in 2020/21, explaining drop in performance. Waterfall charts are incorrect.
CP5	Based on discussions, delay minutes +9.5%. Some drivers are 16.9% passenger growth vs 1.7% traffic growth putting dwell times and service recovery under pressure; timetable changes on WAML and c2c saw dip in performance then recovered

Plans - External	
Passenger Growth	Unclear, model assumes X% growth increases PPM failures by X%. Impacts on GA & ARL likely too small
Traffic Growth	Assume performance neutral in model. NPAT suggests -0.7pp for GA and -0.32pp for ARL
Timetable change	TfL Rail – Crossrail impacts PPM by -0.17pp in 19/20 then recovers (based on c2c 15/16 change); same method in 19/20 for GA (-0.17pp) and c2c (-0.03pp)
New Trains	Initial dip in PPM then restore so neutral impact. Would expect a lower initial dip and then overall benefit.
TOC Initiatives	None assumed
Other	Assume current impact following investments in CP5, although RSP mentions impact of “external effects, autumn and weather” as opportunity area

Anglia

Plans - Enhancements	
TMS	TM for Essex Thameside forecast planned for end CP5. Hope to reduce DPI (-6% or -12% integrated with c2c). To be proven so only in “better than” trajectory
HS2	N/a
Projects	None committed in CP6
Plans – Route Management	
M&R	RAMs forecast SAFs, forecast small reduction in PPM based on 5 years historic data (not reviewed). Strategic Renewal Investment to improve resilience and enable predict and prevent failures. Unclear if modelled correctly.
TSRs	Unplanned TSRs not to exceed 18/19 target
Service recovery	Maintain -5% to be gained in 18/19. Unclear if in model for CP6
Weather resilience	Impact of weather same as in CP5 (based on analysis); consistent with RSP having no specific activity
Opportunities for improvement	
• Re-design performance model to aid clarity • Review assumptions • Consider TOC initiatives • Support cross route discussions with Western and South East	

Our view of the possible impact of assumptions on current trajectories is shown below

Assumption	c2c	GA	ARL	TfL Rail
Passenger growth		↓	↓	
Traffic growth		↓	↓	
Timetable change			↓	↓
External delays				
Digital Railway / TMS	↑			
Planned enhancements				
Asset Maintenance & Renewals	↑	↑	↑	↑
TSRs		↑	↑	
Service recovery	↑	↑	↑	↑
New fleet	↑	↑	↑	↑
TOC Initiatives				

CP6 trajectory

Easy or challenging?

A review of current performance against the CP6 exit point suggests all four TOCs need to improve between 0.3 and 0.5pp. When compared to the revised CP5 exit points as agreed with the TOCs (with the exception of GA) only TfL Rail is forecast to improve performance by the end of CP6, the other TOCs' performance trajectories fall.

There is a large degree of uncertainty on the Route, in particular the scale of passenger growth forecast. However, this also needs to be set alongside the levels of investment by the TOC (especially in rolling stock replacement), the Route itself and projects such as Crossrail to deal with and generate further growth.

TfL Rail's trajectory faces the largest challenge given its target is the only one to improve in CP6 and it has the largest change with the opening of Crossrail and risk of delays from Western Route. The targets for the other three TOCs fall and so cannot be described as stretching, nor are likely to meet TOC aspirations.

TOC	Current PPM MAA (2017/18 pd 13)	CP5 exit PPM in RSP	CP5 exit PPM – revised target
c2c	95.3%	95.6%	96.0%
Greater Anglia	88.9%	89.6%	89.7%
Arriva Rail London	94.4%	95.2%	95.1%
TfL Rail (Elizabeth line)	93.4%	94.4%	93.5%

Possible additional factors for consideration

No long-term improvements plans by the operators for fleet and other delay causes have been taken into account. Given that some old and unreliable fleets are being replaced (e.g. Class 315s) this could be significant and it is likely the TOC franchise bids will have factored in reliability improvements.

TOC initiatives in other areas also appear to be missing from the trajectories. These include plans to reduce station delays to offset passenger growth forecasts, and to improve other key areas such as traincrew management.

LNE&EM

Confidence in process: Medium

CRM-P

Objectives	Maintain or marginally improve performance whilst accommodating major timetable and fleet changes with ageing assets. Do so with precision timetables, better recovery plans, start of day performance, response & repair times, enhanced maintenance, reduced crime & trespass. Note there is a gap to franchise PPM targets.
Approach	• Forecasts based on incident count • Delay forecasts then developed based on forecast incident count and historical relationship between DPI and number of delay causing incidents for each TOC • Delay forecasts converted to PPM based on historical relationship between delay and PPM for each TOC. • Best and worst case scenarios based on historical fluctuations in performance for each TOC. • Thameslink Timetable: additional modelling carried out to reflect risk from Thameslink timetable.
CP5	From 14/15 to 16/17, NR incidents fell by 13% and delay by 17%. Northern affected by Manchester bombing and collapsed wall at Liverpool, also removal of some public differentials. VTEC & Hull Trains suffered fleet faults.

Plans - External	
Passenger Growth	Passenger and traffic growth considered together. We have not seen the method. Compared with NPAT figures, Northern & VTEC may under-estimate risks (see below).
Traffic Growth	As above
Timetable change	Use of GPS timings to improve timetable.
New Trains	Benefits have been discussed with TOCs but the Route, based on previous experience, has toned down TOC assumptions (e.g. VTEC from +2.0pp to 1.25pp). As comparison, IEPs on Western produce benefit of +0.56pp.
TOC Initiatives	Based on discussions with TOCs, moderated by the route in light of experience. Benefit of DOO on dwell times considered for Northern.
Other	Reduced external delays benefits VTEC by 0.25pp (other TOCs less), consistent with objective of reducing crime and trespass.

Plans - Enhancements	
TMS	TMS on ECML south of Peterborough considered within Thameslink impact
T'link	Structured review with TOCs and shared with Thameslink Industry Readiness Board.
Projects	All projects (e.g. Werrington grade separation and Huntingdon – Woodwalton 4-tracking) will be performance neutral since the extra capacity they provide will be used
Plans – Route Management	
M&R	RAMs forecast incident count for each asset, aim for SAFs to fall by 9.9%, prioritise mainline assets
TSRs	Plans to reduce with benefits shown on waterfall charts but calculations not seen
Service recovery	Aim for faster response to incidents to help mitigate risk of more delays with more trains.
Weather resilience	Impact of severe weather events in line with the average impact over the last 5 years. We note whilst more trains will run, there is a Weather Resilience Plan for CP6 (£87.5m) with a new RAM for Drainage and Off Track.
Opportunities for improvement	
• Greater transparency in the way that factors have been assessed	

CP6 trajectory

Easy or challenging?

The targets set by the route appear to be realistic but not overly ambitious or stretching. The effects of the completion of the Thameslink project and additional TPE services north of York greatly affect the overall delivery of the CP6 targets. Given the transformation of services with the wholesale introduction of new and more reliable electric rolling stock, the positive performance impact seems to have been outweighed by the greater congestion of the network.

The targets appear not to be stretching but given the uncertainties of future timetable enhancements, a stretching target may not be appropriate for the route. The key deliverable for the control period will be the stabilisation of performance following the completion of the Thameslink project.

Possible additional factors for consideration

The significant risk of performance undershoot at the end of CP5 could make the CP6 targets in the early years more challenging. In particular, VTEC have to make up a deficit of 2.3pp PPM MAA in a little over 12 months.

LNW

Confidence in process: Medium

CRM-P

Objectives	A strong theme is improving asset management within funding constraint: reduce SAFs by 5% by end CP6 through use of RCM and Intelligent Infrastructure. Key challenges include HS2 works and new train fleets
Approach	• Forecasts are based on PPM failures • Estimates have been made for a range of different factors based on perceived performance impact and actions
CP5	• VTWC – increase in external incidents on WCML South and removal of Public Book timetable allowances • Chilterns – significant drop in performance with the introduction of Oxford services, partly due to TOC • TPE – performance in 2017/18 suffered from infrastructure issues at Manchester and knock-on delays from Northern fleet unreliability

Plans - External	
Passenger Growth	Used central 2017 growth forecasts and assessed as having small impacts on PPM. Passenger & traffic considered together for TPE at -0.4pp, based on last TPE timetable change. Could not fully reconcile with NPAT figures.
Traffic Growth	Appears not to be considered significant for all TOCs except TPE.
Timetable change	Some TOCs affected by May 19 and Dec 19 timetable changes. Their impact is not explicitly shown.
New Trains	Considered a 'bathtub' curve showing net improvements
TOC Initiatives	Considered alongside new trains Industrial relations assume to impact WMR (-0.1pp and MerseyRail (-0.3pp)
Other	Route crime strategy and autumn plan deliver small benefits

LNW

Plans - Enhancements	
TMS	Pilots are mentioned on MerseyRail and Chilterns but are not committed and so excluded from trajectories
HS2	High level assessment, which is actively being reviewed
Projects	Some small benefits of enhancements
Plans – Route Management	
M&R	High level estimation of impact of reduced SAFs and increasing age on PPM (so overall worse); “golden 5 mile” asset renewals near Marylebone not yet formalised
TSRs	Not mentioned
Service recovery	Not formalised or considered separately
Weather resilience	Weather resilience plan to deliver small improvements

Opportunities for improvement

- Greater clarity on impact of M&R plans
- Consider using the Thameslink method for HS2 with operators
- Consider if passenger growth and traffic growth pose additional risks
- Consider formalising incident management plans on service recovery

Summary of impacts on PPM during CP6

		VT	WMT	TPE	Chilterns	MerseyRail
Risks	Passenger Growth	-0.10%	-0.10%	-0.40%	-0.10%	-0.10%
	Fleet Reliability	-0.10%	-0.20%	-0.10%	-0.20%	-0.30%
	Infrastructure Reliability	-0.30%	-0.20%	-0.20%	-0.20%	-0.20%
	Other TOC impacts (e.g. Northern fleet reliability)			-0.20%		
	Improved Safety / Performance Impact				-0.05%	
	TOC Operations & Control	-0.05%	-0.05%	-0.05%	-0.05%	-0.05%
	Major Events e.e Grand National					-0.05%
	Public Book allowances	-0.10%				
	IR Issues		-0.10%			-0.30%
	Major project work (Not Inc. HS2)	-0.20%	-0.10%	-0.20%	-0.10%	-0.20%
	HS2 and wider impact	-0.80%	-0.40%			
Opportunities	New Fleet Reliability / better suited to operations	0.10%	0.25%	0.30%	0.30%	0.30%
	Optimised timetables	0.05%	0.25%	0.30%	0.20%	0.25%
	On time all the time performance focus	0.05%	0.20%	0.20%	0.10%	0.25%
	Infrastructure reliability / Predict and prevent strategy	0.20%	0.30%	0.20%	0.15%	0.30%
	New enhancements	0.10%	0.10%		0.10%	0.20%
	Other TOC fleet reliability	0.00%		0.30%		
	Route Crime Joint Strategy	0.10%	0.10%	0.05%	0.05%	0.10%
	Autumn Plan			0.05%	0.05%	0.10%
	Weather resilience plan	0.05%	0.15%	0.10%	0.10%	0.05%
Enablers	Aligned objectives with operators	0.05%	0.05%	0.05%	0.05%	0.05%
	Better data and systems	0.05%	0.05%	0.05%	0.05%	0.05%
Total		**-0.90%**	**0.30%**	**0.45%**	**0.45%**	**0.45%**

CP6 trajectory

Easy or challenging?

With the exception of VTWC, the forecasts for the end of CP6 show a modest improvement on current performance and the CP5 exit point. VTWC is forecast to fall by nearly 2pp over the control period.

Chiltern and MerseyRail are considered realistic targets given the relative stability of operations. VTWC and WMR are considered realistic and stretching given the scale of the changes to navigate on the route and with the uncertainty of HS2 works.

TPE is considered more challenging given the plans to extend services to Scotland and the complex movements round Manchester, the works required in the north of England and current performance levels.

Possible additional factors for consideration

The one area that may not be fully exploited is process and systems. Changes in the relationships between TOCs and NR offer opportunities to improve joint working and deliver better performance management processes. Aligning this to better systems such as improved reporting or sub threshold data capture offers opportunities to find additional improvements.

South East

Confidence in process: High

CRM-P

Objectives	A vision for CP7 includes on-time arrivals at all stations of 72% and PPM of 94%. In CP6, the constrained base plan delivers broadly constant performance (and noted as remaining unacceptable to stakeholders)
Approach	Detailed structured model of 394 initiatives with defined min, max and average delay impact Monte Carlo modelling with @Risk software, involves running 10,000 simulations to calculate PPM at different confidence levels Model reviewed by NPAT
CP5	The London Bridge works and industrial actions have had significant impacts.
Plans - External	
Passenger Growth	Based on NPAT figures
Traffic Growth	Considered as part of the Thameslink assessment
Timetable change	Considered as part of the Thameslink assessment
New Trains	Considered as beneficial within Thameslink assessment
TOC Initiatives	GTR agreed 2pp PPM benefit for their initiatives including 0.3pp recovery from IA. Agreed with DfT 13% reduction in TOC delay minutes from Southeastern
Other	Not considered by us

Plans - Enhancements	
TMS	A plan for deployment in CP6 and CP7 has been developed with the Digital Railway team and assessed.
T'link	A structured approach to assess impact with operators
Projects	None committed in the constrained base plan
Plans – Route Management	
M&R	Increased maintenance and data driven asset management. Impact on delays agreed with subject matter experts.
TSRs	Not considered by us
Service recovery	Several initiatives including incident management and signalling control
Weather resilience	Improved weather resilience seen as key
Opportunities for improvement	
• Consider extending the base data in the model beyond just 2016/17 • As noted in the RSP, might be worth re-visiting the trajectories early in CP6 given the significant uncertainties of Thameslink and TMS	

CP6 trajectory

Easy or challenging?

The detailed level of analysis give confidence the route understands the drivers of performance and the risk associated with each. We therefore broadly agree with their assessment that the trajectories are realistic, reflecting its choice to produce trajectories for its TOCs at 80% confidence of delivery, although there are still some potential risks to delivering the forecasts.

The new SE franchise will increase service levels but the extent is currently unclear as the bidding process is still in progress. The impact of the new GTR timetable is a major factor in the forecasts with the impact in service increases and the introduction of through services estimated to have a significant downward impact on performance. This, though, is balanced against the benefits of the full capacity of London Bridge, the introduction of high capacity digital signalling in the Thameslink core, and the full introduction of the Class 700 trains offering a more suitably internally configured rolling stock and improved boarding and alighting.

Possible additional factors for consideration

Any plans to improve Brighton Mainline from East Croydon inwards need to take account of London Overground, from Norwood Junction to New Cross Gate. We note there are also proposals to increase service frequency on the East London Line, with new trains already ordered for the route with a potential December 2019 implementation.

The interaction of freight on the Channel Tunnel Corridors and into and around Clapham Junction is another possible consideration.

Wales

Confidence in process: High

CRM-P

Objectives	Increased focus on end user experience, prioritising operational effectiveness, robust timetables and closer alignment with end user demand.
Approach	Forecasts based on Route NR delay minutes Detailed and evidenced modelling has been undertaken to consider a number of factors affecting performance. Based on 5 years of historic data.
CP5	Noted that impacts of passenger growth and ageing fleet had been under-estimated; performance below target also because resignalling and TMS schemes were deferred
Plans - External	
Passenger Growth	Used TfW figures. Impact on AML based on analysing 5 years data (1% growth produces +0.4% AML). Regression to estimate PPM.
Traffic Growth	No traffic growth for Wales and Borders franchise
Timetable change	None considered
New Trains	Current ageing fleet with +15% failures (based on recent trends)
TOC Initiatives	Used TfW's expected improvements to TOC-on-Self for the new franchise, though scaled back due to current uncertainty of outcome of bidding.
Other	Vegetation management delivers a small benefit

Plans - Enhancements	
TMS	Impacts not yet known
HS2	N/a
Projects	N/a
Plans – Route Management	
M&R	Each asset considered in detail outlining risks and benefits
TSRs	Not reviewed by us
Service recovery	2.5% reduction in reactionary delays from operations strategy in CP6.
Weather resilience	Impacts of weather remain at average of last 5 years
Opportunities for improvement	
• Improved documentation and inclusion of all calculations	

CP6 trajectory

Easy or challenging?

The trajectory appears to be cautious compared to the levels the network has performed in the past, and the major signalling works in Newport, Cardiff and Port Talbot that have been completed to improve resilience. The completion of electrification work from Severn Tunnel Junction to Cardiff will further improve key parts of the South Wales Main Line.

A CP6 target which recovers performance to less than the position at the start of CP5 (when it was 93%) does not feel stretching. We also note that PPM at 2017/18 period 13 was 92.2% which is higher than the CP6 exit target of 92.1%.

With the outcome of the Wales & Borders franchise currently unknown, the Route has assumed its current service pattern will continue without traffic growth. They have assumed the CVL network will continue to be part of the national rail network so the impact of any works on these routes is not relevant within the forecast provided. These are the best performing service codes on the Wales franchise so if these are removed from the figures during CP6 this will mean change to the trajectory for the remaining services which is recognised within the RSP. Prior to then, the reasons for a lower entry point to CP6 and a subsequent lower exit point on the trajectory shown are unclear.

Possible additional factors for consideration

None identified as the plans have assumed no improvements from the new franchise.

CP6 trajectory

Process

We have not seen how the performance trajectory was calculated. We have seen waterfall charts for the first three years of CP6. We understand the waterfall charts have been based on professional judgment, following the issue of an independent report of 27th March 2018. Our comments on the trajectory are based on reading that report.

Easy or challenging?

The figures for ScotRail are a realistically ambitious target for performance improvement. On a diverse network such as Scotland, with a breadth of railways from high frequency urban network to low frequency rural railways, a 1% improvement over 2 years provides an ambitious target.

A static target over the remaining 3 years could be seen as less stretching but must accommodate pressure from forecast passenger growth.

Possible additional factors for consideration

The independent report concentrates solely on ScotRail services and takes no account of other operators such as Caledonian Sleeper and Virgin services into both Glasgow and Edinburgh, and potential for importing poor performance from other parts of Network Rail's infrastructure.