ARUP

Office of Rail & Road and Network Rail

Independent Reporter - Review of Network Capability

Review of Network Capability

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Glossary

AIRS	Asset Information Reporting System
AR	Annual Return
CNC Report	Capability Non Conformance Report (a suggested reporting measure)
CP (6 or 7)	Control Period
FCaL	Freight Cancellations and Lateness
FNPO	Freight and National Passenger Operations
FOC	Freight Operating Company
GBRF	GB Railfreight
GEOGIS	Geography and Infrastructure System - database for track and structures assets.
GRIP	Governance for Railway Investment Projects
HLOS	High-Level Output Specification
HoSP	Head of Strategic Planning
INM	Integrated Network Model
INM	Integrated Network Model
ITPS	Integrated Train Planning System
NC	Network Change
NCC	Network Change Coordinator
NCIP	Network Change Improvement Programme
NCSG	Network Capability Steering Group
NESA	National Electronic Sectional Appendix
NGD	National Gauging Database
NGD	National Gauging Database
NR	Network Rail
OHLE	Overhead Line Equipment
ORR	Office of Rail and Road
P&R	Planning and Regulation (internal NR team)
PON	Periodic Operating Notices
PPS	Possession Planning System
PR(23)	Periodic Review
PSR	Permanent Speed Restrictions
QA	Quality Assurance
RAG	Red, Amber, Green (scoring system)
RIRG	Rail Industry Recovery Group
RPSG	Regional Planning Strategic Group
SBP	Strategic Business Plan
SNC	Short Term Network Change
TA	Technical Authorities
TOC	Train Operating Company

TPE	TransPennine
TSR	Temporary Speed Restrictions
WON	Weekly Operating Notices

1. Executive Summary

1.1. General

Arup, supported by Winder Phillips Associates, has been appointed by the Office of Rail and Road (ORR) and Network Rail under the Independent Reporter Framework to undertake a review of Network Capability, which is currently defined by the linespeed, gauge, route availability and electrification capability of the railway network. An understanding of the overall capability of the rail network is essential for meeting the requirements of Network Rail's Network Licence and to provide reliable and accurate information to Operators to enable their business planning.

The purpose of the review was to:

- establish whether Network Rail is delivering its licence requirement (specifically maintaining Network Capability at the CP6 baseline, or following the Network Change process); and
- to review Network Rail's progress in the development of its Network Capability management governance processes and systems.

The review covered a number of topics including:

- The Network Capability baseline agreement and reporting process;
- Governance and data systems;
- Recommendations for CP7 dashboard measures; and
- Previous Independent Reporter review findings (2018[1]) and embedment of recommendations.

Feedback to support the review was sought from rail and freight operators through questionnaires and interviews. Meetings with Network Rail internal teams and the ORR also provided a balanced view across the different stakeholders.

The areas for review were closely linked and therefore a model was developed by the Independent Reporter team which identified all the strategic parts of a well-functioning management framework, in order to set the conclusions and recommendations in a clear context (Figure 1).

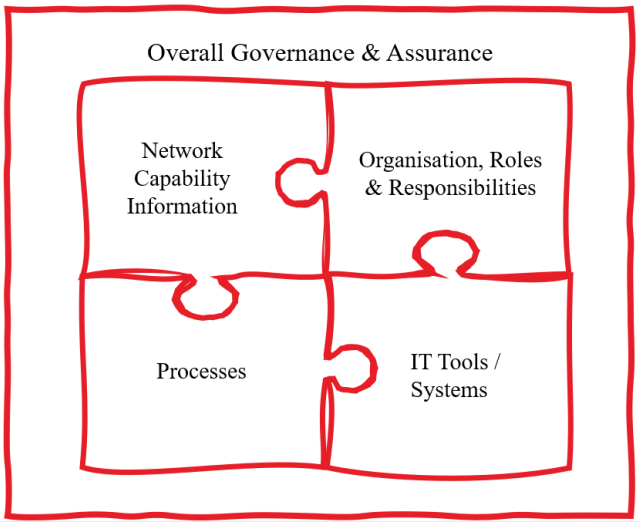

Figure 1: Network Capability information management model

Using the topics in the model, the key conclusions are as follows:

[1] Independent Reporter Mandate L4AR007: Review of Network Capability - Phase 1 - Review of CP5 Network Capability Processes (Nov 2018) and Mandate L4AR007: Review of Network Capability – Phase 2 - Recommendations on the Monitoring and Assessment of Network Capability in CP6 (Nov 2018)

1.2. Network Capability Information

Network Capability (linespeed, gauge, route availability and electrification) are all reported annually by region and network-wide in Network Rail's Annual Return[2]. In addition, Tables 50-52 in the Annual Return provide detail on the number of short term and permanent Network Changes and discrepancies between actual and published Network Capability. The main user of this information is the ORR. It is provided for regulatory compliance and forms a baseline for monitoring Network Capability and reporting Network Change.

In its current format, the Network Capability metrics do not appear to inform ORR decision making beyond identifying broad trends over a longer time frame. The Independent Reporter could not identify a clear audit trail for the development and agreement of the CP6 baseline.

The Reporter identified inconsistencies in the Annual Return data received as part of this review and evidence of similar data quality concerns was also provided by ORR. The Independent Reporter therefore has low confidence that Network Capability data is being reported correctly and that Network Rail's assessment of performance against the baseline can be relied upon.

Currently, the ORR do not appear to be using the Annual Return information to understand the extent to which the Network Change process is being followed. Instead, they rely on specific events, identified by Operators, where issues of non-compliance are identified and raised before being investigated or escalated with Network Rail.

Similarly, the Operators who engaged with the team advised that they do not use the Annual Return information. In its aggregated format, they find it to be of limited use for scheduling services or responding to business opportunities. Instead, they rely on the National Electronic Sectional Appendix (NESA) to understand network capability, supplemented by other data sources and types.

Confidence in the quality and accuracy of network capability information was an issue for all Operators. They described a need to verify published information with different data sources and contacts before using it in their business processes and planning. Examples of inaccurate data were cited in our interviews. There did not appear to be a clear and collaborative process for reporting/ correction of incorrect information, for example where reported capability is found to differ from actual capability **[REC0021-01]**.

1.3. Process

The Network Change process itself appears to be well understood (both within Network Rail and by the Operators) and was described as clear, typically consistent and fit for purpose. There is evidence that recommendations from the previous Network Change Improvement Programme (NCIP)[3] to regularly review the documentation and guidance have been implemented.

Some good regional practices were noted – for example guidance notes being provided at key milestones and regional forums being used to raise awareness of Network Changes. Despite these efforts, the reporting of Network Change is currently a manual process, with regional differences in the way changes are tracked and recorded. Examples were shared where the Network Change process did not appear to have been followed consistently and/or where the Network Change Coordinators (NCC) had not been made aware of Network Changes.

[2] https://www.networkrail.co.uk/who-we-are/publications-and-resources/regulatory-and-licensing/annual-return/

[3] Refer to Network Rail Internal Audit : Network Change framework in LNE & EM (2017)

Network Rail's process for deriving Network Capability metrics makes use of legacy systems to transform and manipulate data. Whilst a process is in place to provide points of review and guidance on the review steps, inconsistencies were observed in the data, suggesting that this may not be followed consistently.

Obtaining documentation to demonstrate compliance with the Network Change process proved to be very difficult. Four of the five Regions did not provide any of the requested information within the time available for the review. Review of the information that was made available, highlighted a disconnect between Asset Reporting information and the Network Change process which means that, in most observed cases, changes in Asset Reporting systems did not correspond to a real change in Network Capability. Information relating to the samples requested should continue to be sought from regions which did not provide any data, to enable Network Rail to demonstrate that the Network Change process has been followed **[REC0021-02]**.

1.3.1. Temporary Speed Restriction (TSRs)

The (Short Term) Network Change process also covers treatment of TSRs with durations of longer than six months. TSRs are recorded in the Possession Planning System and published to Operators through Weekly Operating Notices. They are not reported in the existing suite of Network Capability metrics and therefore without specific analysis, it is difficult to monitor number and duration of TSRs. An increase in TSRs and/or their duration could imply network degradation which is not picked up elsewhere by the Network Change process.

It is apparent that there are different interpretations of the Network Change process in the case of TSRs. The review found that TSRs which are over six months old are treated differently by Regions – with some Regions reviewing and extending TSRs, some actively converting to permanent speed restrictions, and others triggering the Short-Term Network Change process.

It is recommended that a review is undertaken to further understand the different approaches to managing TSRs, including the cumulative impact on Operators, of TSRs spanning multiple routes and whether it is appropriate for all TSRs persisting for longer than six months to follow the Short-Term Network Change process (and the subsequent impact on number of Network Changes to be processed) **[REC0021-03]**.

1.4. Organisation, Roles and Responsibilities

The Network Change process is administered by the Network Change Coordinators (NCC), as stated in Part G of the Network Code. NCC's sit in different functions within Network Rail and regional variations in the way Network Change is managed were noted. Roles and responsibilities for the Network Change process appear to be clearly defined; however, examples provided as part of this review have shown that not all Network Changes are undertaken through the NCC. This report identifies four potential situations where changes may occur without the NCC's awareness.

Network Change Coordinators are fundamental to ensuring the process works well. There are in the region of 50 recorded Network Changes per Region per year (more with major upgrade programmes). The process takes a minimum of three months, resulting in multiple ongoing changes at any one time. With one NCC per region they are a limited resource, particularly in the case of annual leave / sickness.

The Sponsor of a Network Change is identified as a key person in the overall process and is responsible for requesting updates to publications such as NESA, although there does not appear to be any assigned responsibility for confirming that the established change has been recorded correctly in publications.

TSRs were found to be managed through multiple processes and across multiple teams. A lack of clear roles and responsibilities, decision making and reporting was evident, with no clear accountability for monitoring or managing long-term TSRs **[REC0021-04]**.

1.5. IT Tools / Systems

The process for deriving Network Capability metrics in CP6 makes use of legacy systems to transform and manipulate data; however, it should be noted that positive steps have been taken to move towards using

Microsoft PowerBI for asset reporting. This is already being done within the current funding envelope and is supported.

Network Change information comprises forms and letters; redacted versions of which can be found on the Network Rail website. These documents which were found to be unstructured pdf files and not easily searchable. A standardised method for recording and searching for Network Changes is recommended to improve visibility of all Network Changes, and through adding metadata (for example ELR and mileage) enable easier identification by stakeholders of key information and impacted locations. The Independent Reporter considers that amendments to the Network Change document templates and management systems could be explored and implemented for CP7 within the existing resource.

A proof of concept to digitise the Sectional Appendix was provided by Network Rail as part of this review and it is recommended that this work should continue **[REC0021-05]**. Furthermore, there is an opportunity to further explore how other wider digital initiatives within Network Rail (such as the Common Network Model and central TSR database) could be applied in the context of Network Capability.

The Independent Reporter considers that the management of Network Capability could be improved without digitisation – for example through improved processes, data audit and review. In the Reporter's opinion, there is also an opportunity for Network Rail to consider investment in longer term digital solutions, to reduce reliance on manual processes and significantly improve Network Capability management and reporting, without a large increase in bureaucratic processes. Digitisation would therefore be both a cost-effective approach for NR to improve management of Network Capability and improve the methods by which ORR can assess whether NR is meeting its licence condition.

1.6. Governance and Assurance

Surrounding the other four aspects of the model presented in Figure 1 is the overall governance and assurance of Network Capability (i.e. both within Network Rail and industry wide).

Source data for publications such as the Annual Return was found to be signed off by relevant technical authorities in Network Rail before use in calculations. Whilst this does not guarantee the accuracy of the information, it provides accountability, and an indication that the information is reviewed prior to use.

Furthermore, a review of the process to produce Network Capability metrics, as outlined in the work instructions, does provide for a degree of assurance at key steps. However, it does not seem that this process is fully implemented in practice. This was evident when data submitted to the Independent Reporter was found to contain multiple inaccuracies. Upon raising these with the Network Rail Asset Reporting team, advice was given that they were unable to review due to workload and resourcing issues.

The Reporter found evidence that information to verify that the Network Change process had been followed correctly was not readily available for sharing. This points towards a process which lacks adequate governance and where compliance with the process cannot be easily demonstrated to the ORR. It is unclear what the consequences are for not following process, or for inaccurate data.

Understanding capability of the rail network is complex – it is closely linked to capacity and asset condition and it is fundamental to the Network Rail's customers' business. There does not appear to be overall senior level challenge in place for network capability within Network Rail.

Currently, ORR have not proposed any Tier 1 or Tier 2 Network Capability measures[4]. To enable Network Rail and ORR to exercise adequate rigour in management of Network Capability, appropriate measures need to be put in place to monitor and support improved reporting in the Annual Return, with the required governance around this to ensure that the priority is reflected throughout through the business **[REC0021-06, REC0021-07]**.

[4] Refer to "ORR Responses to PR23 policy framework consultations" and "ORR – PR23 Policy Framework. Conclusions on the measures in our CP7 outcomes framework" (2022). https://www.orr.gov.uk/search-consultations/pr23-policy-framework-initial-consultations

Suggestions for CP7 Network Capability measures have been made based on the findings of this review. These have been prioritised in terms of ease of implementation and impact, with a "Capability Non-Conformance" Report type measure and associated reporting of key measures on a 'Network Capability Dashboard' proposed for immediate consideration. Other suggested measures are:

- Number of 'Priority Structures' with reduced capability compared to start of CP7
- Capability of 'Strategic Route Sections' that have been identified as critical freight routes
- Number of TSRs with duration exceeding 6 months
- Number of Network Changes where 'Date Raised' is less than 3 months before 'Date Implemented'
- Number of established Network Changes by 'type'

1.7. Summary and Recommendations

The Independent Reporter was not provided with sufficient evidence to demonstrate compliance with the Network Change process. It is therefore difficult to conclusively comment on whether Network Rail is delivering its licence obligations. Considering the above, it is recommended that additional governance around network capability and measures are put in place, to make it easier for Network Rail to demonstrate and provide objective evidence of compliance with the Network Change aspect of the Network Code.

Whilst positive steps in the implementation of the Network Change Improvement Programme recommendations have been seen, it has been accepted by all parties that limited progress has been made on the previous Independent Reporter recommendations from 2017. In particular, the Reporter expected more progress to have been made on the selection, and implementation and automation of Network Capability measures.

The recommendations from this review have been summarised below - grouped by topic area. A priority has been suggested for each, although it is assumed that Network Rail and the ORR will agree priorities and assign ownership accordingly.

Table 1: Summary of recommendations

Ref.	Topic	Recommendation	Priority
REC0021-01	Network Capability Information	A formal agreement of the CP7 baseline should be established to agree the starting position for the network in terms of Network Capability with relevant stakeholders, with appropriate assurance and governance. It is recommended a process for reporting and correcting incorrect data in a collaborative way is developed to improve understanding of the type and impact of errors and improve the quality of information moving forwards**.** This could take the form of a "Capability Non-Conformance" Report, see also **REC0021-07**.	High
REC0021-02	Process	Information relating to the samples requested should continue to be sought from regions which did not provide any data, to enable Network Rail to demonstrate that the Network Change process has been followed.	High
REC0021-03	Process	It is recommended that a review is undertaken to understand in more detail the different approaches to managing TSRs, including the cumulative impact on Operators of TSRs spanning multiple routes and whether it is appropriate for all TSRs persisting for longer than 6 months to follow the Network Change process.	Medium

REC0021-04	Roles and Responsibilities	There does not appear to be a clear RACI for the management of TSR and it is recommended that this is developed. A minor revision or note should be added to the Standard (NR/L2/OCS/009) to reflect or reference the updated RACI for Network Change.	High
REC0021-05	IT Systems	Current systems do not appear to support the Network Change process as efficiently as would be possible with present day technology. The following are suggested opportunities to improve system performance: - Network Change Document Management – start managing all the documents associated with Network Change on an accessible web-based system with appropriate meta data (e.g. ELR and mileage) to improve searchability and quick generation of reports. - Automation of the process - workflow tools should be investigated as an approach to streamline the management and measurement of the Network Change process, improving efficiency, traceability and reporting. - The move to PowerBI based system for asset Reporting is positive and should continue. - The current proof of concept work to digitise the Sectional Appendix is positive and should continue. - During the course of the review, the Reporter was made aware of other digital initiatives (including the Common Network Model and central TSR database) which are ongoing within Network Rail and how they might improve Network Capability management, TSR management and Network Change process. It is recommended that Network Rail explore how these other initiatives could be applied in the context of Network Capability.	High
REC0021-06	Governance and Assurance	A review of the overall responsibility for Network Capability is recommended to ensure senior level challenge within Network Rail reflects the importance of railway capability to customers' businesses.	High
REC0021-07	Governance and Assurance	To support **REC0021-06**, Tier 1 and/or 2 Network Capability measures should be developed, agreed and implemented by ORR and Network Rail. These might include: - "Capability Non Conformance" Reports (no. of reported open incidents, time to resolve/investigate, type of incident etc from a new feedback method), and associated reporting of these measures on a Network Capability dashboard. - A regular data-audit to assess Network Capability data quality. The outcome of these audits and associated improvement plans would provide assurance to ORR and other stakeholders regarding reliability of Network Capability information and a vehicle for continuous improvements.	High

1.8. Acknowledgement

The Independent Reporter Team would like to thank Network Rail, ORR and wider TOC and FOC stakeholders for their support in this study.

2. Introduction

2.1. General

Arup, supported by Winder Phillips Associates, has been appointed by the Office of Rail and Road (ORR) and Network Rail under the Independent Reporter Framework to undertake a review of railway Network Capability.

2.2. Background

The capability of the national railway infrastructure, which is owned and operated by Network Rail, is described in documents and databases including:

- National Electronic Sectional Appendix (NESA);
- Integrated Network Model (INM);
- National Gauging Database (NGD); and
- Integrated Train Planning System (ITPS).

'Network Capability' is currently defined by the linespeed, gauge, route availability and electrification capability of the network. These are all reported annually by region and network-wide in Network Rail's Annual Return[5]. The capability of the network is also determined by other constraints such as platform lengths or power supply, which are published in the documents and databases above.

2.2.1. Licence obligation

Network Rail has an obligation as part of its licence to maintain the *"quality and capability of the network"* (condition 1.2) and to *"…maintain appropriate information about the Relevant Assets which have been allocated to it by the licence holder, including information about their condition, capability and capacity."*[6]. This obligation, set out in conditions 5.7(a) and 6.7 of its Licence, applies to both Network Rail (System Operator) and each of its Route Businesses.

2.2.2. CP6 baseline

The Reporter understands that Network Capability must be maintained at the baseline level as set at route level on 1 April 2019[7]. Any change to capability must be agreed in accordance with the Network Change process in the Network Code – specifically 'Part G – Network Change'.

2.3. Purpose of the Review

The purpose of this review is:

- to establish whether Network Rail is delivering its licence requirement (specifically maintaining Network Capability at the CP6 baseline, or following the Network Code change management processes in amending that capability); and
- to review the progress Network Rail has made in the development of its Network Capability management governance processes and systems, since the previous Independent Reporter review in June 2018 (Mandate L4AR007).

2.4. Requirements

The Statement of Works set out four key areas for the review, as follows:

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[5] https://www.networkrail.co.uk/who-we-are/publications-and-resources/regulatory-and-licensing/annual-return/
[6] *Network Licence granted to Network Rail Infrastructure Limited (as at April 2019)*
[7] Refer to Scottish HLOS Pg 8 https://www.orr.gov.uk/media/17272/download

- The processes of capability baseline agreement and reporting;
- The reporting process and governance, including the data systems that enable the process;
- The improvements that Network Rail has made in the development of its Network Capability tools and systems in CP6 against the recommendations made in the 2018 Independent Reporter review and Network Rail's Network Change Improvement Programme; and,
- Specific data and process issues that arise, based on feedback from Train Operating Companies (TOCs), Freight Operating Companies (FOCs) and feedback from within Network Rail centre and Regions.

A copy of the Statement of Works is included in Appendix A.1.

2.5. Structure of Report

This report is structured to answer the questions set out in the Statement of Works, under the following headings:

- Section 4: Capability baseline and reporting;
- Section 5: Governance and data systems;
- Section 6: Operator feedback;
- Section 7: Recommendations for Network Capability dashboard measures; and
- Section 8: Feedback on improvements.

Together, these topics set-out a remit to explore the current approach to managing understanding of the railway network capability. Each of these areas are closely linked. To enable holistic analysis of findings and development of strategically consistent recommendations, a model has been developed by the Independent Reporter team which identifies all the strategic parts of a well-functioning management framework - this is shown as Figure 2.

The model shows four enablers which are required to achieve a comprehensive, current and reliable understanding of Network Capability. A process which is not associated with clear organisational responsibilities, supported by a well aligned and well-functioning system and focused on stakeholder engagement through provision of useful information, will fail to achieve its aims. These core components must fit together well and be held together and maintained by adequate governance and assurance.

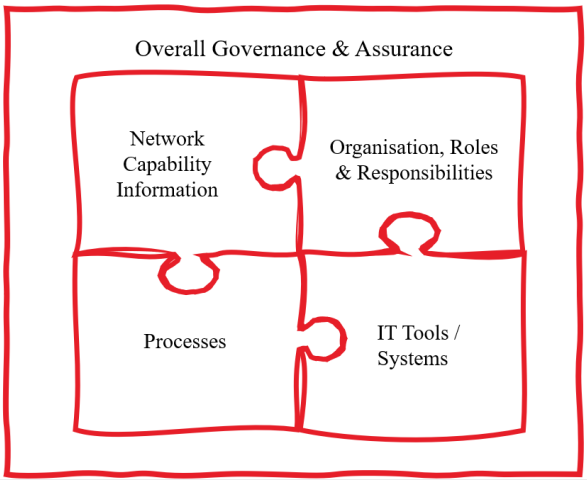


Figure 2: Network Capability information management model

2.5.1. Notation

Throughout the report, conclusions are highlighted in text boxes, following the format below.

Conclusions are highlighted from the main text by text boxes

Recommendations are followed by a reference in square brackets, including the Mandate number and a recommendation number – for example "**[REC0021-00]**".

3. Approach

3.1. Overall

This review has been undertaken in four stages, recognising a requirement from the ORR to report back on the measures aspect of the scope in advance of the Strategic Business Plan (SBP) determination at the end of March 2023, followed by a further period to finalise reporting.

The stages are structured as follows:

3.1.1. Stage 1 – Initiate

The objective of this stage was to clarify the review objectives and agree the project plan with stakeholders. A request for information from Network Rail and ORR was provided at the project Inception Meeting. To facilitate the timely organisation of stakeholder meetings, contact lists were sought for the TOCs and FOCs who would be contacted either for interview or to complete a questionnaire. In parallel, a questionnaire for the TOCs/ FOCs was prepared and reviewed with ORR and Network Rail. Meetings with key Network Rail and ORR personnel were scheduled.

3.1.2. Stage 2 – Discover

During this stage, feedback from Operators on Network Capability and Network Change was obtained through interviews and questionnaires. The interviews sought to highlight positive experiences as well as areas for improvement. Specific case studies and issues that were highlighted were followed up with requests for supporting information as required, both from the Operators from Network Rail.

In parallel, data provided by Network Rail (including Annual Returns data, details of Temporary Speed Restrictions (TSR), process maps and roles / responsibilities) were reviewed. This information was supplemented by further data requests and meetings with Network Rail's process and data owners.

3.1.3. Stage 3 – Analyse

This stage involved two parts – detailed analysis of the provided data and an in-depth analysis of the overall processes and controls, based on material provided during the 'Discovery' phase.

Initial findings were used to inform discussions with Network Rail's Network Change Coordinators (NCC) and those involved in the management and production of Network Capability reporting. A review of TSRs, and the extent to which they have been converted to Permanent Speed Restrictions (PSRs) was also undertaken.

The analysis was supported by information about Network Change events from locations that have been discussed during stakeholder meetings or selected as part of a sample, where information has been received.

3.1.4. Stage 4 – Report

An interim tripartite meeting was held with ORR and Network Rail towards the end of March 2023 to discuss proposed measures for a Network Capability dashboard in advance of the SBP Draft Determination.

The full set of findings and the resulting recommendations are recorded in this report against the questions set out in the Statement of Works. Previous recommendations and other related improvement programmes were also considered. These findings were presented at a further tripartite meeting with Network Rail and the ORR in May 2023.

Following the tripartite meeting, comments were taken into consideration and any outstanding feedback reviewed in order to update and deliver the final report.

3.2. Input Data Request

Table 2 below summarises the data that was requested at the Inception Meeting on 15/02/23 and when it was received.

Table 2: Data Request Details

Data Request	Date Received
Data used to compile Network Capability metrics for Annual Returns (2019 – present)	Received from Network Rail by 03/04/23.
List of Temporary Speed Restrictions (TSRs) that have been implemented during CP6, with supporting information (start date, end date, description)	Received from Network Rail by 06/04/23
Network Capability Scorecard / PowerBI Dashboard	Scorecard sent by ORR 10/03/23
Process maps relating to the reporting of Network Capability	Received from Network Rail 31/03/23
Network Change Process and roles and responsibilities	Received from Network Rail 13/03/23
Outcomes and recommendations from Network Change Improvement Programme	Received in parts from Network Rail (03/03/23) and ORR (10/03/23)
End to end process for operational network changes (TSRs, PSRs)	Received from Network Rail 13/03/23
Network Rail's early SBP proposals on network capability measures	Draft commentary received by email from Network Rail 03/03/23
End to end process for enhancements network changes	Included in info received 13/03/23
Contact details for all FOCS	Received – questionnaire sent out 09/03/23
Contact details for all TOCS	Received – questionnaire sent out 09/03/23
Proposed list of TOCs for interview	Agreed during inception meeting and reviewed during subsequent meetings
List of Network Changes that have occurred during CP6	Included with Network Change data received 03/04/23.
Evidence of consultation with stakeholders to agree the CP6 Baseline	No specific information received.

The above input data was received after the start of the review (20/02/23). Network Change sample data could not be requested until the Network Change information had been received. There were difficulties in obtaining this information, which are further discussed in the report. A full document register detailing all the files that were received is included within Appendix A.2 of this report.

3.3. Sampling Methodology

The rail infrastructure undergoes a number of changes each year that alter its capability. These changes are captured in the Network Capability metrics within the Annual Return, in the four key areas:

- Line Speed;
- Gauging;
- Route Allowance; and
- Electrification.

Given the volume of changes that occur on each route and each year, it was not feasible to review all changes that occur within a reasonable timeframe, therefore a sample of 376 network changes was selected for further

investigation. The methodology used to make sure the requested sample was of adequate size and content to be representative full data set is detailed in Appendix A.3. For each of the five Regions, the NCC was asked to demonstrate evidence that the sampled capability changes had undergone the Network Change process as described in the Network Code Part G.

3.4. Stakeholder Engagement

3.4.1. Operator meetings

Initially, 14 TOCs and 3 FOCs were contacted with requests for meetings. The FOCs that were interviewed were DB Cargo, GB Railfreight and Freightliner. This list was agreed at project inception and key contacts were provided to allow for these meetings to be set up quickly and efficiently. There was more discussion around which TOCs should be interviewed, with various Operators being considered for different reasons. Ultimately, several operators were invited for interview, anticipating that due to the time constraints, not all TOCs would respond or be available. The contacts for these organisations were obtained from each of the Network Rail regions' NCC's '*External Contacts List*', although in some cases, it was unclear who the correct contact point was in regard to Network Change.

Table 3 below sets out which TOCs and FOCs were contacted for interviews, the reasons why they were contacted and details on their responses.

Table 3: TOC and FOC Meetings Summary

Type of Operator	Organisation	Reason for Inclusion	Meeting
TOC	Avanti West Coast	Give spread across regions	Met on 17/03/2023
TOC	CrossCountry	Give spread across regions	Met on 11/04/2023
TOC	Lumo	To get perspective from a new open access operator	Met on 05/04/2023
TOC	Scotrail	Give spread across regions	Met on 14/03/2023
TOC	TransPennine	Recommended by ORR at inception	Met on 12/04/2023
FOC	DB Cargo UK	To address specific concerns	Met on 15/03/2023
FOC	GB Railfreight	ORR Request	Met on 07/03/2023
FOC	Freightliner Group	ORR Request	Met on 17/03/2023
TOC	East Midlands	Recommended by ORR	No response before 11th April.
TOC	Southeastern	Responded to PR23 consultation on Network Capability	Unable to set up meeting
TOC	Transport for Wales	Give spread across regions	No response before 11th April
TOC	LNER	Long distance operator and to give comparison with Lumo experience on same route	No response before 11th April.
TOC	South Western	Recently introduced new rolling stock	No response before 11th April.
TOC	Caledonian Sleeper	Recommended by Scotland NCC since they are unique operator	No response before 11th April.
TOC	Merseyrail	Recommended by NWC NCC as they are a concession from Merseytravel so a different set up to DfT funded operators	No response before 11th April.
TOC	TfL	Responded to PR23 consultation on Network Capability – also interesting perspective as both operator and infrastructure manager	No response before 11th April.
TOC	GTR	Recommended by ORR	No response before 11th April.

In cases where a response was not received in time to be interviewed, the request was altered to ask for a completed questionnaire response instead.

For the interviews to be representative, the aim was to meet Operators from across the routes and regions and as far as possible, to select TOCs of different sizes to understand the administrative burden of the Network Change process on smaller companies. Ultimately, five TOCs and three FOCs were interviewed with coverage across all Regions (albeit relatively little coverage in the Southern Region). Table 4 below provides key statistics of the UK's TOCs and helps to illustrate how well the TOC interviews were conducted in terms of a distribution in size of TOC. The table is ordered by number of employees, in descending order. By this measure, the largest TOC that was interviewed was Scotrail and the smallest was Lumo. The TOCs interviewed represent a good mix of small, medium and large companies, both in terms of employee numbers and route kilometres operated.

Table 4: TOC Key Statistics. Source: ORR Table 2200[8]

TOC	Full-time equivalent (FTE) employees	Number of stations managed	Passenger journeys (millions)	Passenger **kilometres (millions)**	Passenger train kilometres (millions)	Route kilometres operated
Govia Thameslink Railway	7,413	235	179.0	4,695.5	57.4	1,268.0
Northern Trains	6,854	465	67.5	2,000.6	48.7	3,158.0
Great Western Railway	6,230	194	55.1	3,804.5	42.4	1,997.2
South Western Railway	5,265	187	108.5	3,058.4	32.9	998.0
ScotRail	***4,925***	***355***	***46.7***	***1,473.5***	***38.6***	***3,120.5***
Southeastern	4,555	164	97.8	2,542.6	26.6	748.3
Avanti West Coast	***3,278***	***16***	***21.6***	***4,225.5***	***25.7***	***1,310.0***
LNER	3,016	11	17.7	4,388.1	22.2	1,514.5
West Midlands Trains	2,900	149	42.4	1,712.3	22.3	899.6
Greater Anglia	2,798	134	49.6	2,102.2	25.7	511.0
TfW Rail	2,769	248	17.6	734.7	20.6	1,827.0
East Midlands Railway	2,294	102	18.0	1,488.5	22.9	1,501.5
CrossCountry	***1,913***	***0***	***20.6***	***1,814.3***	***21.5***	***2,710.1***
TransPennine Express	***1,569***	***19***	***16.2***	***1,186.1***	***15.7***	***1,252.9***

[8]ORR data portal – accessed at "https://dataportal.orr.gov.uk/statistics/compendia/toc-key-statistics/"

TOC	Full-time equivalent (FTE) employees	Number of stations managed	Passenger journeys (millions)	Passenger **kilometres (millions)**	Passenger train kilometres (millions)	Route kilometres operated
London Overground	1,529	81	126.9	863.7	9.1	167.4
TfL Rail	1,255	24	37.4	459.8	6.6	98.8
Merseyrail	1,148	66	21.0	382.5	5.4	120.7
Chiltern Railways	895	35	14.3	750.6	9.2	349.2
c2c	633	25	28.1	622.0	6.0	125.5
Caledonian Sleeper	187	0	0.2	150.0	1.3	1,470.9
Heathrow Express	183	3	1.8	45.9	1.1	29.0
Grand Central	164.0	0	1.0	283.0	2.1	518.5
Hull Trains	101.0	0	0.8	177.1	1.3	344.4
Lumo	***100.5***	***0***	***0.3***	***151.6***	***0.5***	***632.5***

3.4.2. Questionnaire

The questionnaire was sent on 08/03/2023 to all TOCs and FOCs that were not asked for interviews, with follow-up on both the 20/03/2023 and 11/04/2023. Contacts were provided by the NCCs in each of the Regions from their individual contact lists. Of the 19 TOCs asked, 7 returned the questionnaire, these were:

- MTR Crossrail;
- Greater Anglia;
- Heathrow Express;
- Northern;
- West Midlands;
- TransPennine (also interviewed, but supplied questionnaire as supplementary info); and
- East Midlands (initially asked for interview but did not respond in time).

A copy of the questionnaire is included within Appendix A.4.

3.4.3. Network Rail and ORR meetings

Weekly progress meetings were held between the core team to discuss progress and findings. In addition, the following meetings were arranged with either Network Rail or ORR (Table 5):

Table 5: Meeting Schedule

Region / Team	Meeting Details	Date
NWC - Network Change Coordinator	Understand Network Change process and explore examples	29/03/2023
Scotland - Network Change Coordinator	As above	23/03/2023

Region / Team	Meeting Details	Date
Southern - Network Change Coordinator	As above	22/03/2023
Wales & Western - Network Change Coordinator	As above	21/03/2023
Eastern – Network Change Coordinator	As above	20/03/2023
Network Rail Regulator Reform Manager	To discuss the Network Change process and relevant standards	08/03/2023
Network Rail Reporting Compliance Manager – Regulatory Reporting	To discuss process of assurance / sharing of the Annual Return data with ORR	21/02/23 and 08/03/2023
Network Rail Gauging Team	To discuss gauging action plans in response to specific ORR improvement questions	22/03/2023
Network Rail Data Team	Understand / request asset data followed by a further meeting for a PowerBI walkthrough / overview of databases etc.	27/03/2023
ORR Asset Management and Operations team	Review ORR's role in the process of holding NR to account on network capability	15/03/2023
ORR Information & Analysis team	To discuss the process/ issues around the Annual Return Network Capability data and its review	13/04/2023

3.4.4. Tripartite meetings

The findings from this review were summarised at two tripartite meetings. The first of these took place on the 28th March 2023 and was used as an interim meeting covering Network Capability dashboard measures. The second meeting was held on the 03rd May 2023 and covered the remainder of the scope of works.

4. Capability Baseline and Reporting – Findings

4.1. Network Capability Baseline

The Statement of Works poses the following points for review:

- *"Sufficiency of the network capability baseline agreement process with ORR/stakeholders.*
- *Verify the soundness of Network Rail's Capability reporting, to assure ORR if Network Capability is being reported correctly against CP6 baseline and whether Network Rail's assessment of performance against the CP6 regulated output target can be relied upon."*

4.1.1. Annual Return

The Annual Return[9] is the formal reporting document by Network Rail for a range of regulated outputs, indicators and enablers. The Annual Return reports Network Capability (in Table 49) in terms of linespeed, gauge, route availability and electrification capability. These are all reported by region and aggregated up to network-wide totals. In addition, the Annual Return provides three tables describing the Network Change process for consideration –

- Table 50 – Short Term Network Change (this describes the schemes due for review and expiry during each year across the Control Period);
- Table 51 – Permanent Network Change (this describes the number of changes consulted, established and withdrawn in each year); and
- Table 52 – Discrepancies between actual and published Network Capability by type and proposed resolution (see Section 4.1.4).

A meeting with the Asset Reporting team confirmed that the baseline for CP6 was the position of the Network Capability metrics as they stood at April 2019. These values were published within Network Rail's Annual Return 2019, aggregated at network-wide and region levels.

The values of the metrics are made available via Network Rail's website alongside the Annual Return itself. It should be noted that since 2021, the Annual Return is published as a series of 'scorecards', with the specific Network Capability metrics only appearing within data tables published as a separate document to the scorecards. At the time of writing, Table 49 which contains the most recent Network Capability data had been removed from the 2021 data tables and was awaiting re-publishing.

4.1.2. Reporting of Network Capability - Annual Return

The main user of the Network Capability metrics in the Annual Return is the ORR. It is provided for regulatory compliance and forms a baseline for monitoring Network Capability and reporting Network Change. The information is submitted annually and the high level process for this is summarised in Figure 3, which was provided as an example of internal guidance within the Planning and Regulation (P&R) team. Within the process described to the Independent Reporter by both Network Rail and the ORR:

- There are steps for internal review (within Network Rail) of data that is published for the Annual Return prior to submission.
- High-level assurance is undertaken by teams responsible for collating data in Network Rail, but this appears to be around confirming all required numbers are submitted. The assurance of the numbers themselves was described as sitting with the appropriate business owners.
- An opportunity is provided for ORR to review the draft information and provide feedback to Network Rail; and

[9] https://www.networkrail.co.uk/who-we-are/publications-and-resources/regulatory-and-licensing/annual-return/

- There is time within the process for Network Rail to respond to any feedback prior to formal submission to the ORR.

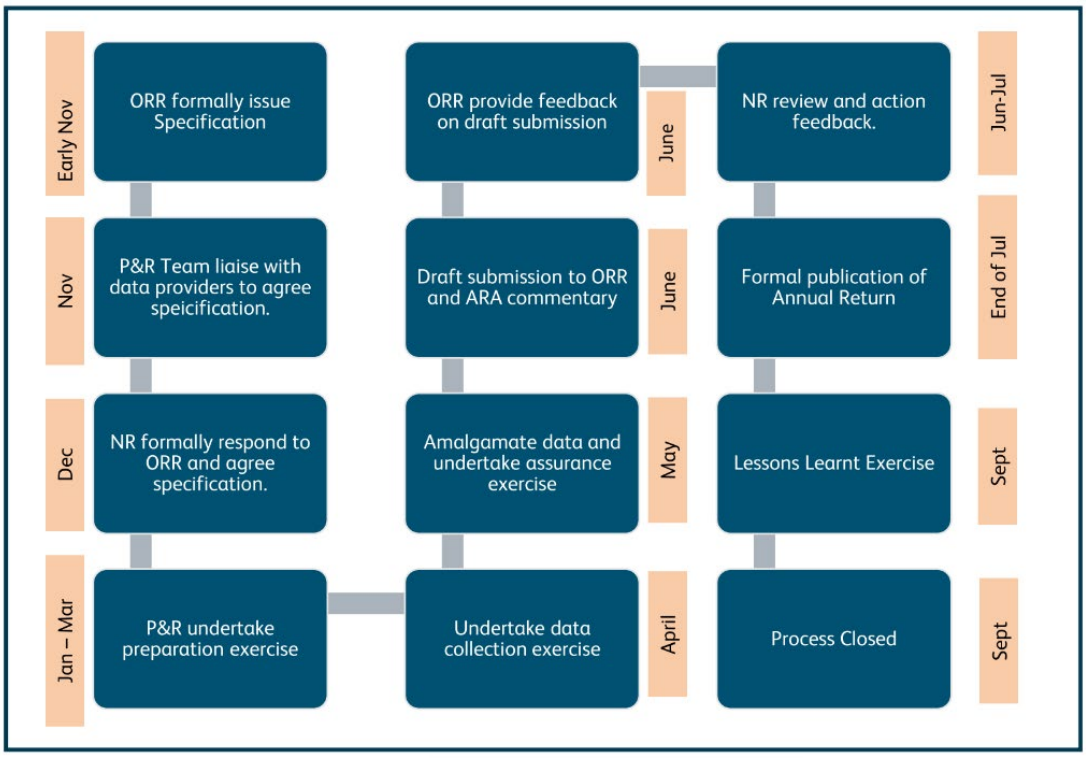


Figure 3; Key steps in the Annual Return process (from a Network Rail internal guidance document)

The extent to which the Annual Return data is used by the ORR is unclear. In particular:

- In its current aggregated format, the metrics do not appear to inform decision making beyond identifying broad trends over a longer time frame.
- The ORR make a further request to Network Rail for a separate grouping of the information by Great Britain (England and Scotland), and Wales. This is different to the default grouping of the Annual Return, which is based on the five Regions operated by Network Rail. This information is then published on the ORR Data Portal, making it accessible to the wider public.

It is unclear whether specific consultation on the Network Capability metrics and agreement of the CP6 baseline/2019 Annual Return baseline with the ORR was undertaken prior to formal publication.

The Independent Reporter could not identify a clear audit trail for the development and agreement of the formal CP6 baseline. For the purposes of further investigation, the 2018/19 position for Network Capability, as noted in the Annual Return will be considered as the CP6 Baseline.

It is understood from Network Rail that a review is undertaken by the ORR of the Annual Return metrics, and that this sometimes results in the reported numbers being challenged.

Interviews with the ORR and the Independent Reporter's own analysis of the data used to develop the Network Capability metrics raised several issues, including:

- Inconsistencies identified by the ORR in historic and published data, for example:
    - The inclusion of track that is not used to operate passenger services increasing the total track km being reported.
    - The inclusion of track km from the Isle of Wight, which is traditionally not reported on.

- The inclusion of the Cardiff Valley Lines which are no longer managed by Network Rail.
- Changes of significant magnitudes for a particular metric e.g. electrification in Southern region in 2017/8.
- Changes in metrics, such as the amount of electrified track when it was known that no electrification changes had occurred in a region.

- Discrepancies which appear to result from the way the data has been cut. For example, the ORR noted differences between the total km reported for a given year when published in the Annual Return against data published for the ORR Data Portal (they key difference is the grouping of data based on England, Wales and Scotland).
- A lack of resource preventing Network Rail from being able to fully investigate and respond to the Independent Reporter's queries of data anomalies within the time available for this review.
- Discussions with ORR indicated a period of several weeks before Network Rail were able to respond to data queries from ORR's previous review or to retrospectively correct incorrect data.

Based on the inconsistencies identified in the Annual Return data received as part of this review and evidence of similar data quality concerns provided by the ORR, the Independent Reporter has low confidence that Network Capability is being reported correctly and that Network Rail's assessment of performance against the assumed baseline of the 2018/19 Annual Returns values can be relied upon.

It is recommended that a formal agreement of the CP7 baseline should be established to agree the starting position for the network in terms of Network Capability with relevant stakeholders **[REC0021-01]**. This should consider:

- Agreement of what inclusions and exclusions for track km should be reported.
- An appropriate aggregation of the data that is reflective of the requirements of stakeholders.
- An appropriate level of assurance undertaken on the CP7 baseline by Network Rail to provide confidence to the ORR that the data has been systematically checked and assured.

4.1.3. Network Capability Data Flow

Noting the information and key findings from Section 4.1.2, further investigation and interviews were conducted with Network Rail regarding the process for production of the Network Capability metrics.

The process diagram in Figure 4 has been drawn to summarise the Independent Reporter's understanding of the process for developing Network Capability metrics, based on information provided by Network Rail.

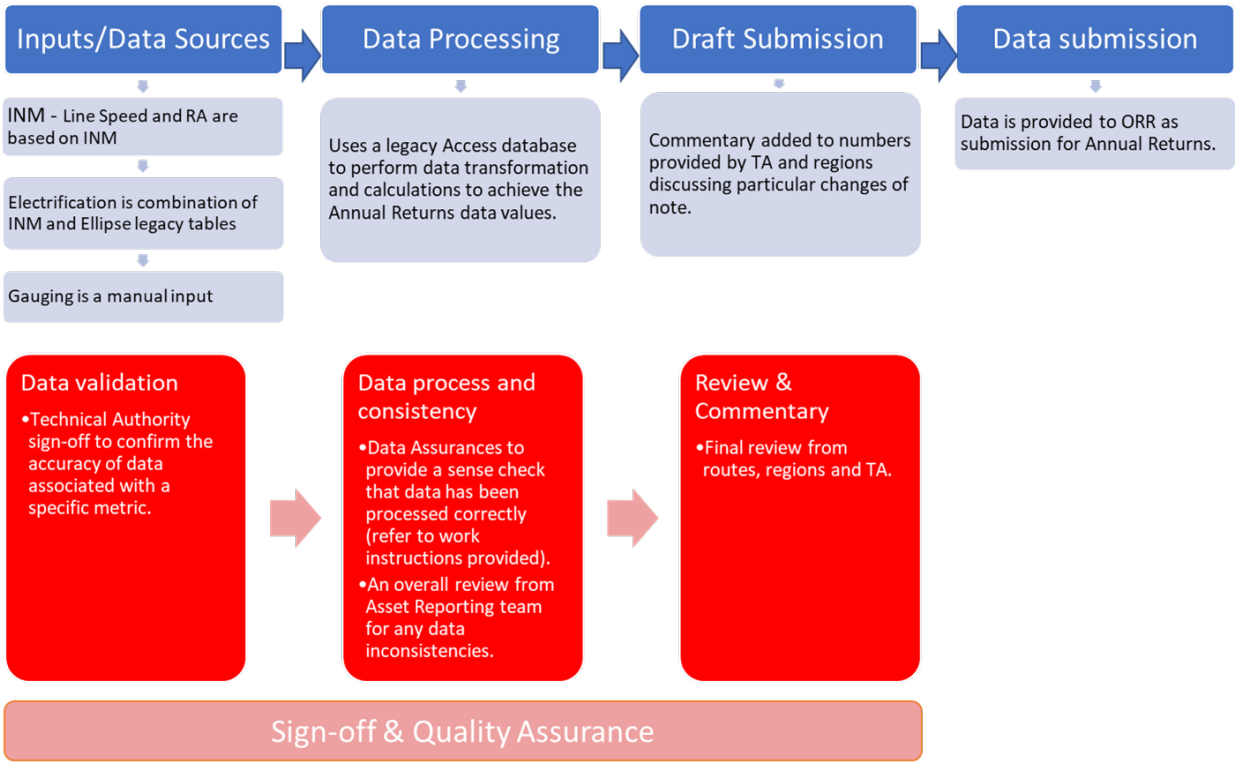


Figure 4: Process diagram for developing Network Capability metrics

The documentation[10] supplied by Network Rail and interviews with the Asset Reporting team indicated that the Network Capability metrics are derived from Ellipse and INM inputs and do not acknowledge NESA as a source of information.

Updates to NESA are made following implementation of Network Change as part of the Network Change Process (this is covered in more detail in Section 5). Furthermore, NESA was found from the Operator interviews to be the key source of Network Capability information relied on by Network Rail's customers.

Network Capability metrics for the Annual Returns are derived from different sources of information to those which are governed by the Network Change Process. As such, there appears to be a disconnect between Network Change and the information used to report Network Capability in the Annual Return.

It is outside of the scope of this review to look at the information from the source systems used to generate Network Capability metrics; however, it is understood that prior to generating the metrics for the Annual Returns, a cut of the data is obtained from the source systems (INM, Ellipse, GEOGIS and bespoke spreadsheets) which is signed off by the relevant technical authority (TA) for the discipline.

Source data for publications such as the Annual Return was found to be signed off by relevant technical authorities in Network Rail before use in calculations. Whilst this does not guarantee the accuracy of the information, it provides accountability, and an indication that the information is reviewed prior to use.

[10] Refer to "lineage diagram" within AIRS – Annual Return Technical Documentation ppt. received 31/03/23. Document Reference 40

Interviews with the Network Rail Asset Reporting team and a review of submitted work instructions[11] both demonstrated that a process is in place for the derivation of Network Capability metrics and a degree of assurance at key steps is built into this process. This includes verification macros to perform 'sense checks' on the processed data (e.g. the comparison of two data tables prior to processing and after processing for consistency of records, checking that the total report km of track was around a certain number).

No evidence of a specific RACI relating to the assurance and production of the Annual Return data was provided. However, the work instruction lists contacts / roles to consult with when validating information and the Asset Reporting team noted during the interview specific people/roles with responsibility for validation e.g. Technical Advisors in System Operator function being responsible for reviewing processed metrics.

Reviews of the data submitted to the Independent Reporter raised queries, including:

- Rationale for significant changes occurring in LNE in 2020/21, and Western in 2019/20;
- Rationale for no changes reported on Wessex route in 2019/20, 2020/21 and 2021/22;
- Rational for no changes reported on Western route in 2020/21 and 2021/22.

These were subsequently raised with the Asset Reporting team; however, due to resource pressures, the Independent Reporter was advised that it was not possible to thoroughly investigate these concerns within the time available for review. Noting the above and comments and evidence provided by the ORR (Section 4.1.2), it is unclear whether the process in place is followed completely.

The process for deriving Network Capability metrics by Network Rail in CP6 makes use of legacy systems to transform and manipulate data. Whilst a process is in place to provide points of review and guidance on the review steps, inconsistencies were observed in the data, suggesting this may not be followed consistently.

Throughout the review, improvements to the process, data and systems associated with generating the Annual Returns were seen to be in progress. For example, at the time of writing, data relating to gauging metrics was undergoing review and was being made available within INM for reporting from 2023/24 onwards, removing reliance on legacy systems and bespoke data sets held by the TA. System improvements are discussed further in Section 5.2.2.

4.1.4. Reporting of Network Change - Annual Return

Where differences from the CP6 capability baseline exist, Network Rail should be able to demonstrate that these have gone through the Network Change process. The ORR do not appear to be using the Annual Return information to understand the extent to which the Network Change process is being followed. Instead, they rely on specific events, identified by FOCs or TOCs, where issues of non-compliance are identified and raised before being investigated or escalated with Network Rail.

The number of Short Term and Permanent Network Changes are counted both for each region and network wide and reported in Tables 50 and 51 in the Annual Return. These are submitted manually to Planning and Regulation by the NCCs based on their own internal records of what has been progressed through the Network Change process for the given year (there is therefore some variation in local methodologies).

The documents *"Network Capability Management Procedure (NR/L2/OCS/009)"* and *"Management of Short-term Network Change (NR/L2/OCS/098)"* describe the process for Network Change and the roles and responsibilities associated with it (discussed in Section 5.1.1). In principle, all Network Changes should be processed by the respective regional NCC. There are some exceptions to this which potentially result in Network Changes not being captured, or in some cases, physical changes to the network occurring without going through the Network Change process.

[11] Example " AIS – WI – 020a – Dummy Run" – See Document Reference 41

Interviews with NCCs noted that they were not responsible for updating Table 52 within the Annual Returns (*'discrepancies between actual and published Network Capability'*). Responses for the Eastern region, which are the only ones present in the 2021 Annual Return, were populated by Customer Relation Executives for the region. It is unclear why only issues on the Eastern region are noted in the table. This may suggest that the Eastern region is most proactive in notifying these matters, or there is no formal process for reporting discrepancies.

The reporting of Network Changes is a manual process, reliant on non-standardised methods of recording data. Due to the ability of others to raise Network Changes, unless the Network Change Coordinator is made aware of such changes, it is possible that these may not be counted. It is also possible for physical changes to the network to occur without going through the Network Change process. As such, these may not be reported correctly in the Annual Return.

Furthermore, there did not appear to be a clear and collaborative process for reporting or correcting incorrect information, for example where reported capability is found to differ from actual capability. It is recommended that this is developed to understand the impact of errors and improve the quality of information moving forwards **[REC0021-01].**

4.2. Changes to Network Capability

The Statement of Works requires:

- *At locations where Network Rail or the Reporter identifies (through sampling for England & Wales and Scotland) that the capability of the network has changed since 1 April 2019 (CP6 baseline date), evaluate Network Rail's compliance with the Network Change element of the Network Code.*

4.2.1. Sampling Selection

The number of Network Changes established each year and by each region varies depending on the amount of works that are occurring for those years. The Eastern region has had a significant number of Network Changes in recent years due to works associated with the Transpennine Route Upgrade (TRU). The data in Table 6 shows an average of 71 Network Changes occur for any given region in a year (excluding Eastern region, the average number of Network Changes is 53).

Table 6: Number of Network Changes Consulted, Established and Withdrawn in CP6

Region	NC Status	2019/20	2020/21	2021/22
Scotland	Consulted	15	22	11
Scotland	Established	11	18	10
Scotland	Withdrawn	0	0	0
Eastern	Consulted	77	89	63
Eastern	Established	63	76	57
Eastern	Withdrawn	0	1	0
North West & Central	Consulted	11	34	35
North West & Central	Established	27	16	21
North West & Central	Withdrawn	0	2	0
Southern	Consulted	67	28	34
Southern	Established	26	25	23
Southern	Withdrawn	2	3	2
Wales & Western	Consulted	33	40	34
Wales & Western	Established	26	27	19
Wales & Western	Withdrawn	3	8	5

Based on the Network Capability data provided, Table 7 summarises the total number of changes reported by route, for each year.

Table 7: Summary of Network Capability change records provided by Network Rail

	Route	Anglia	Kent	LNE	LNW	Midlands	Scotland	Sussex	Wales	Western	Wessex
Capability	**Year**										
Line Speed	2020	19	19	29	99	30	50	6	91	653	0
	2021	9	4	961	77	10	102	2	7	0	0
	2022	22	8	20	34	10	10	6	7	0	0
Gauging	2020	71	36	162	337	37	135	36	77	120	0
	2021	16	2	244	53	9	31	0	12	0	0
	2022	19	18	52	50	14	43	6	18	0	0
Route Availability	2020	15	11	17	89	19	52	0	58	441	0
	2021	8	2	628	67	10	81	1	7	0	0
	2022	20	7	19	32	10	8	4	7	0	0
Electrification	2020	40	14	22	96	45	171	0	145	565	0
	2021	46	3	659	70	59	149	1	16	0	0
	2022	22	7	28	36	12	9	4	10	0	0

Observations on the data submitted resulted in some queries relating to the Network Change data which were passed back to Network Rail. The anomalies noted are seen in Table 7:

- No capability change records in the Wessex route.
- A significant change across all capabilities on the Western route in 2020, followed by no changes for subsequent years.
- A significant number of changes on the LNE route in 2021.

It is understood from discussions with Network Rail's Asset Reporting team that these inconsistencies could have been a result of changes in route boundaries brought about by the 'Putting Passengers First' initiative; however, confirmation was not received within the time available for the review and consequently this remains unclear. This resulted in difficulties obtaining relevant information to support the analysis. For the purposes of this review and verification check, an assumption was made that the information supplied was correct.

Using the sampling methodology described in Section 3.3, Table 8 shows the number of samples for each route, year and capability category that were requested by the Independent Reporter for further investigation.

Table 8: Number of data samples requested from Network Rail, by route

	Route	Anglia	Kent	LNE	LNW	Midlands	Scotland	Sussex	Wales	Western	Wessex
Capability	Year										
Line Speed	2020	2	2	2	5	2	3	2	5	16	0
	2021	2	0	24	4	2	5	0	2	0	0
	2022	2	2	2	2	2	2	2	2	0	0
Gauging	2020	4	2	8	17	2	7	2	4	6	0
	2021	2	0	12	3	2	2	0	2	0	0
	2022	2	2	3	3	2	2	2	2	0	0

	Route	Anglia	Kent	LNE	LNW	Midlands	Scotland	Sussex	Wales	Western	Wessex
Route Availability	2020	2	2	2	5	2	3	0	3	22	0
	2021	2	0	16	3	2	4	0	2	0	0
	2022	2	2	2	2	2	2	0	2	0	0
Electrification	2020	2	2	2	5	2	9	0	7	28	0
	2021	2	0	16	4	3	7	0	2	0	0
	2022	2	2	2	2	2	2	0	2	0	0

The associated Network Capability change records were provided by the Independent Reporter to Network Rail, following individual meetings with the NCCs. The objective was to obtain relevant evidence to demonstrate that the Network Code has been followed for the sample of requested data points.

4.2.2. Findings of Sampling

Four of the five Regions did not provide any of the information required within the time available[12], to verify that the Network Change element of the Network Code had been followed correctly.

The Southern region responded within the agreed timescale. However, from analysis of this response the following were noted:

- There appears to be a misalignment between Network Changes and reported Network Capability changes – not all Network Capability changes recorded in INM and Ellipse related to a known Network Change.
- There was difficulty in verifying the location of Network Capability changes (reported by ELR and chainage) with the locations that Network Changes are recorded against (whilst Network Changes do record the ELR and chainage impacted, these are embedded in pdf documents as unstructured data).
- The Southern region provided supplementary information for all Network Changes that had been made since 2017, with one instance dating from 2013.

Multiple location referencing systems (e.g. ELRs, Line or Routes, place names) were found to be used within the Network Capability reporting systems and Network Change process. This appears to make it difficult to quickly search for information across different functions and is discussed further in Section 5.2.1.

Obtaining Network Change documentation for specific samples proved to be difficult. Review of the information that was made available, highlighted a disconnect between Network Changes and reported Network Capability changes which means that, in most observed cases, changes in Asset Reporting systems did not correspond to a real change in Network Capability.

The Independent Reporter undertook a review based on the published Network Change notifications on Network Rail's website to confirm compliance for the changes that were received from the Southern region. On review of 50% of the 124 Network Changes in the Southern region in CP6, all of them were found to have had published information demonstrating that the Network Change process had been followed.

The Independent Reporter was not provided with sufficient evidence to demonstrate compliance with the Network Change process. It is therefore difficult to conclusively comment on whether Network Rail is fully compliant with the Network Change element of the Network Code. It is recommended that provision of Network Change information relating to the samples requested should continue such that Network Rail

[12] Sample requests were first made during the week commencing 20th March 2023. Following a joint meeting with ORR and Network Rail on 24th March 2023, the number of samples requested from each NCC was reduced by 50% and the time within which to provide data was extended. The revised sample set was circulated on 29th March with a new deadline for responses of 14th April 2023.

can more readily demonstrate that the Network Change process has been followed for the regions which did not provide any data **[REC0021-02]**.

5. Governance and Data Systems – Findings

The Statement of Works requires:

- *Evaluate whether the structure, roles, and responsibilities (in both regions and the centre) associated with network capability management are appropriate and adequate.*
- *Evaluate the effectiveness of the data management and reporting processes, and associated controls (from the point of extraction from source systems to the compilation of reports and population of data dashboards).*
- *Assess the adequacy of the various systems (both in the regions and at the centre) used in maintaining and reporting Network Capability, including how it is shared with Operators and other Stakeholders such as ORR.*

5.1. Governance

5.1.1. Network Change Process

The Network Change process is administered by the Network Change Coordinators (NCC), as stated in Part G of the Network Code. NCCs sit in different functions within Network Rail and regional variations were seen to exist for how Network Change requests are monitored, tracked and information stored. This is discussed further in Section 5.2.1.

From the obtained documentation, it was found that whilst specific standards documents have not been updated since 2010, the Commercial Manual was last reviewed and updated in February 2020. Other supporting training presentations were also submitted, providing evidence that those involved in the Network Change process appear to have sufficient material to support them.

The Network Change Process diagram is reproduced for reference in Appendix A.5. Interviews were conducted with Network Rail's NCCs and the Regulatory Reform Manager.

All steps within the Network Change process are triggered through human intervention, including:

- Instigating the Network Change Process, through the processing of a form;
- Notifying stakeholders of formal consultation for a Network Change; and
- Notifying stakeholders of the outcome of a Network Change consultation (either establishment or withdrawal).

There may be opportunities to use systems which reduce reliance on manual interventions to trigger the next stage in the process in order to reduce potential for errors and omissions and to improve consistency across the Regions.

Examples of regional good practices were noted, in particular:

- Guidance notes being provided by the NCCs at key milestones of the process. This includes following the establishment of a Network Change, where the NCC would send documents providing onward guidance to the Sponsor to update NESA (as explained by Eastern and North West & Central Regions). In some cases, NCCs set reminders to check that NESA had been updated (as in Western & Wales Region).
- Prior to instigating the Network Change process, the NCCs described opportunities available for both internal and external stakeholders to be made aware of upcoming NCs through forums such as the 'Regional Strategic Planning Group' and the 'Rail Industry Recovery Group'. Interviews with NCCs noted these forums helped to support stakeholder management.
- A strong NCC network and good communication was evident from the interviews.

Overall, through interviews with relevant members of Network Rail and through the review of documentation, there appears to be a good understanding of the Network Change Process, and there is evidence that recommendations from the previous Network Change Improvement Programme (NCIP) to regularly review the documentation and guidance have been implemented.

Whilst mandated as part of the Network Change process, the necessity to ensure publications, in particular NESA, but also including Periodic Operating Notices (PON) and Weekly Operating Notices (WON) are updated, occurs after the implementation of the Network Change. From a process perspective:

- NESA can only be changed following/alongside publication of the change event in the PON and WON.
- NESA is only updated after the implementation of the Network Change.
- Updates to NESA may not occur in a timely manner as this exists as a separate process to the Network Change process described here. Furthermore, it is a manual process to update and verify changes to NESA.
- There may be a long lead time between the establishment of a Network Change and its implementation.
    - Changes in personnel may result in continuity issues.
    - Variations which deviate from the original change may not be picked up.

5.1.2. Network Change Roles and Responsibilities

The roles and responsibilities associated with the Network Change process are described in *'Network Capability Management Procedure (NR/L2/OCS/009) (2010)'* and more recently updated in the document *'NC-Roles and Responsibilities – post SOAR approval (2021)'* provided, in the form of RACI matrices.

	Sponsor of Network Change	R/E Scheme Sponsor	Infrastructure Maintenance Delivery Manager	Senior Gauging Engineer	Route Structures Engineer	Operations Capability Manager	Area/Route General Manager	Network Change Coordinator	Publications & Document Control Mgr	Senior Route Freight Manager
Identify driver to change in infrastructure	Note 1									
Renewals/enhancements		A# R	A# R			C	I			I
Maintenance			A R			C	I			I
Incident			A R			C	I			I
Survey analysis				A R*	A R*	C	I			I
Error in SA						R	A		I	
Assess impact on capability	A R		C	C	C	C	C	C		C
Informal consultation	A R					C	C	C		I
Manage Network Change process	A					I	C	R	I	C
Delivery of change to network (i.e. physical change to network)	A R					C	I		I	I
Change asset data	A		C	C	C		I			
Change published capability	A		I	C	C	C	I		R	I

	Network Change Sponsor /Proposer (1)	NCC (2)	RRM	NCSO	DEAM	Finance Director (6)	Regional Legal Counsel	Identified Escalation Role
R – Responsible : A – Accountable : C – Consulted : – Informed					I			
Identify need for NC	A/R	C			C	C	C	C
Maintain corporate guidance and review alignment to standard (3)			R	A				
Provide local guidance / training to NC proposers	C	R			I			A
Facilitate formal consultation documentation and recording of consultees responses	C	A/R			I	I	I	I
Resolution of objections	A/R	C	C/I (5)					
Issue establishment of NC	I	A/R	I		I	I	I	I
Requesting update of Sectional Appendix (4)	A, R	I	I		I	I	I	I

Figure 5: Left: RACI Matrix from NR/L2/OCS/009 (2010). Right: RACI Matrix from 'NC-Roles and Responsibilities – post SOAR Approval (updated December 2021)

Although the roles and responsibilities are clearly defined, differences between the two matrices are observed. Accountability for components of Network Change lie with both the Network Change Coordinator (NCC) and the Sponsor in the more recent guidance, whereas all accountability lies with the Sponsor according to the Standard *'Network Capability Management Procedure (NR/L2/OCS/009)'* - potentially resulting in ambiguity over who is accountable for managing the Network Change process.

It is recommended that a minor revision or note is added to the Standard (NR/L2/OCS/009) to reflect or reference the updated RACI **[REC0021-04]**

Network Changes occur for a variety of reasons and can be conducted by a small number of people. Whilst these are all ultimately the accountability of the Sponsor (person raising the change), the following situations may arise where a Network Change can occur, potentially without the NCC's awareness:

- Where major programmes have been delegated authority to manage their own Network Changes and the NCC role may be undertaken by a designated person in the project (for some Regions, the NCC always manages the change whereas for others, this is not the case);
- Where programmes, projects or maintenance teams unilaterally decide to make their own Network Changes;
- Where changes to the network are made, but the Network Change process is not followed.
- Where deterioration to the network takes place (either as a result of deterioration of asset condition, or as a side effect of other work) but Network Rail does not notify this via Network Change.

Interviews with NCCs noted that:

- NCCs see themselves as independent arbiters of the process, liaising between Network Rail Sponsors and TOC/FOC customers.
- Network Changes have occurred without the NCC being aware of them. This could happen for a number of reasons, including those above, but also where Network Change is raised by an authorised third party and follows process accordingly;
- NCCs do not actively seek out all Network Changes that occur.
- For one region, there were strict rules in place about who could raise a Network Change.
- Insufficient knowledge or experience in Sponsor teams can result in inconsistencies in approach to Network Changes.
- Objectives of sponsor teams for delivery of projects have resulted in instances of non-compliance with the Network Change process.
- NCCs confirmed that their involvement ends once a Network Change has been established – they are regimented in staying within their remit.

There are in the region of 50 recorded Network Changes per Region per year - more with major upgrade programmes (refer to Section 4.2.1). The process takes a minimum of three months, resulting in multiple ongoing changes at any one time. With one NCC per region they are a limited resource, particularly in the case of annual leave / sickness.

Unless there is a role or responsibility for a person to oversee all Network Change types, it is not reasonable to expect a NCC to have sight of all changes. However, this does give rise to the possibility of changes occurring without following the Network Change process appropriately, which in turn can result in undocumented or mismatching information in other sources, such as NESA.

The Sponsor of a Network Change is identified as a key person in the overall process for undertaking Network Changes. They provide the necessary evidence to communicate the impact of changes and to ensure necessary elements of Network Change are undertaken. It should be noted that the duration of any particular project can vary greatly, with some projects such as Crossrail or Thameslink Programme taking a significant amount of time, which may result in the Sponsor changing over time. The Sponsor is also responsible for requesting updates to publications such as NESA.

Network Rail provided a series of training manuals and guidance notes used for briefings to people who are required to engage or undertake Network Changes, in addition to guidance on how to interpret whether a Network Change is required, and what steps need to be taken (Commercial Manual). These have been recently updated and demonstrate Network Rail's implementation of the NCIP.

The information supplied demonstrated a clear process and allocation of responsibilities associated with Network Change. The Network Change Coordinators were found to be fundamental to ensuring the

Network Change process works well; however, not all Network Changes are undertaken through the Network Change Coordinator. The ability for others to be delegated authority to manage their own Network Changes, or where the process isn't correctly followed, can result in gaps in awareness. In addition, there does not appear to be any assigned responsibility for confirming that the established change has been recorded correctly in publications.

5.1.3. Network Capability Reporting

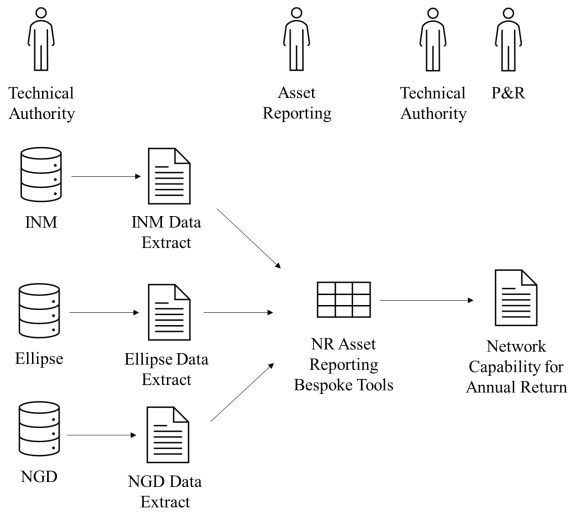


Figure 6: Summary of Governance, Systems and Data associated with Asset Reporting Process

The overall governance of the Asset Reporting process was found to involve a number of functions within the organisation:

- Source systems and data are maintained by maintenance and asset management teams within Routes;
- Information provision and reporting assurance is provided by Technical Authorities (TA) engineers;
- Asset reporting tools and outputs are managed by the Asset Reporting team; and
- Final outputs for submission in the Annual Returns are by Planning and Regulation (P&R).

For key steps within the process, relevant governance is stated within documentation for providing assurance and sign-off of data to be used for subsequent processing. Documentation provided also notes points within the processing of data where quality assurance (QA) should be undertaken, and guidelines of values to validate and verify, along with Subject Matter Experts and Asset Data Champions to seek guidance from[13].

Whilst there are noted steps for QA of data during processing and review of outputs, given the evidence and discussions from Section 4.1.2, it is unclear whether the QA is effective, or if it is followed correctly. Noting the complexity, volume, and specificity of the metrics, it may be difficult or require a significant amount of time to undertake reviews.

Following production of draft metrics to be published for the Annual Returns, these are disseminated to TAs within the System Operator function and Regions for verification. Commentary is requested to accompany the metrics to explain any changes, with final numbers to be submitted to the ORR signed-off by Network Rail's Planning and Regulation team.

[13] For example, refer to Example Work Instruction: AIS - WI - 020a - Dummy Run.doc

A review of the process to produce Network Capability metrics includes responsibility for source information by technical specialists, well documented processes with specific noted steps for QA and a final review from internal stakeholders. However, based on anomalies found in the data produced, it is unclear whether the process is being fully implemented in practice and how effective the QA is.

5.2. Data and Systems

5.2.1. Network Change

Data specifically relevant to the Network Change process can be summarised as unstructured documents that serve as evidence and information for a Network Change – listed in Table 9. These all take the form of pdf documents that contain useful information but due to their format are not easily searchable.

Table 9: Information associated with Network Change Process

Data	Description
Network Change Request Form	This document formally establishes the need for a Network Change. It provides a description of the Network Change itself – what is being changed, how it would impact the current network and would also include documentation demonstrating analysis has been undertaken to serve as evidence of the change.
Network Change Formal Consultation Letter	This document is issued by the Network Change Coordinator. It serves as the mechanism for demonstrating that Network Rail has notified stakeholders that a change is proposed and is the commencement of the formal consultation period (30 days) for the Network Change. In the event of amendments or changes to the initial consultation, further notifications will be sent advising changes to the initial proposal and will start a new consultation period.
Network Change Responses	In the event of any objections or queries associated with the change being proposed, stakeholders must respond within the consultation period. Document(s) may not exist of this nature, as the Network Change stipulates clearly that non-responses are considered as acceptance of the Network Change.
Network Change Establishment Letter	Once all queries have been resolved from stakeholders a Network Change establishment letter is issued to confirm that the Network Change will proceed and construction can commence.

Redacted versions of documents are published on Network Rail's website to demonstrate adherence to the process. Original documentation is stored on Network Rail's internal servers, with some Regions currently in the process of migrating documents to a Sharepoint site.

Interviews with NCCs did not demonstrate a consistent means of tracking the status of proposed, completed, or anticipated Network Changes. The use of email systems and local spreadsheets were identified as the primary methods to establish upcoming changes for managing workloads and understanding the status of ongoing Network Changes.

Access to Network Rail's internal documentation was not requested for the purposes of this review. It was noted during the meetings that the published information on Network Rail's website is a fair approximation of the filing structure used by Network Change Coordinators for initial documentation. A review of Network Rail's website for Network Changes found:

- Documents are sorted into folders based on either the route or project/programme that is relevant for the Network Change
- Folders associated with individual Network Changes are not consistent in their naming:
    - The majority include what appears to be an internal designated ID, whilst others don't.
    - The format is not consistent between different routes, or within routes in some cases.

    - All changes include a short description of the named location where the change is occurring, but not any reference to a structured geographical referencing method (e.g. ELR & mileage)

- Individual files do not always contain names that reference the Network Change ID.
- The search function does not work correctly – for example, if searching for a named location (e.g. "Euston"), not all files/changes associated with that location are returned.

The following general risks and issues are observed:

- There is a single point of failure in the event of a change of personnel for the NCC – if tacit information and understanding is not communicated to successors comprehensively then gaps in knowledge and continuity will exist.
- Sending unstructured documents via email is time consuming for both NCCs and recipients, making it difficult to efficiently track and manage Network Changes through the process over time.
- The unstructured nature of the data makes it time consuming to identify line of sight (for example identifying a specific change in network capability against a Network Change) – this is demonstrated through the Independent Reporter's requests to obtain data to verify the Network Code has been adhered to.
- Provision of information to Operators about a Network Change is often via signalling diagrams. These are engineering design documents that are being re-used for communication with stakeholders and therefore require expert interpretation to understand the impact on network capability. They are in a different format to later network capability publications (e.g. NESA)

An improved and standardised method for recording and searching for Network Changes (on Network Rail's website) is recommended. This will improve visibility and quick reporting of all Network Changes raised, and through design, enable easier identification by stakeholders of key information and impacted locations.
This could be achieved in the short-term through adding metadata (e.g. ELR and mileage) to all Network Change folders and files, creating an index and fixing the search engine **[REC0021-05]**.

During the course of the review, the Reporter was made aware of Network Rail's 'Digital Factory' which has invested in 'low-code' workflow tools that enable automation of processes.

It is recommended that these tools and initiatives are investigated as an approach to streamline the management and measurement of the Network Change process, improving efficiency, traceability and reporting. **[REC0021-05].**

5.2.2. Network Capability Reporting

As has been established in earlier sections, Network Capability metrics are derived from information in the source systems of INM and Ellipse. Our review has focused on the process and systems after data extraction from source systems, though acknowledges some developments being made by Network Rail to enable improved reporting.

Since 2017/18, Network Capability metrics have been migrated to make use of the INM system as opposed to reporting from the GEOGIS/Ellipse systems. It is acknowledged that due to the complexity of certain data elements, this information has continued to be reported from elsewhere:

- Switches & Crossings data (S&C) is mastered in Ellipse, so electrification data comes from two sources (INM for Plain Line; Ellipse for S&C).
- Gauging information, due to complexities with multiple gauging categories that cannot be stored in INM, continue to be extracted from a separate gauging capability database.

Through interviews, it was established that gauging data has been successfully migrated to INM and it is the intention that from 2023/24 this information will be reported from INM. It was also noted that NESA was not mentioned as a source of data for the development of the Network Capability metrics – though it should represent the same information.

During CP6, the processing and calculation of Network Capability metrics has been undertaken using a legacy Access database. Whilst this has been able to generate information to present in the Annual Return, evidence of issues with verification and data anomalies were recorded as part of this review (Refer to Section 4.1). Further to this, it appears that data is disaggregated by Routes but reported by Region since 2019, which suggests a further level of manual intervention which was not noted in documentation.

Network Rail have been developing an Asset Information Reporting System (AIRS) with third party developers that when deployed (from 2023/24) will remove the need to post process source data. This new system will also enable other advantages, including:

- More frequent and up to date reporting of Network Capability metrics;
- The ability to provide end users with information through a PowerBI Dashboard; and
- Drill down functionality to provide further detail for future analysis.

The PowerBI Dashboard would provide an opportunity to develop further insights relating to Network Capability, which may prove useful and an effective way to communicate impacts. This platform may also open opportunities to allow stakeholders to review Network Capability and Annual Returns information.

The main system used for deriving Network Capability metrics makes use of legacy systems to transform and manipulate data, which has not been updated to reflect the revised organisation structure for Network Rail. However, it should be noted that positive steps have been taken to move towards implementing a 'Power BI' reporting tool and continual improvements to reduce the different number of source systems to report on data and it is recommended that this continues **[REC0021-05]**.

5.2.3. Network Capability Information provision

There are a number of issues with provision of Network Capability information to Operators:

- Asset Management and Information is managed completely separately to Publications, leading to a disconnect between managing assets to deliver network capability, communicating network change and utilising capability information for planning & operations
- Information on network capability is spread across multiple sources – documents (e.g. NESA), forms (e.g. RT3973 forms), emails, tacit knowledge. These information sources are in different formats, and utilise inconsistent methods of referencing locations on the network
- Network capability information is usually unstructured – this means that it is difficult to validate data quality; to audit and report on capability information; and leads to inefficient processes to manage and use network capability data.

During the course of the review, the Reporter was made aware of other digital initiatives, including the Common Network Model and a proof-of-concept document discussing the challenges and opportunities associated with developing a digital replacement for the Sectional Appendix was shared[14]. There appear to be opportunities to further define these initiatives by including Network Capability use cases as part of the network model roadmap and business case.

It is recommended that Network Rail explore how other digital initiatives could be applied in the context of Network Capability. In particular, the current proof-of-concept to digitise the Sectional Appendix should continue **[REC0021-05]**.

[14] AXIOM: Sectional Appendix Replacement POC powerpoint presentation.

The benefits to adopting these recommendations include:

- increased flexibility in planning train services in alignment to network capability information;
- improved publication data quality due to reduction in human/manual processes, leading to improved communication and customer service to Operators;
- reduced cost of managing data; and
- improved potential to automate processes and create efficiencies.

5.3. Temporary Speed Restrictions (TSRs)

The Statement of Works requires:

- *Verify whether long-term Temporary Speed Restrictions go through the Network Change process and how promptly they are converted to Permanent Speed Restrictions.*

The (Short Term) Network Change process also covers treatment of TSRs with durations of longer than six months. TSRs are recorded in the Possession Planning System (PPS) and published to Operators through Weekly Operating Notices. They are not reported in the existing suite of Network Capability metrics and therefore without specific analysis, it is difficult to monitor number and length duration of TSRs.

The Network Code Part G does not require a TSR to be consulted on unless it *"has lasted or is likely to last for more than six months"* (Network Code Part G Definitions) or unless an operator has requested a consultation. In accordance with the Network Code (Condition G1.9) documentation, there is no obligation on Network Rail to notify it as a Network Change, or the conversion of a TSR to a Permanent Speed Restriction (PSR)[15].

5.3.1. Number of long-term TSRs

Data on the number of active TSRs on the rail network between 2019 and 2023 were obtained from Network Rail's PPS.

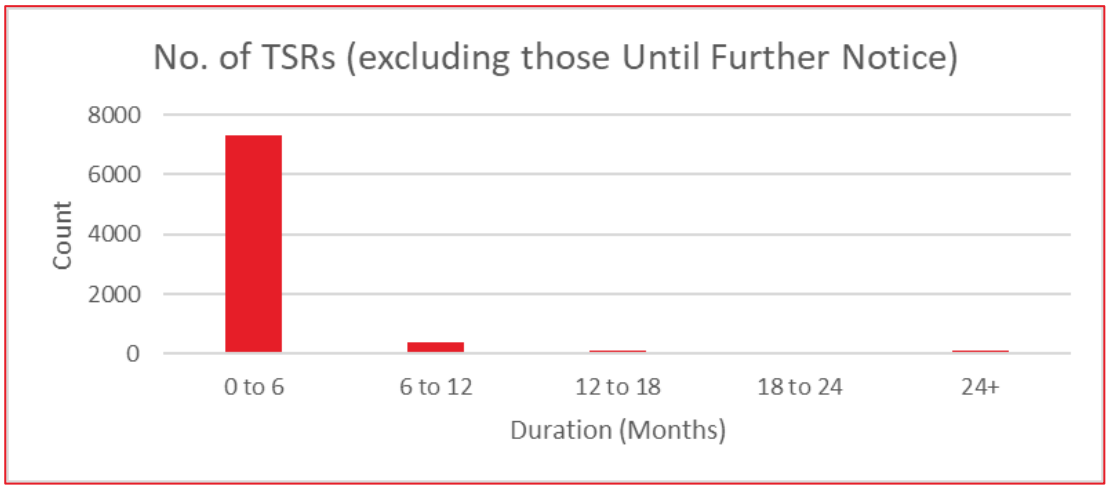


Figure 7: Count of Temporary Speed Restrictions planned or active during CP6

A total of 8,186 unique TSRs are recorded in the data provided. Of these, 246 have been set with an '*Until Further Notice*' (UFN) label. These have been excluded from the analysis. As shown in Figure 7, of the 7,940 TSRs where an end date is known, 92.3% of these have a duration of less than 6 months, which strongly suggests that a six months cut-off period is appropriate to the circumstances and current industry

[15] Refer to Network Change Commercial Manual "Lessons Learnt" part i - "Network Change for TSRs and operational changed lasting over 6 months (G1.9)"

practice. The remaining 7.7% (612 instances) would theoretically have been required to have undergone either the Network Change of Short Term Network Change process. Only 1.3% (104 instances) of TSRs were found to have been active for longer than 2 years.

A sample review of the longest-lasting TSRs (over 5 years) noted that approximately two thirds were related to signal or level crossing sighting issues, with the remaining third split 50/50 between bridges and track issues. Many were on relatively low traffic volume and/or goods lines.

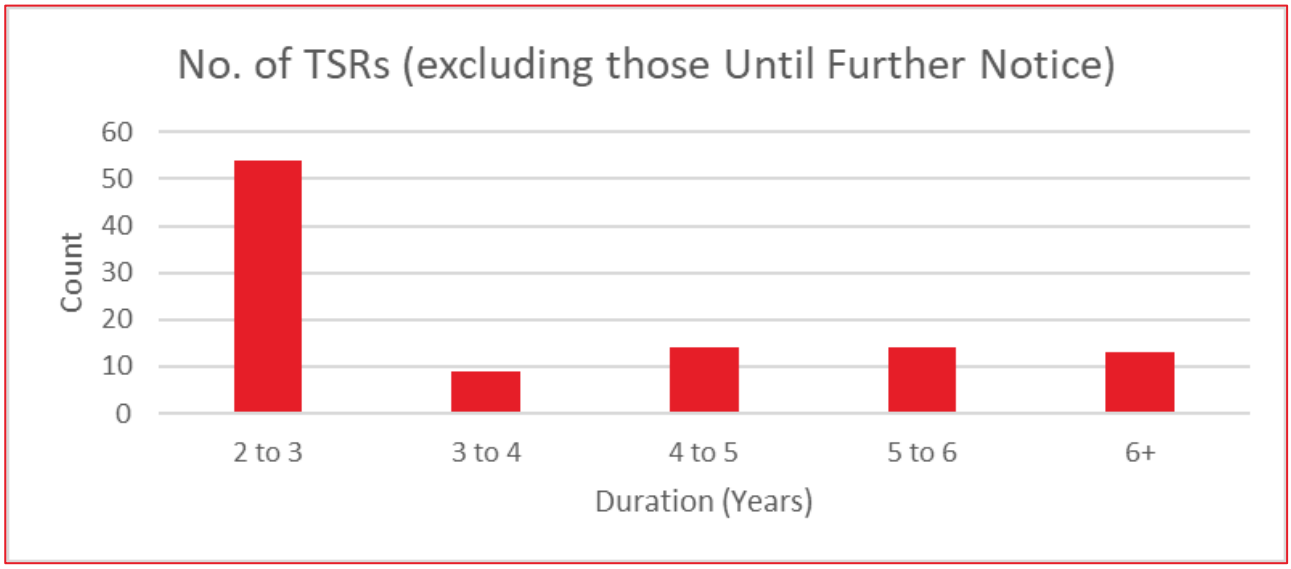


Figure 8: Count of Temporary Speed Restrictions active for longer than 2 years

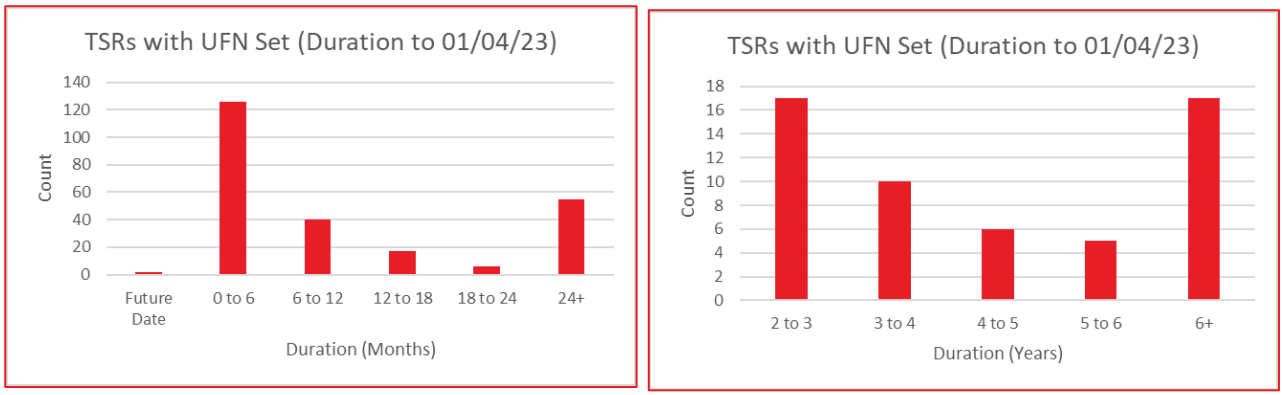


Figure 9: Counts of TSRs where a UFN label has been applied

For the 246 instances where a UFN label has been applied (), 118 have been in place for longer than 6 months, with 55 of these records having been in place for over 2 years.

TSR are not reported in NESA or the currently Network Capability metrics. An increase in TSRs and/or their duration could imply network degradation which is not picked up elsewhere by the Network Change process. A recommendation for monitoring this is made later in this report (refer to 'Measures' Section 7.3.4)

5.3.2. Treatment of long-term TSRs

It is apparent that there are different interpretations of the Network Change process in the case of TSRs.

The Network Change documentation notes that where a TSR is active for more than 6 months, then it should follow the Short-Term Network Change (SNC) process in the first instance. A SNC should only apply in the event that the TSR is active for less than 2 years, or there is agreement reached between each affected

operator that it may last for a longer period of time[16]. When the expiry date nears, the SNC may be reviewed and extended.

With respect to converting TSRs to PSRs, as noted in the Statement of Works, the data was not able to identify whether this had occurred. It should be noted that conversion to a PSR would remove any obligations for Network Rail to restore network capability.

Interviews with NCC noted some regional differences with the handling of TSRs:

- For the Scotland region, PSRs were regarded as a reduction in Network Capability, which is against Transport Scotland's aspirations for maintaining network capability to at least the same level at the start of CP6. The Scotland region therefore tends towards reviewing and removing TSRs where possible, otherwise extending them.
- Some Regions, such as Western, undertook a targeted approach – specifically undergoing projects to identify and convert TSRs to PSRs, or removing them.
- In other Regions, for example Eastern, it was noted that few TSRs were converted to PSRs due to resistance from Operators.

Greater Anglia, in their questionnaire response, stated that they have urged Network Rail to *"Short Term Network Change the many 6+ month old TSRs on (their) part of the Network"* – although they noted that this has not often happened. They stated that Network Rail is *"usually quite efficient in implementing the Part G1 Network Change process where a TSR is made permanent"*.

The interviews also noted that similar to other types of Network Changes, NCCs were not required to actively pursue conversion of TSRs.

The impact of differenced in treatment of TSRs across Regions is particularly felt by freight and cross-route operators when dealing with this specific type of Network Change – for example impacting timetabling and performance management.

From this review, it does not appear to be the case that long-term TSRs should necessarily be converted to PSR. This would signify a permanent deterioration of capability and may not always be appropriate or desired by Operators and/or Network Rail, for a variety of factors including performance and capacity management factors; compensation outcomes; engineering budgets and priorities. One approach would be to consistently recognise longer term TSRs as a (temporary) change to network capability by implementing the Short-Term Network Change process, where a TSR will last longer than 6 months.

A uniform approach would remove ambiguity for all stakeholders, although it is accepted that TSRs are the responsibility of several groups within Network Rail and this may not be straightforward.

> It is recommended that a review is undertaken to further understand the different approaches to managing TSRs, including the cumulative impact on Operators of TSRs spanning multiple routes and whether it is appropriate for all TSRs persisting for longer than 6 months to follow the Short-Term Network Change process (and the subsequent impact on number of Network Changes to be processed). **[REC0021-03].**

5.3.3. Data and systems for TSRs

TSRs are managed through multiple processes, across multiple teams, including Operations (e.g. signage, publication/notification to train drivers); maintenance and asset management (management of asset issues / planning TSR removal); performance (delay attribution, impact review) and timetabling (planning for impact of TSRs). This leads to a fragmented process and systems landscape, with data held in multiple sources. Consequently, there appears to be no single picture about the current, historic or likely future states of TSRs on the network, in relation to management, decision making and reporting. This also acts as a barrier to automation of business processes and to implementation of new operational technology.

[16] NR L2 OCS 098

This report has sourced data from the PPS, which is a national database that publishes the WON and therefore is considered to be a reasonably accurate source of which TSRs have operated on the network, due to critical nature of providing the train drivers with accurate information via the WON. However, PPS does not hold other elements of TSR data, including:

- Emergency and blanket speed restrictions (which are 'wired' out by Control i.e. word documents)
- TSR treatment / removal plans (which are held in local maintenance databases / spreadsheets)
- TSR performance impact (held in delay attribution systems)

In order to address this fragmentation of management and information provision from a Network Capability / Network Change perspective, it is recommended that Network Rail continue with the existing 'TSR database' project, with additional consideration of use cases involving Network Capability and Network Change **[refer to REC0021-05]**.

6. Operator Feedback

The Statement of Works requires:

- *Survey a representative and valid sample of the train and freight operators including GB Railfreight and Freightliner, to identify any pattern of concerns with the delivery of network capability obligations. This is in particular regard to Route Availability and Gauging.*
- *Specific issues raised by the operators should be followed up with a review of NR's records to assure processes were followed.*

6.1. Introduction

Train Operating Company (TOC) and Freight Operating Company (FOC) meetings took place with the following Operators between 07/03/2023 and 12/04/2023:

- FOCs - GB Railfreight (GBRF), Freightliner, DB Cargo
- TOCs - Scotrail, Lumo, TransPennine (TPE), CrossCountry and Avanti West Coast

A further six TOCs responded to the questionnaire, with TransPennine also providing a questionnaire following interview. Further details on the selection process are given in Section 3.4.1.

This section provides a summary of the feedback. Where examples are given in the text, the Operator is provided in brackets. Specific examples are recorded in more detail in Appendix A.6. These were discussed during regular team meetings to facilitate further discussion at Network Rail meetings and to follow up with data requests; however, as noted in Section 4.2.2, there have been difficulties obtaining specific records from Network Rail.

The needs of freight and passenger operators are different in regards to access to and use of network capability information, and in relation to Network Change. The need for capability data can be described as more constant in the case of freight, and more of an infrequent but no less important requirement for passenger operators.

6.2. Capability Baseline & Reporting

TOCs and FOCs do not appear to use or refer to the capability baseline data presented in the Annual Return. In its aggregated format they find it to be of limited use when attempting to schedule services – instead, they noted during interviews that their reliance on Network Capability data is focussed on publications such as the NESA and supplemented by many other data types and sources (for example signalling scheme plans, Freight Load Books, Timetable Planning Rules (TPRs) etc.)

6.2.1. Quality of published capability information

Confidence in the quality and accuracy of Network Rail's capability data was an issue across both freight and passenger operators that were interviewed. Having reliable data is crucial for operators to run their business yet interviewees all described the need to verify published information before utilising it in their business processes and planning. This verification process typically involves different data sources and/or access to multiple contacts within Network Rail. Many described contacting other operators or phoning signal boxes directly to obtain correct and accurate data.

Freight operators in particular use a broad range of capability data to undertake their business-as-usual activities and to explore new business opportunities. GBRF described having to be '*extremely agile*' – sometimes having as little as a few days to respond to new opportunities or plan rolling stock movements.

Many examples of inaccurate data were cited in our interviews and there appeared to be low confidence in NESA. Some of which are detailed in Appendix A.6. Smaller operators with limited resource described having deployed manual methods to measure platform lengths to confirm or refute the information provided in NESA *(all Lumo stations and St Pancras for Hull Trains)*. Freight operators *(GBRF, Freightliner)* described using Google Maps and other third party data sources to verify loop lengths rather than relying

upon the official data sources provided. East Midlands Rail in their questionnaire gave an example of route opening hours being incorrect in the TPRs which led to failed bids (the example given was an enhanced Sunday service where signal boxes were not staffed over winter).

The process of updating information (for example following completion of upgrade work), was described as being either extremely slow or non-existent. It was stated that this adds to the mistrust of data. When Operators find inaccurate data, they described a process of informing Network Rail account teams, local contacts, and/or the Network Change Coordinator. The interviews did not find a consistent understanding of what the process should be if incorrect data is uncovered. There was a notable absence of ORR in the process, with only the most severe cases being escalated via the ORR – examples being provided from the Transpennine route which is *'published at W8 but with five structures foul of W8...and two impassable'* (reported by Freightliner) and of *'non-replacement of permissive moves functionality'* around Bristol Temple Meads (reported by GBRF).

The Transpennine route example was investigated further via both the Network Change team and the Gauging team. In this case, it was found that the gauge capability had deteriorated over time from the published W8 level, potentially as a result of upgrade work on the Transpennine route. This deterioration had not led to a Network Change request being raised, nor had it triggered a changed to the Sectional Appendix / NESA documents. See **REC0021-05** which suggests how digitisation of network capability documents would help prevent such errors arising in future.

Power supply capability data was consistently raised by operators as an area for concern *(Avanti, TPE, GBRF, Freightliner, Lumo)***,** with the exception being CrossCountry who do not currently operate any electric traction. Several recent disputes involving Event Steering Groups *(East Coast Mainline – TPE, Lumo)* and declarations of Congested Infrastructure *(GBRF, TPE)* were raised, with participants citing their concerns around a lack of credible power supply data across the network. The link between power supply and network capacity was described as being a real threat to operators' ability to deliver both contractual obligations and commercial aspirations.

There does not appear to be a process for reporting of incorrect data in a collaborative way. It is recommended that such a process is developed to improve understanding of the type and impact of errors and improve the quality of information moving forwards **[REC0021-01].**

6.2.2. Impact on freight operators

A number of FOCs noted that inaccuracy of data can effect a their business in a number of ways:

- Additional mileage and crew costs as a result of needing to use an alternative route;
- Additional mileage and crew costs as a result of needing to access a different terminal or port to access the rail network; and
- Loss of potential business because information on capability is not forthcoming, is inaccurate, or because the additional costs above make the commercial proposition untenable.

Freight operators described frequent scenarios where they had highlighted to Network Rail where infrastructure was not in a condition fit for their use. This was typically transacted via either the Route Freight Managers or the Freight and National Passenger Operations (FNPO) account team. The issues described above can result from these situations as FOCs described the process of bringing such infrastructure up to operational standard as a lengthy one, usually beyond the timescales required to acquire new or different business.

6.2.3. Impact on TOC customers

TOC participants described a consistently lower frequency of circumstances where they required access to capability data. These were usually centred around responding to engineering work requests from Network Rail, or as a result of change (either Network Change requests, or business driven changes such as timetable changes).

TOCs described day to day conversations about capability of the network typically involving interactions with the capacity planning team at Network Rail. There was mixed feedback from TOCs in relation to the ability to rely on the knowledge of the planning team in Milton Keynes. Those based closer to them (for example Avanti) described a good relationship with competent practitioners on hand to assist with Network Capability data. Conversely, Scotrail described long standing and continuing concerns with turnover of staff and knowledge of local geography in Milton Keynes. This can create a reliance on local contacts and perpetuates the lack of confidence in data quality.

6.3. Governance & Data Systems

6.3.1. Network Change

The Network Change process was generally described by the Operators as being clear, typically consistent and fit for purpose, but with many examples of it not being followed consistently - particularly in respect of insufficient, incomplete or late notice information. Network Change Coordinators were described as a competent and willing resource, working within often constrained parameters and did not appear to be fully supported by the processes and systems around them.

Interviewees consistently described the Network Change process as one where they typically felt 'done to' rather than being an equal participant in the process. This manifested in two principal ways:

- Objections to Network Change not being dealt with promptly, effectively, or in some cases at all. In the latter instance examples were sighted of Network Change being established despite operators having registered legitimate objections (*for example Port Talbot re-signalling – GBRF, FL)*.
- Operators agreeing to a Network Change only to find the detail of the change alters later in the process without further/reopening consultation *(for example Marsh Lane – GBRF)*.

When these issues have occurred, it was found that they were not commonly escalated within Network Rail or to ORR. The interviewees described this being driven by three factors;

- Operators (in particular freight) do not have the resources to pursue escalation of these issues. There was a perception that resolution could take a long time to achieve when operators are already utilising scarce resources to undertake core business activities;
- Operators have very little confidence that escalation would lead to a positive outcome. This was mainly a perception but may also be based on some experience of escalating issues that do not result in a positive outcome for Operators;
- Operators are conscious of the need to maintain positive working relationships with, in particular Network Rail, therefore a feeling of not wanting to disrupt or damage the relationship was described.

The Network Change process allows for an 'informal Network Change consultation' step[17]. There was positive feedback on this step, with many participants feeling that it was potentially underutilised and advocating for wider spread of this mechanism. Whilst not cited as being a completely flawless process, two operators *(TPE, CrossCountry)* stated they thought it would be beneficial to consult the detail of Network Change informally in more cases. This way, they felt all concerns could be worked through in advance of the formal process where protecting contractual positions and compensation budgets become the priorities rather than focussing on the detail.

> The 'informal consultation' aspect of the Network Change Process provides opportunity to refine the detail and request more information on the proposed change before a formal Network Change Notification is received. In a process where ultimately the choice is "accept" (and forfeit any potential compensation) or "reject", this step encourages collaboration between the parties and should be used where possible to resolve comments or conditions prior to acceptance.

[17] Step 2 in the G1 Network Change Process – refer to Appendix A.5

6.3.2. Treatment of TSRs

Operators were asked to give their views on the process for publishing TSRs and how these are converted when it becomes apparent that a longer-term solution is required.

The Operators raised no significant concerns in this area; however, the question did bring about discussions with several operators around the use of Short-Term Network Change and gauging/structures derogations as examples of other processes affecting them in a similar way. Similarly to TSRs, these measures are, by their very nature, intended to be time bound and short term in effect. However, significant concerns were raised *(Scotrail, GBRF and Freightliner)* that such measures were being initiated as a short-term restriction on capability but being 'rolled over' in perpetuity. An example was given in Invergordon where a temporary change to the signal box boundaries and token exchange has been in effect since 2018, with no compensation to operators (because this is not triggered for temporary Network Change) and no apparent plan to return to the original network capability.

The FOCs spoke at length about the cumulative effect of gauging and structures derogations meaning they could have multiple speed restrictions (imposed as mitigations for such capability degradations) in place across multiple Network Rail routes. When accounted for in end-to-end journey times, the potential commercial effect is significant; however, the Operators felt this was being missed in the way the data was managed locally, with the holistic impact not visible to Network Rail **[REC0021-03].**

6.4. Capability Dashboard and Network Rail Improvement Initiatives

None of the users involved in the interviews or responding to the questionnaires were familiar with the capability dashboard and there was little knowledge of any improvement initiatives in this area.

7. Recommendations for Network Capability Dashboard Measures

The Statement of Works requires:

- *recommendations as to how Network Capability dashboard measures could be improved in CP7, taking account of HLOS requirements, ORR's PR23 consultation responses and Network Rail's early SBP proposals*

This section sets out the context of each of these sources of information and presents a framework and suggestions for improving the Network Capability dashboard measures for CP7.

7.1. Background Requirements

The requirements for the network in CP7 are defined in the High-Level Output Specification (HLOS) documentation prepared for England and Wales, and separately for Scotland.

7.1.1. CP7 HLOS Requirements England and Wales

The England and Wales HLOS[18] sets an expectation for strong analytical capability and collaboration with Government and train operators to drive overall capability of the transport network. It puts emphasis on understanding the need of the customer in this regard; however, there are no explicit requirements set out in terms of network capability.

7.1.2. CP7 HLOS Requirements Scotland

The Scottish Ministers' HLOS[19] is more specific in its requirements for capability and it is detailed throughout the document, as set out in the following extracts:

Maintaining network capability

"the capability of the network will be operated and maintained as a minimum throughout CP7 at a level which will satisfy all of the track access rights of all passenger, freight and charter operators in place at the date of the publication of this HLOS and any rights secured… between then and 31 March 2024".

"..the network must be operated at a level which is fully consistent with the commitments specified in the agreements or franchise contracts … and the industry "network change" process."

Performance

" Network Rail is required to provide a consistently high level of performance for the benefit of freight users in CP7…with Network Rail providing capability to ensure that the Freight Cancellations and Lateness (FCaL) measurement for freight trains on Scotland's railway does not exceed 5.5%."

Whilst FCaL is noted as a specific measurement, changes in FCaL would have root causes spreading much wider than Network Capability and therefore it is not proposed as a measure in this report.

Asset management, knowledge and assurance

The Scottish HLOS also notes that "*incomplete or inaccurate asset data has led to risks, delays and costs for the wider industry and funders"* – therefore the importance of accurate and correctly maintained asset data and gauge information is highlighted to ensure customers can make informed business decisions.

[18] https://www.gov.uk/government/publications/railways-high-level-output-specification-2022/railways-act-2005-statement-high-level-output-specification-2022

[19] https://www.transport.gov.scot/media/52916/scottish-ministers-high-level-output-specification-hlos-control-period-7-2024-2029.pdf

Gauge management and assurance

Network Rail is required to maintain the Structural Clearance CP6 baseline capability throughout CP7 and to restore any structural clearance which has been allowed to deteriorate.

A *"Scottish Passenger Vehicle Gauge"* requirement is to be defined by the end of CP6, to ensure efficient network-wide operation of rolling stock, and Network Rail are to ensure structural clearance for the Scottish Passenger Vehicle Gauge requirement is achieved and maintained; however, no timescale for this has been stated.

"…freight gauge capability should be maintained to at least the capability in the most recently published issue of the Sectional Appendix11, or the special authorisation issued by Network Rail on a RT3973 form to run a larger vehicle or heavier axle load on a specific Scottish route, whichever is most capable at the time of publication of this HLOS".

Readiness for rolling stock

With regards to introduction of new rolling stock, Network Rail are required to maintain asset capability and provide assured data upon which business decisions on rolling stock can be made, and in particular:

"Data on capability, infrastructure gauge, electro-magnetic compatibility and vehicle–platform interfaces, should be maintained now for the safe operation of existing rolling stock."

There is an obligation on Network Rail and the ORR to have a system for monitoring and reporting on the delivery of the specific capability related requirements identified above; however, the brief for this Mandate was set before the Scottish HLOS was published and therefore this has not been considered in detail as part of the review. However, the requirements inform the suggested measures for Network Capability discussed below.

7.1.3. ORR PR23 consultation responses

The following documents have been reviewed:

- Office of Rail and Road – PR23 Policy framework – Conclusions on the measures in our CP7 outcomes framework (19 December 2022)
- Office of Rail and Road – Responses to PR23 policy framework consultations

The ORR framework for measures has three tiers – 'success', 'supporting' and 'additional assurance' (Figure 10).

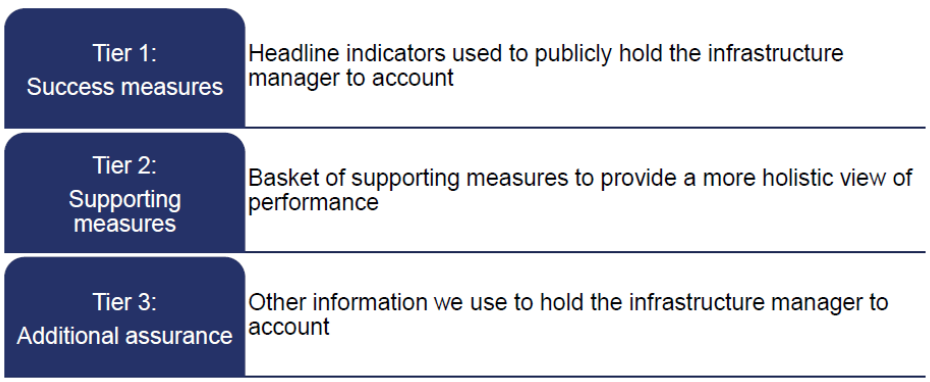


Figure 10: CP7 outcomes framework (ORR PR23 Policy Framework)

No success or supporting measures were proposed in the CP7 outcomes framework for network capability[20]. ORR's approach instead is to monitor this through dashboard reporting and engagement with operators.

[20] Refer to "ORR Responses to PR23 policy framework consultations" and "ORR – PR23 Policy Framework. Conclusions on the measures in our CP7 outcomes framework" (2022). https://www.orr.gov.uk/search-consultations/pr23-policy-framework-initial-consultations

Respondents to ORR's consultation supported development of capability measures and requested further information on what 'dashboard reporting' would look like. Northern Trains acknowledged that there were *"widespread challenges"* with Network Capability and that monitoring alone wouldn't go far enough to address these. Network Capability was recognised as a *"key risk area"* (Rail Freight Group).

Freightliner found that whilst published capability data (particularly gauge) was useful for their operation, examples were cited where published capability data (or elements of capability data) were not available.

TfL stressed the importance of ORR liaising with operators to ensure adequate consultation where capability is changed, particularly when operating companies are not the primary customers.

Although there was good response to the consultation from different stakeholders, no suggestions for measures which specifically related to capability were provided. It is understood from ORR that they are not seeking any Tier 1 success measures for Network Capability in CP7, but may look to include other measures.

7.1.4. Network Rail's Early SBP Proposals

No guidance on Network Capability was given in ORR's document "Guidance to Network Rail on the preparation of its Strategic Business Plan (July 2022)".

Network Rail's draft Strategic Business Plan (SBP) proposals have not been shared in detail as part of this mandate. It is understood that the draft plans include a target for freight growth of 7.5%. Network Rail expect that this growth will be driven by heavy construction traffic, and to support this, they have set aside £72m investment for *'high priority structures'* where *'capability to carry heavier traffic has already degraded, or is likely to degrade within CP7'*[21].

7.2. Criteria for Successful Measures

As part of the previous IR review of Network Capability[22] a list of key characteristics of 'best practice' metrics was proposed:

- The metric should be objective and easy to measure;
- It should be relevant to the organisation being measured (it is helpful if the output aligns to what the organisation is managing);
- The metric should provide an immediate and reliable indication of performance;
- It should be cost efficient to collate the information;
- They should be understood and owned by the group being measured (both Network Rail and operators);
- For leading performance indicators, there must be a connection to the desired lagging outputs - so that there is reasonable belief that the actions taken to improve the leading performance indicator will be followed by an improvement in the associated lagging output indicators;
- The reasons for measurement are understood, with a clear link back to HLOS, the Strategic Business Plan, and eventually the CP7 Determination and Delivery Plan; and
- They provide information to guide future management actions.

The above points have been used to guide the recommendations below.

[21] Extracted text as reported by email 02/03/23

[22] ORR & NR: Mandate L4AR007: Review of Network Capability – Phase 2. Recommendations on the Monitoring and Assessment of Network Capability in CP6, Arup Report, 2018

7.3. Network Capability Measures

7.3.1. Current Reporting

As detailed in Section 4.1.1, the current Capability reporting in the Annual Return is in terms of linespeed, gauge; route availability and electrification capability (reported regionally and network-wide) with tables to record 'Short Term Network Change' (schemes due for review and expiry) and 'Permanent Network Change' (number of changes consulted, established and withdrawn consulted).

7.3.2. Proposed framework for future measures

For measures to be meaningful, they should be targeted towards a specific business outcome, consider who the 'customer' is and what the 'need' is. In all cases, the aim should be for a clear line of sight between measures of capability and railway industry outputs.

It should be noted that Network Rail's licence condition requires that the *'quality and capability'* of the network is maintained and that Network Rail must maintain *'appropriate, accurate and readily accessible information about the relevant assets, including their capability..'*. Any amendments to capability from the agreed baseline (in this case the baseline set at route level as on 1 April 2019) should be made through following the Network Code change management processes. This section suggests measures to cover all of these elements.

In the case of Network Capability data, there are several end-uses for consideration. Therefore, the recommendations outlined below are split into four groups (A to D) based on purpose. All recommendations are then considered in more detail in the subsequent section.

A. Network Capability provision

These measures are proposed to monitor compliance of Network Rail's licence obligation to maintain network capability (at baseline within England and Wales; to meet HLOS requirements within Scotland). The primary 'customer' for these measures will be the ORR; however, it is noted that any improvement to monitoring in this area will likely lead indirectly to a positive outcome for the Operators, as the new measures are designed to focus on network capability outcomes that are important to their businesses.

In this area, four measures are proposed:

- A-1. Network Capability aggregations (existing measure retained for long-term trend analysis)
- A-2. Priority structures
- A-3. Section measures
- A-4. No. of TSRs

B. Network Change process effectiveness

These measures are to demonstrate effectiveness of the Network Change process (with respect to Network Capability). The primary 'customer' for this measure will be the ORR; however, it is noted that any improvement to monitoring in this area will likely lead indirectly to a positive outcome for the Operators, as the new measures are designed to focus on improving the monitoring of Network Change according to the impact on their business.

- B-1. Network Change timescales (additional categorisation for existing measure)
- B-2. Network Change by type (additional categorisation for existing measure)
- B-3. Network Change by severity (additional categorisation for existing measure)

C. Data Quality

These measures are proposed to assure the consistency of Network Capability information. The primary 'customer' for this measure will be the ORR; however, it is noted that any improvement to monitoring in this area will likely lead indirectly to a positive outcome for the Operators, as the new measures are designed to focus on improving consistency across multiple sources of information.

- C-1. Data consistency between Publications and Asset Information Systems
- C-2. Data consistency between Publications and raw data
- C-3. Publications consistency

D. Decision Making

No separate measures are proposed to support Network Rail in their decision making in management of capability; however, A-2 and A-3 are particularly useful for Network Rail as an input to Asset Management planning, supporting correct prioritisation of work to maintain network capability. C-1 and C-2 will help Network Rail track where published data is no longer reflective of conditions 'on the ground'.

Measures that monitor accuracy of data have not been proposed at this stage (for example, the common confidence grade scoring, with A-E grade for system reliability and 1- 5 score for data accuracy). As most datasets are not digitised, this would require heavy duty comparison and sampling of data from 'on-the-ground' observation, which would involve high cost and risk. In the interim, it is recommended that a regular (annual) data-audit is planned to measure non-conformance of reported network capability changes **[REC0021-07].** See also **[REC0021-05],** regarding data set digitisation.

7.3.3. 'Capability Non-Conformance Report'

During discussions with the ORR it was stated that most issues relating to Network Capability / Network Change are raised by freight operators and at forums rather than through detailed review of the Annual Return tables. Crucially, these issues are raised through different routes and there does not appear to be a consistent approach to managing them.

Similarly, conversations with Operators presented many examples of incidents and underlying issues which led to either Network Capability not being as reported or the Network Change process not being carried out effectively. It was found that these incidents were not often escalated to ORR or Network Rail – principally for the reasons outlined in Section 6. Some were long-standing.

A 'Capability Non-Conformance Report' (CNC Report) measure is therefore suggested as a means of providing a feedback loop between key stakeholders and Network Rail. This would make it easier for customers of network capability (primarily Operators) to report any issues with Network Capability provision, the network change process or data quality, through a simple non-conformance report template.

A successful report card scheme will aid Network Rail in more effective management of its licence condition, by:

- Tracking incidents and improving understanding of root causes and common issues;
- Prioritising the needs of customers based on their feedback;
- Triggering a follow up process for resolution, with an action plan and timescale that is appropriate to the nature (criticality/scale) of the incident; and
- Including embedment checks on high criticality reports, to close any actions.

A ‘Capability non – conformance’ report measure, or similar, is suggested to accumulate feedback from Operators. As a Network Rail owned process, metrics could be gathered from the CNC reports (no. of reported open incidents, time to resolve/investigate, type of incident etc) to provide additional data points for a Network Capability dashboard (using Microsoft PowerBI or similar). This dashboard can then be shared with the Network Rail Capacity Steering Group members on a regular basis **[REC0021-07].**

7.3.4. Proposed measures for Network Capability

Table 10 below outlines suggestions for metrics that could be monitored by Network Rail, with the intention of providing better information for the purposes listed above. The extent to which these are translated into “Measures” i.e. included in the ORR Outcomes Framework will depend largely on the availability and quality of the underlying base data. Whilst some of the suggestions below would be able to be implemented within a short time frame, others, for example the data measures, would be more beneficial to monitor once the base data sets (for example, the Sectional Appendix) are digitised.

Table 10: Proposed measures for Network Capability - with descriptions

Measure	Recommendation	Benefit	Implementation steps	Ease[23]	Impact
A-1. Network Capability aggregations	Retain the existing Network Capability Annual Return (AR) measures (Table 49) but extend current narrative as a qualitative measure of compliance.	Consistent approach for measuring the overall capability of the UK rail network over time. Although not hugely useful for regulatory monitoring, provides a consistent long-term figure for benchmarking and trend analysis and some qualitative assessment of performance against baseline.	Recommend that current work to improve robustness and automation of reporting process continues	Easy	Low
A-2. Priority structures	For priority structures identified as key drivers of capability – i.e. infrastructure 'bottlenecks' on the network- regularly (e.g. every quarter) measure and report on the key network capability values, especially Route Availability.	Enables ORR, Network Rail and customers (primary Freight Operators) to confirm that key structures (bottlenecks of infrastructure) are being appropriately maintained, in line with the SBP and CP7 funding. In the first instance, priority structures would target "High Priority Structures" identified as part of draft SBP freight plan, however this could be expanded to other priority structures across the network.	Gather baseline capability data for identified areas of the network (i.e. from start to end of structures) Monitor via manual check of publications and asset information systems each quarter. Seek automation opportunity if Sectional Appendix digitised	Moderate	Medium
A-3 Section Measures	Extend current Annual Return Table 49 with a drill-down to look at Capability across Strategic Route Sections. These could be further split into "Operational" route sections that are categorised with respect to criticality (RAG score), for example 'red' for heavily used / critical sections. Consider separate categories for passenger and freight, as may have different key drivers.	Enables a more granular view of network capability in relation to the impact it has on customer outcomes.	Categorise sections – will likely need research and consultation across the industry. Amend the AR process to be able to split data by the new sections Determine when to publish – either just via dashboard (for regular monitoring) or also as additional new table in the AR	Difficult	High

[23] Ease of implementation - including appreciation of cost / scale of change required

Measure	Recommendation	Benefit	Implementation steps	Ease[23]	Impact
A-4. No. of TSRs	Report number of TSRs in place longer than 6 months. Provide a narrative to explain what the numbers say in relation to degradation of Network Capability	Provides an indication of Network Capability degrading over time but not being picked up by permanent restrictions and therefore Network Change	Extract from Possession Planning System (PPS) – showing start and end date	Moderate	High
B-1. Network Change timescales	Report on timescale of the Network Change Process. Record: - Date 'Change raised' in relation to 'Change established' - Time to complete Network Change - Time to update NESA following completion of Network Change	To highlight where Network Change is being raised too late or retrospectively. To track the timely update of publications that contain capability data, following completion of the Network Change.	There are a number of key challenges to address, including: - implement consistent monitoring and information recording by Network Change Co-ordinators - identify who will measure elements that are outside of Network Change Co-ordinator remit (e.g. publications)	Moderate	Medium
B-2. Network Change by Type	In addition to the number of changes presented on the current AR (Table 51), provide an additional table to record every Network Change by type– for example: Improvement to linespeed Degradation to linespeed Improvement to Route Availability Degradation to route availability Etc.	Improves utility of Annual Return data for the ORR and enables a view of what type of changes are being processed via Network Change. Highlights positive Network Changes.	Implement consistent monitoring and information recording by Network Change Co-ordinators Determine when to publish – either just via dashboard (for regular monitoring) or also as additional new table in AR.	Easy	Low
B-3. Network Change by Severity	In addition to the number of changes presented on the current AR (Table 51), provide an additional table to record severity or impact to end customer's business.	Improves utility of Annual Return data for the ORR and enables a view of impact on customers' businesses	As for B-2	Easy	Medium

Measure	Recommendation	Benefit	Implementation steps	Ease[23]	Impact
C-1. Data consistency between Publications and Asset Information systems	Regular consistency measures to check that the data in the Sectional Appendix is consistent with the data in Asset Information systems (e.g. INM, NGD)	Ascertains whether the human / manual interface between asset information systems and publications is working correctly, and highlights discrepancies for correction	Not advised as a regular measure until data is digitised – which (depending on digitisation approach) may render this measure useless. Whilst the timeline for digitisation is to be confirmed, consider occasional data quality audit / review through manual data sampling and comparison **[REC0021-07].**	Difficult	High
C-2. Data consistency between Publications and raw data	Regular consistency measures to check that the data in the Sectional Appendix is consistent with the raw data collected by train-borne or trackside monitoring systems	Ascertains whether the human / manual interface between asset information systems and publications is working correctly, and highlights discrepancies for correction. Particularly useful to highlight errors and deterioration to gauging data	Consider implementing as a trial to monitoring gauging, as raw data already available in new NGD Create monitoring system that runs regular checks (frequency to be determined by level of automation), and reports back number of anomalies	Difficult	High
C-3. Publications consistency	Measure consistency between all publications which hold similar data e.g. Sectional Appendix vs Freight Load Books vs RT3973 forms	To check for consistency between publications that hold similar or adjacent data	As for C-1	Difficult	High
Report Card	Instigate a "Capability Non-Conformance Report" process to obtain feedback from customers Measure number of reports, by type / route	To reflect what is important to customers' businesses	Setup new report card process Administrator (tbc) to collect measures of how many reports, by type – suggested on a PowerBI dashboard, or similar **[REC0021-07].**	Easy	High

7.3.5. Suggestions for consideration as CP7 Measures

Figure 11 shows an indicative prioritisation matrix for the measures options listed in Table 10 above. It is recognised that these measures may not necessarily be easy to implement in CP7 and will be subject to funding and resourcing constraints.

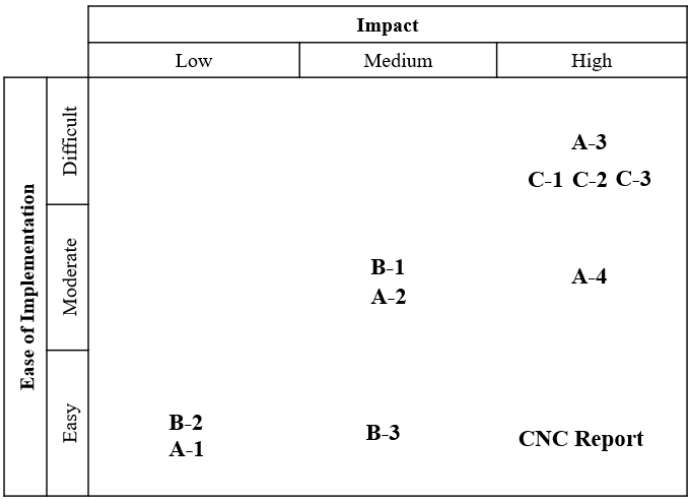


Figure 11: Indicative prioritisation matrix

From the suggestions listed in Table 10, the following shortlist of measures could be adopted in the ORR Outcomes Framework, following consultation with relevant stakeholders and assurance of the input data.

Table 11: Measures that could be adopted for CP7

Suggested Tier[24]	Indicator / Measure	Type	Source data
Tier 2	No. of completed and outstanding incident reports by route [further detail could be provided on a dashboard].	Leading	Capability Non-Conformance Report
Tier 3	[A-2] Number of "Priority Structures" with reduced capability (compared to start of CP7)	Lagging	Sectional Appendix, INM
Tier 3	[A-3] Capability Strategic Route Sections that have been identified as critical freight routes	Lagging	Existing AR data, cut differently
Tier 2	[A-4] Number of TSRs > 6 months	Lagging	Exported from PPS
Tier 3	[B-1] No of Network Changes where 'Date raised' is less than 3 months before 'Date Implemented'	Leading	Network Change Co-Ordinators monitoring
Tier 3	[B-2] Number of established Network Changes by Type	Lagging	Network Change Co-Ordinators monitoring

7.3.6. Implementation

Prior to adoption within the ORR Outcomes Framework, it is recommended that these Measures are consulted upon with all relevant stakeholders and that the processes/systems required to output the reported data are trialled, with a feedback loop to ensure the resulting output is accurate and can be relied upon.

[24] Refer to ORR PR23 Policy Framework – Conclusions on the measures in our CP7 outcomes framework - Figure 2.1 / Table 2.1

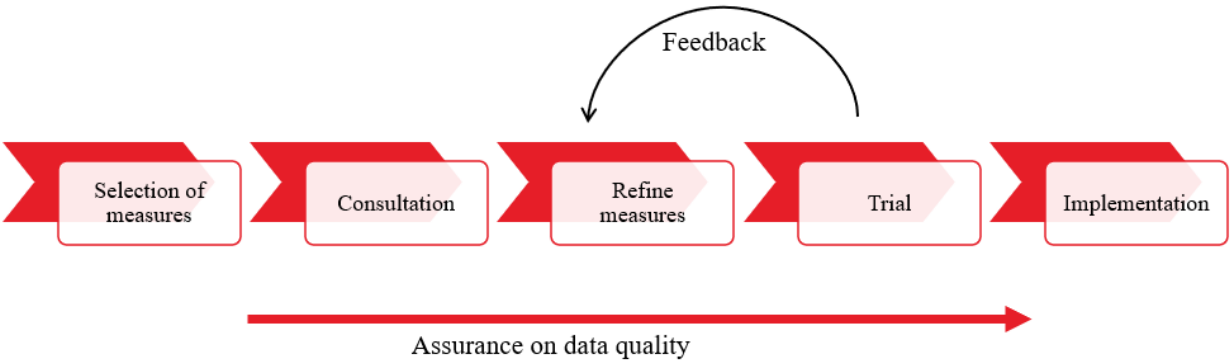


Figure 12: Example implementation plan

8. Improvements Since CP6

The Statement of Works requires:

- *Review the progress that Network Rail has made in developing its tools and systems in CP6, this shall include reviewing the*
    - *implementation of recommendations from the previous IR report and internal audit and provide feedback.*
    - *implementation of the action plan developed by Network Rail to address the concerns on gauging information raised by ORR in 2021.*

There are a number of previous reports and improvement plans which have targeted capability measures and the Network Change process. These are the 2018 Independent Reporter reports, the Network Change Improvement Plan (Internal Audit) and the gauging action plan.

8.1. Independent Reporter Recommendations

An independent reporter task was commissioned to review Network Capability in CP5. This was reported in two phases:

- Independent Reporter Mandate L4AR007: Review of Network Capability - Phase 1 - Review of CP5 Network Capability Processes (Nov 2018)
- Mandate L4AR007: Review of Network Capability – Phase 2 - Recommendations on the Monitoring and Assessment of Network Capability in CP6 (Nov 2018)

Table 12 and 13 below summarise the previous recommendations and provide a status update.

Table 12: Recommendation Status - 2018 Phase 1 Report

Reference	Previous recommendation	Previous suggested evidence / target date	Status update (May 2023)
L4AR007-05	"An appropriate Network Capability baseline is agreed and signed-off with Routes, operators and ORR for CP6."	Documents signed-off with ORR, operators and Routes - by July 2019	A baseline for CP6 has been set – the extent to which it has been 'signed-off' is unclear. Refer to Section 4.1.2
L4AR007-06	"Put in place measures to ensure Network Capability / change reporting documentation provides a clear line of sight through the process of network change."	Revised processes for documentation of change process. – by April 2019	Evidence of an updated and revised Network Change process has been seen (Section 4.1.4 and 8.2). However, having requested a sample of Network Changes to analyse, it is clear that difficulties remain in tracing records for specific Network Changes detailed in the Annual Return (Refer to Section 4.2.2).

Table 13: Recommendation Status - 2018 Phase 2 Report

Reference	Previous recommendation	Previous suggested evidence / target date	Status update (May 2023)
L4AR007-01	"That the Network Capability Steering Group (NCSG) routinely receives a dashboard report on Network Change and Network Capability. This dashboard would comprise a 'basket' of measures … agreed by the NCSG membership. The dashboard	Dashboard of measures agreed by all parties to the NCSG; and Minutes of meetings demonstrating the presentation and discussion of the dashboard. – by April 2019	Notes of April 2020 NCSG meeting have been shared but action dates on those notes suggest that regular meetings have taken place. A capability dashboard is referenced in the Terms of Reference, although it is unclear whether this was regularly reviewed.

Reference	Previous recommendation	Previous suggested evidence / target date	Status update (May 2023)
	could consider a 360° view on behaviours of the wider industry group. The dashboard would be produced by the System Operator as the basis for discussion at the NCSG."		Refer to recommendation **[REC0021-07]**
L4AR007-02	"Develop a single cohesive system wide view of the Network linking capability, performance and capacity".	Production of the integrated view; and demonstration of its applicability to decision making – by June 2019.	No new information has been shared to support this recommendation.
L4AR007-03	"Based on the output of recommendation L4AR007-02 develop a long-term vision for Network Capability across the Network that provides a touchstone against which to test change."	Production of the long-term vision in a format and of such structure that it can be used to 'test' Network Change; and incorporation of this test in the Network Change process possibly via the Network Code. – by June 2019	No new information has been shared to support this recommendation.
L4AR007-04	The inclusion of a simple metric to record customer / stakeholder satisfaction regarding Network Capability; this would form one metric on the dashboard reported to NCSG (see L4AR007-01 above)	Design of process to engage with operators to test satisfaction; and inclusion of the measures in the dashboard reported at NCSG – by March 2019	No new information has been shared to support this recommendation. Refer to 'Capability non-conformance' report (Section 7.3.3) for further suggestion on how this could be implemented.

Little evidence of progress against the previous Independent Reporter recommendations (2017) was provided as part of this review. In particular, the Reporter expected more progress to have been made on the selection, and implementation and automation of Network Capability measures.

8.2. NCIP

It is understood that at a similar time to the Independent Reporter work, Network Rail carried out an internal audit on "Network Change framework in LNE & EM (2017)". It is our understanding from the documents and correspondence received that the "Network Change Improvement Programme (NCIP)" also relates to this Network Rail internal audit. This audit resulted in a series of findings and actions and in this context, we have received the following documents:

- "2017 Network Change - CMO actions.xlsx" (received ORR 10/03/23)
- "MScomments-120918-1819 System Operator IA Actions Report.xlsx" (received from NR 03/03/23)

The implementation of actions and resolutions to address the identified issues were undertaken towards the end of CP5, and in theory should have concluded at the time of this review.

Table 14: Workstreams identified in NCIP to implement for CP6 to improve Network Change Process

Workstream	Summary of Outputs	Status Update (May 2023)
Clarify accountabilities and formalise consistent process	• Summary of accountabilities for key individuals involved in Network Change • Process map • Guidance notes & Sharepoint site (updated on ongoing basis, owned by NCC forum) • Escalation process • Examples of projects subject to / not subject to NC • Frequently Asked Questions (Updated on ongoing basis, owned by NCC forum) • Sectional Appendix update process (pending LNW review note above)	Evidence provided demonstrating all documents have been reviewed and updated.
Effective reporting and assurance and training	• Standard training guidance • Standard Network Change reporting process agreed. Periodic report to be submitted to each route HoSP and RIRG to agree format of report on a route-by-route basis. • Alignment to GRIP training and sponsor training process	Evidence provided demonstrating all documents have been reviewed and updated.
Policy and Network Code Guidance	• Commercial manual updated including Roles & Responsibilities summary/RACI and Process Map • Review Network Capability Standard	Evidence provided demonstrating all documents have been reviewed and updated.
Industry alignment	• RIRG recognised as opportunity for industry feedback via Network Change as "standing item" • "Effectiveness test "of NC process embedded in business as usual (1/11/18)	Evidence provided demonstrating all documents have been reviewed and updated.

Through the discussions undertaken in this report in Sections 4.1.4 and 5.1.1, the recommendations from NCIP have been achieved and appear to be embedded within the organisation.

8.3. Gauging

A separate concern flagged in the Statement of Works relates specifically to issues with gauging information raised in 2021. Upon clarifying with ORR, two concerns were noted:

Firstly, relating to the HLOS commitments for Scotland to develop/ implement a gauging strategy by end of CP6. ORR noted in their annual assessment[25] that *"delivery of the passenger gauge strategy remains challenging for Network Rail Scotland"* as the scope of the requirement had not yet been agreed (as of Oct 2020) and as a result marked it "*not on course*". Since this does not relate specifically to gauging information or the scope of this review, no further comment is provided.

The second issue was also raised by the ORR to Network Rail and sent to the Independent Reporter via email. It is understood that it was removed from an 'emerging issue list' following a series of meetings between the two organisations:

[25] ORR's Annual Assessment of Network Rail for the Financial Year 2020/21

01/06/2021 – *"NR's National Gauging Database (NGD) is out of date and non-complying. This causes delay and cost to external stakeholders, as well as a [sic] infrastructure reliability risk. A programme is being rolled-out to bring this up-to-date through use of train-mounted RILA surveying technology. However, it is expected to be approx. 5 years before full roll out across network achieved. We are currently awaiting details from NR on the programme roll-out and evidence of information used for internal assurance."*

It is understood that Network Rail met with the ORR on 07/02/23, which covered:

- Limitations of current reporting in the Annual Returns regarding gauging; and
- Improvements to reporting of gauging for Annual Returns from 2023/24 onwards.

A presentation to explain the points above with examples was provided by both parties to support this review. A separate meeting was organised with Network Rail, which also noted the following initiatives to support improvements from CP7 onwards:

- Migration of data from the current National Gauging Database to a new platform 'Railway Gauging Data Solution' from August 2023.
- Changes to survey standards – making the review and updating of gauging capability more robust (every 5 years as opposed to by exception or bespoke timescales for different types of structures).
- Development of a Gauging Strategy for each region to support improvements in surveying, updating and reporting gauging information.

The above points demonstrate Network Rail's intentions and plans to support improvements in the recording and maintenance of gauging capability moving forwards.

9. Conclusions

The purpose of this review was to:

- establish whether Network Rail is delivering its licence requirement (specifically maintaining Network Capability at the CP6 baseline, or following the Network Change process); and
- to review Network Rail's progress in the development of its Network Capability management governance processes and systems.

The areas for review were closely linked and therefore by the Independent Reporter team which, In order to set the conclusions and recommendations in a clear context, a model was developed which identified all the strategic parts of a well-functioning management framework (Figure 13). This considered the requirement for Network Capability Information, the processes to manage Network Change and Network Capability, the roles and responsibilities associated with Network Capability and the IT systems that support it. Surrounding these aspects is overall governance and assurance.

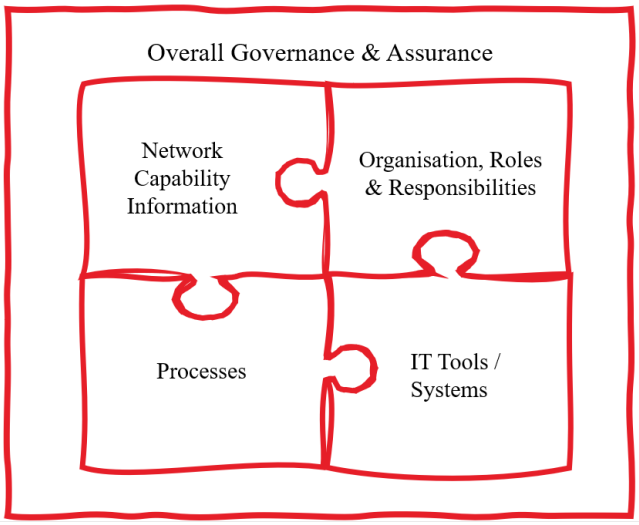


Figure 13: Network Capability information management model

Using the topics in the model, the key conclusions are as follows:

9.1. Network Capability Information

In its current format, the Network Capability metrics do not appear to inform ORR decision making beyond identifying broad trends over a longer time frame. The Independent Reporter could not identify a clear audit trail for the development and agreement of the CP6 baseline.

The Reporter identified inconsistencies in the Annual Return data received as part of this review and evidence of similar data quality concerns was also provided by ORR. The Independent Reporter therefore has low confidence that Network Capability data is being reported correctly and that Network Rail's assessment of performance against the baseline can be relied upon.

Currently, the ORR do not appear to be using the Annual Return information to understand the extent to which the Network Change process is being followed. Instead, they rely on specific events, identified by Operators, where issues of non-compliance are identified and raised before being investigated or escalated with Network Rail.

Similarly, the Operators who engaged with the team advised that they do not use the Annual Return information. Instead, they rely on the National Electronic Sectional Appendix (NESA) to understand network capability, supplemented by other data sources and types.

Confidence in the quality and accuracy of network capability information was an issue for all Operators. They described a need to verify published information with different data sources and contacts before using it in their business processes and planning. Examples of inaccurate data were cited in our interviews. There did not appear to be a clear and collaborative process for reporting/ correction of incorrect information, for example where reported capability is found to differ from actual capability **[REC0021-01]**.

9.2. Process

The Network Change process itself appears to be well understood (both within Network Rail and by the Operators) and was described as clear, typically consistent and fit for purpose. There is evidence that recommendations from the previous Network Change Improvement Programme (NCIP)[26] to regularly review the documentation and guidance have been implemented.

Some good regional practices were noted – for example guidance notes being provided at key milestones and regional forums being used to raise awareness of Network Changes. Despite these efforts, the reporting of Network Change is currently a manual process, with regional differences in the way changes are tracked and recorded. Examples were shared where the Network Change process did not appear to have been followed consistently and/or where the Network Change Coordinators (NCC) had not been made aware of Network Changes.

Network Rail's process for deriving Network Capability metrics makes use of legacy systems to transform and manipulate data. Whilst a process is in place to provide points of review and guidance on the review steps, inconsistencies were observed in the data, suggesting that this may not be followed consistently.

Obtaining documentation to demonstrate compliance with the Network Change process proved to be very difficult. Four of the five Regions did not provide any of the requested information within the time available for the review. Review of the information that was made available, highlighted a disconnect between Asset Reporting information and the Network Change process which means that, in most observed cases, changes in Asset Reporting systems did not correspond to a real change in Network Capability. Information relating to the samples requested should continue to be sought from regions which did not provide any data, to enable Network Rail to demonstrate that the Network Change process has been followed **[REC0021-02]**.

9.2.1. Temporary Speed Restriction (TSRs)

It is apparent that there are different interpretations of the Network Change process in the case of TSRs. The review found that TSRs which are over six months old are treated differently by Regions – with some Regions reviewing and extending TSRs, some actively converting to permanent speed restrictions, and others triggering the Short-Term Network Change process.

It is recommended that a review is undertaken to further understand the different approaches to managing TSRs, including the cumulative impact on Operators, of TSRs spanning multiple routes and whether it is appropriate for all TSRs persisting for longer than six months to follow the Short-Term Network Change process (and the subsequent impact on number of Network Changes to be processed) **[REC0021-03]**.

9.3. Organisation, Roles and Responsibilities

Network Change is a national process with regional ownership. NCCs sit in different functions within Network Rail and regional variations in the way Network Change is managed were noted. Roles and responsibilities for the Network Change process appear to be clearly defined; however, examples provided as part of this review have shown that not all Network Changes are undertaken through the NCC and that changes may occur without the NCC's awareness.

[26] Refer to Network Rail Internal Audit : Network Change framework in LNE & EM (2017)

Network Change Coordinators are fundamental to ensuring the process works well. There are in the region of 50 recorded Network Changes per Region per year (more with major upgrade programmes). The process takes a minimum of three months, resulting in multiple ongoing changes at any one time. With one NCC per region they are a limited resource, particularly in the case of annual leave / sickness.

The Sponsor of a Network Change is identified as a key person in the overall process and is responsible for requesting updates to publications such as NESA, although there does not appear to be any assigned responsibility for confirming that the established change has been recorded correctly in publications.

TSRs were found to be managed through multiple processes and across multiple teams. A lack of clear roles and responsibilities, decision making and reporting was evident, with no clear accountability for monitoring or managing long-term TSRs **[REC0021-04]**.

9.4. IT Tools / Systems

The process for deriving Network Capability metrics in CP6 makes use of legacy systems to transform and manipulate data; however, it should be noted that positive steps have been taken to move towards using Microsoft PowerBI for asset reporting. This is already being done within the current funding envelope and is supported.

Network Change information was found to comprise unstructured pdf files (letters and forms) that were not easily searchable. A standardised method for recording and searching for Network Changes is recommended to improve visibility of all Network Changes, and through adding metadata (for example ELR and mileage) enable easier identification by stakeholders of key information and impacted locations. The Independent Reporter considers that amendments to the Network Change document templates and management systems could be explored and implemented for CP7 within the existing resource.

A proof of concept to digitise the Sectional Appendix was provided by Network Rail as part of this review and it is recommended that this work should continue **[REC0021-05]**. Furthermore, there is an opportunity to further explore how other wider digital initiatives within Network Rail (such as the Common Network Model and central TSR database) could be applied in the context of Network Capability.

The Independent Reporter considers that the management of Network Capability could be improved without digitisation – for example through improved processes, data audit and review. In the Reporter's opinion, there is also an opportunity for Network Rail to consider investment in longer term digital solutions, to reduce reliance on manual processes and significantly improve Network Capability management and reporting, without a large increase in bureaucratic processes. Digitisation would therefore be both a cost-effective approach for NR to improve management of Network Capability and improve the methods by which ORR can assess whether NR is meeting its licence condition.

9.5. Governance and Assurance

The overall governance and assurance of Network Capability (i.e. both within Network Rail and industry wide) was considered throughout the review.

Source data for publications such as the Annual Return was found to be signed off by relevant technical authorities in Network Rail before use in calculations. Whilst this does not guarantee the accuracy of the information, it provides accountability, and an indication that the information is reviewed prior to use.

Furthermore, a review of the process to produce Network Capability metrics, as outlined in the work instructions, does provide for a degree of assurance at key steps. However, it does not seem that this process is fully implemented in practice. This was evident when data submitted to the Independent Reporter was found to contain multiple inaccuracies. Upon raising these with the Network Rail Asset Reporting team, advice was given that they were unable to review due to workload and resourcing issues.

The Reporter found evidence that information to verify that the Network Change process had been followed correctly was not readily available for sharing. This points towards a process which lacks adequate

governance and where compliance with the process cannot be easily demonstrated to the ORR. It is unclear what the consequences are for not following process, or for inaccurate data.

Understanding capability of the rail network is complex – it is closely linked to capacity and asset condition and it is fundamental to the Network Rail's customers' business. There does not appear to be overall senior level challenge in place for network capability within Network Rail.

Currently, ORR have not proposed any Tier 1 or Tier 2 Network Capability measures. To enable Network Rail and ORR to exercise adequate rigour in management of Network Capability, appropriate measures need to be put in place to monitor and support improved reporting in the Annual Return, with the required governance around this to ensure that the priority is reflected throughout through the business **[REC0021-06, REC0021-07]**.

Suggestions for CP7 Network Capability measures have been made based on the findings of this review. These have been prioritised in terms of ease of implementation and impact, with a "Capability Non-Conformance" Report type measure and associated reporting of key measures on a 'Network Capability Dashboard' proposed for immediate consideration. Other suggested measures are:

- Number of 'Priority Structures' with reduced capability compared to start of CP7
- Capability of 'Strategic Route Sections' that have been identified as critical freight routes
- Number of TSRs with duration exceeding 6 months
- Number of Network Changes where 'Date Raised' is less than 3 months before 'Date Implemented'
- Number of established Network Changes by 'type'

9.6. Summary and recommendations

The Independent Reporter was not provided with sufficient evidence to demonstrate compliance with the Network Change process. It is therefore difficult to conclusively comment on whether Network Rail is delivering its licence obligations. Considering the above, it is recommended that additional governance around network capability and measures are put in place, to make it easier for Network Rail to demonstrate and provide objective evidence of compliance with the Network Change aspect of the Network Code.

Whilst positive steps in the implementation of the Network Change Improvement Programme recommendations have been seen, it has been accepted by all parties that limited progress has been made on the previous Independent Reporter recommendations from 2017. In particular, the Reporter expected more progress to have been made on the selection, and implementation and automation of Network Capability measures.

The recommendations from this review have been summarised below - grouped by topic area. A priority has been suggested for each, although it is assumed that Network Rail and the ORR will agree priorities and assign ownership accordingly.

Table 15: Summary of recommendations

Ref.	Topic	Recommendation	Priority
REC0021-01	Network Capability Information	A formal agreement of the CP7 baseline should be established to agree the starting position for the network in terms of Network Capability with relevant stakeholders, with appropriate assurance and governance. It is recommended a process for reporting and correcting incorrect data in a collaborative way is developed to improve understanding of the type and impact of errors and improve the quality of information moving forwards**.** This could take the form of a "Capability Non-Conformance" Report, see also **[REC0021-07**].	High

Ref.	Topic	Recommendation	Priority
REC0021-02	Process	Information relating to the samples requested should continue to be sought from regions which did not provide any data, to enable Network Rail to demonstrate that the Network Change process has been followed.	High
REC0021-03	Process	It is recommended that a review is undertaken to understand in more detail the different approaches to managing TSRs, including the cumulative impact on Operators of TSRs spanning multiple routes and whether it is appropriate for all TSRs persisting for longer than 6 months to follow the Network Change process.	Medium
REC0021-04	Roles and Responsibilities	There does not appear to be a clear RACI for the management of TSR and it is recommended that this is developed. A minor revision or note should be added to the Standard (NR/L2/OCS/009) to reflect or reference the updated RACI for Network Change.	High
REC0021-05	IT Systems	Current systems do not appear to support the Network Change process as efficiently as would be possible with present day technology. The following are suggested opportunities to improve system performance: - Network Change Document Management – start managing all the documents associated with Network Change on an accessible web based system with appropriate meta data (e.g. ELR and mileage) to improve searchability and quick generation of reports. - Automation of the process - workflow tools should be investigated as an approach to streamline the management and measurement of the Network Change process, improving efficiency, traceability and reporting. - The move to PowerBI based system for asset Reporting is positive and should continue. - The current proof of concept work to digitise the Sectional Appendix is positive and should continue. - During the course of the review, the Reporter was made aware of other digital initiatives (including the Common Network Model and central TSR database) which are ongoing within Network Rail and how they might improve Network Capability management, TSR management and Network Change process. It is recommended that Network Rail explore how these other initiatives could be applied in the context of Network Capability.	High
REC0021-06	Governance and Assurance	A review of the overall responsibility for Network Capability is recommended to ensure senior level challenge within Network Rail reflects the importance of railway capability to customers' businesses.	High
REC0021-07	Governance and Assurance	To support **REC0021-06**, Tier 1 and/or 2 Network Capability measures should be developed, agreed and implemented by ORR and Network Rail. These might include: - "Capability Non-Conformance" Reports (no. of reported open incidents, time to resolve/investigate, type of incident etc from a new feedback method), and associated reporting of these measures on a Network Capability dashboard.	High

Ref.	Topic	Recommendation	Priority
		A regular data-audit to assess Network Capability data quality. The outcome of these audits and associated improvement plans would provide assurance to ORR and other stakeholders regarding reliability of Network Capability information and a vehicle for continuous improvements.	

Appendix

A.1 Statement of Work

A.2 Documents Received

External Incoming Documents Register
Project: Review of Network Capability

Ref	File Name	Description	Sent by	Contact	Date	Note
1	NR L2 OCS 098 - Management of Short-term Network Change.doc		Network Rail	Michael Chu	24/02/2023	
2	NR_L2_OCS_009.pdf		Network Rail	Michael Chu		
3	ARM-C1-DF-CP6.pdf		Network Rail	Matthew Jeffs	03/03/2023	
4	ARM-C2-DF-CP6.pdf		Network Rail	Matthew Jeffs	03/03/2023	
5	ARM-C3-DF-CP6.pdf		Network Rail	Matthew Jeffs	03/03/2023	
6	ARM-C4-DF-CP6.pdf		Network Rail	Matthew Jeffs	03/03/2023	
7	Capability Changes 2019.xlsx		Network Rail	Matthew Jeffs	03/03/2023	
8	Capability Changes 2020.xlsx		Network Rail	Matthew Jeffs	03/03/2023	
9	Capability Changes 2021.xlsx		Network Rail	Matthew Jeffs	03/03/2023	
10	Capability Changes 2022.xlsx		Network Rail	Matthew Jeffs	03/03/2023	
11	MScomments-120918-1819 System Operator IA Actions Report.xlsx		Network Rail	Michael Chu	03/03/2023	
12	SBP NCIP TEXT.msg		Network Rail	Michael Chu	03/03/2023	
13	v9 NC-Roles and Responsibilities.pdf		Network Rail	Michael Chu	03/03/2023	
14	RE_ Gauging information for Independent Reporter.msg		Network Rail	Michael Chu	03/03/2023	
15	Overall Annual Return Process.pdf				09/03/2023	
16	RE_ Network Capability review - data gathering.msg				09/03/2023	
17	2017 Network Change - CMO actions.xlsx		ORR		10/03/2023	
18	2021 10 Network Capability Dashboard.xlsx		ORR		10/03/2023	
19	Copy of 2017 Network Change - CMO actions (LD format).xlsx		ORR		10/03/2023	
20	FW_ _EXTERNAL_ RE_ ORR Request for Info - Network Capability Mgmt .msg		ORR		10/03/2023	
21	Fw_ ORR Emerging issue and action plan.msg	Emerging Issues and Action Plan	ORR		10/03/2023	
22	Update 2 Y4 CP6 Monitoring Handbook (January 2023 version 1.15) Final.docx	Monitoring Handbook	ORR		10/03/2023	
23	17 Vehicle Change (Part F).ppt		Network Rail	Andriana Shiakallis	13/03/2023	
24	NC-Roles and Responsibilities - post SOAR approval.docx		Network Rail	Andriana Shiakallis	13/03/2023	
25	NC-Roles and Responsibilities - post SOAR approval.pdf		Network Rail	Andriana Shiakallis	13/03/2023	
26	Network Change (Network Code Part G).pdf		Network Rail	Andriana Shiakallis	13/03/2023	
27	Network Change Risk Escalation Process post SOAR.docx		Network Rail	Andriana Shiakallis	13/03/2023	
28	Network Change Risk Escalation Process post SOAR.pdf		Network Rail	Andriana Shiakallis	13/03/2023	
29	network change.pptx		Network Rail	Andriana Shiakallis	13/03/2023	
30	RE_ feedback from first FOC meeting .msg		Network Rail	Andriana Shiakallis	13/03/2023	
31	Vehicle Change.pdf		Network Rail	Andriana Shiakallis	13/03/2023	
32	FW RE GBRf response to Stoke Creek TSR-PSR Network Change - external Q2.msg		GB Railfreight	Ian Kapur	14/03/2023	
33	Overnight Issues- Settle and Carlisle- ongoing.msg		GB Railfreight	Ian Kapur	14/03/2023	
34	RE Hereford Box closed 1800 Sunday 218 to 1800 Monday 228.msg		GB Railfreight	Ian Kapur	14/03/2023	
35	RE Informal consultation for TSR to PSR for Ashford to Wye.msg		GB Railfreight	Ian Kapur	14/03/2023	
36	RE NCG12023NWC890 PBJ Fowlers Lane LX PSR.msg		GB Railfreight	Ian Kapur	14/03/2023	
37	Third Amended Short Term Network Change Notification NCG12021SE010A3 Stoke Creek LC TSR to PSR.msg		GB Railfreight	Ian Kapur	14/03/2023	
38	$newCapabilitiesGAUGEreference_2022.xlsx	Asset Reporting Info	Network Rail	Matthew Harris	31/03/2023	
39	22 GAUGE_ref_table final mw_v3_FINAL.xlsx	Asset Reporting Info	Network Rail	Matthew Harris	31/03/2023	
40	AIRS - Technical Documentation - Annual Return (1).pptx	Asset Reporting Info	Network Rail	Matthew Harris	31/03/2023	
41	AIS - WI - 020a - Dummy Run.doc	Asset Reporting Info	Network Rail	Matthew Harris	31/03/2023	
42	Latest SRS definitions 130422 v2.xlsx	Asset Reporting Info	Network Rail	Matthew Harris	31/03/2023	
43	List of INM_data input contacts .docx	Asset Reporting Info	Network Rail	Matthew Harris	31/03/2023	
44	STE_VERRAlookup_2021_22_V0.2.xlsm	Asset Reporting Info	Network Rail	Matthew Harris	31/03/2023	
45	Track_Category_with_Responsibility_and_Switch.csv	Asset Reporting Info	Network Rail	Matthew Harris	31/03/2023	
46	$newCapabilitiesGAUGEreference2.xls	Annual Returns 2020	Network Rail	Matthew Harris	03/04/2023	
47	Latest SRS definitions 210420_v2.xlsm	Annual Returns 2020	Network Rail	Matthew Harris	03/04/2023	
48	STE_VERRAlookup_2019_20_V0.2.xls	Annual Returns 2020	Network Rail	Matthew Harris	03/04/2023	
49	Track_Category_with_Responsibility_and_Switch_20200523.csv	Annual Returns 2020	Network Rail	Matthew Harris	03/04/2023	
50	GAUGE_ref_table_UPDATED_2 HH final.xlsx	Annual Returns 2021	Network Rail	Matthew Harris	03/04/2023	
51	Latest SRS definitions 160421 HH.xlsm	Annual Returns 2021	Network Rail	Matthew Harris	03/04/2023	
52	STE_VERRAlookup_2019_20_V0.4 exc IOW.xlsm	Annual Returns 2021	Network Rail	Matthew Harris	03/04/2023	
53	Track_Category_with_Responsibility_and_Switch.csv	Annual Returns 2021	Network Rail	Matthew Harris	03/04/2023	
54	TSR Data 2022_02.04.2022 to 31.03.2023 Final.xls	TSR Data	Network Rail		06/04/2023	
55	_WARNING_ MESSAGE ENCRYPTED_Network Capability Independent Reporter Review - Data Request.msg	Network Change Sampling	Network Rail	Puri Perez	14/04/2023	
56	Network Changes issued.pdf	Network Change Sampling	Network Rail	Puri Perez	14/04/2023	
57	Sampling Request_All Routes.xlsx	Network Change Sampling	Network Rail	Puri Perez	14/04/2023	
58	2020.04.22_Notes_Network Capability Steering Group v0.1.pdf	Steering Group	Network Rail	Oliver Bratton	19/04/2023	
59	ToR - Network Capability steering Groupv6.1.pptx	Steering Group	Network Rail	Oliver Bratton	19/04/2023	
60	Sectional Appendix Stakeholder Catch Up 131222.pptx	Sectional Appendix Review	Network Rail	Oliver Bratton	19/04/2023	

A.3 Sampling Methodology

A.3.1 Sample Size

The Network Change sample size was determined using elementary statistical methodology – using Cochran's formula for determining sample sizes where the population size is unknown.

$$n_0 = \frac{z^2 pq}{e^2}$$

The sample size (n_0) to select, based on the desired confidence level z (to achieve a 95% confidence level, a z value of 1.96 is chosen), a nominal initial value to assume the proportion of the population with the attribute desired (p = 0.5, assuming a standard bell curve), q = 1-p and a desired level of precision (e = 0.05).

Using these values, an initial sample size of 384 items should be selected; however, given the population size is known, this can be reduced slightly:

$$n = \frac{n_0}{1 + \frac{(n_0 - 1)}{N}}$$

Where n_0 represents the initial sample size, and N represents the population size of our sample. Using this correction (N=7,725) a sample size of 366 items is required.

A.3.2 Sample Selection

Following the determination of the sample size, items were selected from the received data set using the same sampling methodology applied in the previous Reporter Mandate[27]. To summarise the process:

- Data points were first summarised and split by year, route and network capability change type.
- Data points were then ordered by ELR for each of the groupings – systematic sampling was applied based on the required sample levels to obtain the required number of data points per group.
- Further documentation was sought from Network Change Coordinators to demonstrate evidence that the capability changes sampled had undergone the processes as described in the Network Code Part G

Applying this logic, a total of 376 data samples were requested for further review.

[27] Refer to Appendix C of Independent Reporter Mandate L4AR007: Review of Network Capability - Phase 1 - Review of CP5 Network Capability Processes – November 2018

A.4 Questionnaire

TOC / FOC Network Capability Review Questionnaire

Arup have been appointed by the Office of Rail and Road (ORR) and Network Rail in their role as Independent Reporter to carry out a review of Network Capability. The objectives of the review are:

1. to establish whether Network Rail is delivering its licence requirement (either maintaining Network Capability at the CP6 baseline set at route level as on 1 April 2019, or following the Network Code change management processes in amending that capability); and
2. to review the progress Network Rail has made in the development of its Network Capability management governance processes and systems, since the previous Independent Reporter review in June 2018.

Part of our approach to this review involves seeking feedback from train operating companies (TOCs) and freight operating companies (FOCs) to understand how the process works and where it can be improved. This will be done through questionnaires and interviews. The findings will be used by ORR to inform how Network Rail will be held to account and what this means in terms of reporting on Network Capability.

We would appreciate your participation in this questionnaire. There are three sections, considering

- obtaining and understanding Network Capability information;
- making a Network Change or Vehicle Change request; and
- suggestions for improvements.

Please answer the questions in as much detail and with examples where possible. Responses will be used solely for the purposes of the Review. Any supporting information provided will be treated in confidence.

Organisation / Contact Details

Date:	
Name:	
TOC / FOC / OTHER (Please provide detail)	
Route:	
Size of organisation:	
Your role:	
Email / Tel no.:	
Have other people been consulted in preparing your response?	

Part One: Obtaining and Understanding Network Capability Information

3. **Please detail the scenarios in which you would seek Network Capability information – e.g. planning and operating train services / new route / rolling stock / other**

4. **Please state the key data types and systems / sources of information you rely on to understand Network Capability? If there are any known issues or types of information that are not readily available, please provide additional comment.**

Data Types	**Tick / comment**
Route availability	
Gauging	
Electrification	
Linespeed	
Power supply	
(Usable) Platform lengths	
(Usable) Loop lengths	
Siding lengths	
Platform track circuit lengths	
Freight Load Books	
Other (*please state*)	

Sources	**Tick / comment**
National Electronic Sectional Appendix (NESA)	
Timetable Planning Rules	
NR Regional / National Contacts (*please specify*)	
Tools / Databases (*please specify*)	
Third party maps / diagrams (*please specify*)	
Other (*please state*)	

5. **What aspects of your business are affected by the inability to obtain Network Capability data in the time, format or detail that you require? Please give examples.**

6. **Please provide us with any examples you have come across where railway Network Capability is recorded incorrectly in the industry documents and databases referred to above.**

7. **What do you do when you find incorrect data?**

8. **Are there any types of information which are not readily available that would support your organisation in obtaining Network Capability information?**

9. **What do you do when you can't find data required?**

10. **To what extent does the Network Change process cater for long term (6+ months) Temporary Speed Restrictions?**

11. **Do you see reasonable endeavours being made to ensure Network Changes are made in a timely manner?**

12. **Have you any examples where a bad experience of the Network Change process has led to a loss of business for you?**

13. **When Network Changes are proposed by Network Rail – do you have sufficient information to enable you to effectively respond?**

Part Two: Your Organisation Making a Network Change Request

14. **Please specify what type of Network Change *(Network Code Part G)* or Vehicle Change *(Network Code Part F)* your organisation makes and approximately how often you make these changes ?**

15. **When proposing a Vehicle Change, what is your experience of Network Rail's ability to provide you with relevant Network Capability information?**

16. **If you propose Network Change (in terms of Network Capability - line speed, gauge, route availability and electrification); is the process well understood by your organisation?**

17. **How good is your experience of the Network Change process in terms of Network Capability so far? i.e. is it fit for purpose? does it use disproportionate resource? are there any gaps? etc. – Please give examples**

18. **To what extent are the structure, roles and responsibilities associated with Network Change clear and appropriate?**

    a. **In terms of receiving a Network Change?**

    b. **In terms of proposing a Network Change?**

Part three: Improvements in Network Capability Process/ Reporting

19. **Are you aware of Network Rail's wider plans for improvement of Network Capability information provision (e.g. data cleansing, tools and systems work within Network Rail)**

20. What improvements would you expect to see in Network Capability process / reporting to enable growth of your business? (i.e. what does good practice look like?)

21. Are you aware of a Network Capability Dashboard? If yes, how useful is it?

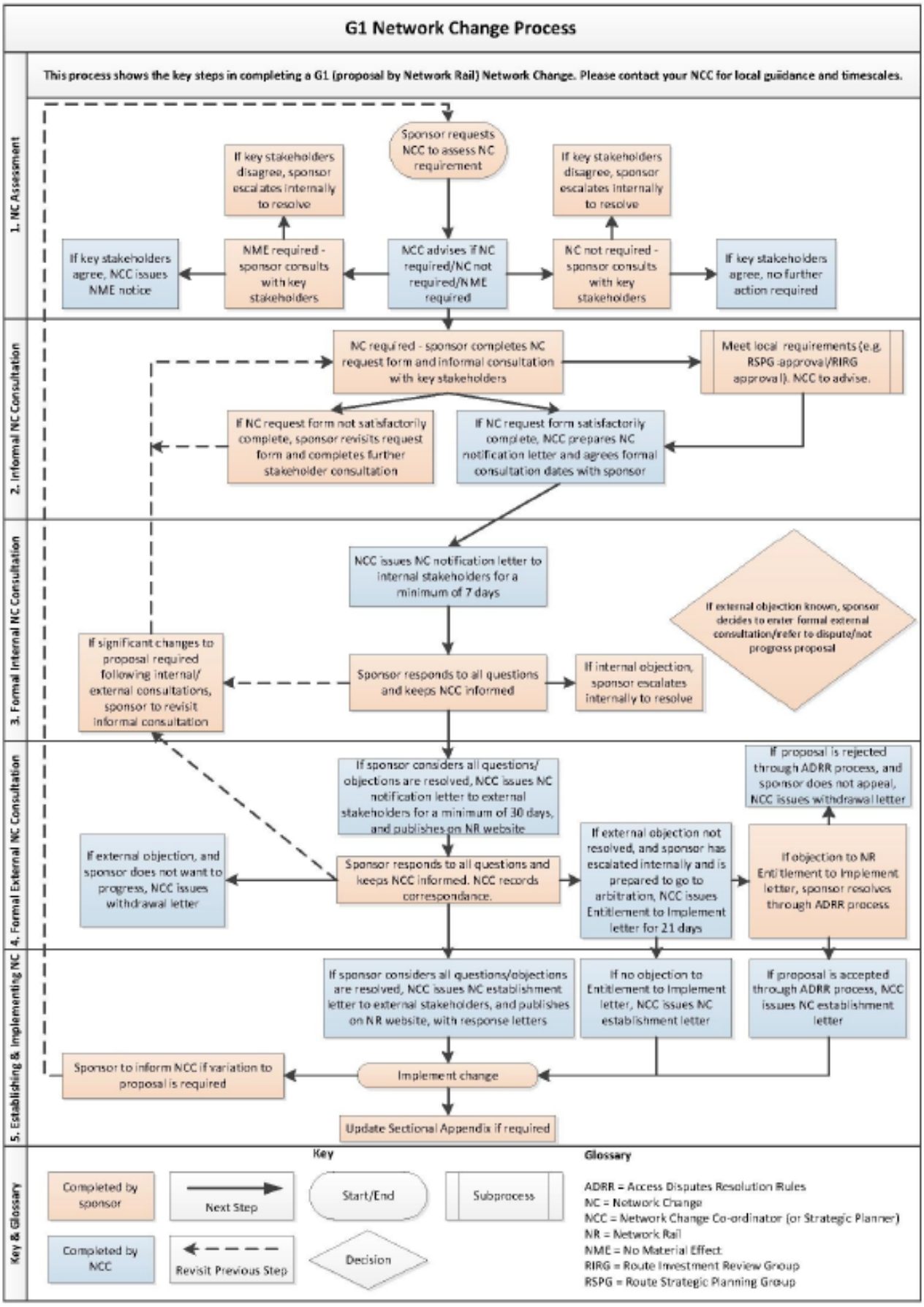
22. Are there any improvements to the existing systems that would support your organisation in obtaining Network Capability information? (e.g. can you raise concerns effectively, are the measures adequate?)

Other

23. **Are there any other issues that haven't already been discussed that you wish to comment on?**

Many thanks for your time and comments.

A.5 Network Change Process Diagram (G1)



A.6 Summary of Examples Provided by Operators

Table 16 Examples provided in Operator meetings

Example/s	Description	Raised by...
TRU – E234 Marsh Lane East of Leeds	Example of Network Change Scheme Plans being altered and changes not shared with operator	GBRF
2008/2209 Stalybridge	Short term Network Change has expired and previous capability has not been reinstated	GBRF
Coton Hill @ SBY Welwyn Garden City Hitchin Yard	Incorrect data / issue 4/5 lines available 2 in use for freight, looking to potentially use others as they are technically in use, but are overgrown	GBRF
Issues with TSRs > 6 months becoming PSRs	¾ are outstanding and varies by Route and Region, issues with the Kent Region	GBRF
Bristol East Euston HS2 moving platform and line capability Rossythe	Short term network change does not contain all the information and the time of reversal is not included – sometimes says "Subject to business case."	GBRF
Port Talbot re-signalling	Network Change rejected by GBRF and FL and possessions have been taken and services halted	GBRF
March No. 19 points	Not working correctly since 2017/18 and works planned for 2024 – currently a 28 mile diversion to change lines	GBRF
Staffing of manual signalling boxes	Newport – Hereford – Shrewsbury line – boxes couldn't be staffed and were closed for a week at short notice.	GBRF
Watford Crossovers	2015 – works planned to reinstate the crossovers at Watford, personnel transferred to Harbury cutting as the works were due to take place and work not rearranged as it was deemed that it was not needed. Was considered as part of the wider strategy for high speed junctions on the West Coast South and it was mentioned that it might get reinstated if Bourne End was taken out – playing off the performance of crossovers between Milton Keynes and Euston. Result is less trains and during engineering works 2 track up to Bourne End.	GBRF
Barnes Bridge	Speed restrictions on RA4 – discussions ongoing, but have appeared out of the blue.	GBRF
Leuchars	Signal boxes not being staffed	ScotRail
Leven	New line opening in June 2024 not seen the scheme plans or the Network Change	Scotrail
Barrhead Re-control	Commissioned in October 2022 Network Change received 2 weeks before. Put overrun in South of the station not signalled. If discussion had taken place could have done something different. This has restricted Network Capability as there is not room for expansion of the timetable or for altered timetable to run	Scotrail
Invergordon	2018 NR splitting control of the route into 2 - a North and South panel. Services going north of Invergordon need to change panel and there is a token exchange needed – 3 minutes for this activity. The staffing on this route is tight due to driver hours and Wick is designated a rural depot, this would have broken Wick's status and would have cost 4 additional drivers due to the journey time penalty. Scotrail objected to the split, NR did it as a short term network change with no end date (work undertaken means that it is not reversible). Result is an on-the-day degradation in performance. Unrelated infrastructure improvements mean trains are arriving early, masking the timing issues with the token and that there are no journey time improvements.	ScotRail

Hartlepool loop	Example of where power supply capability was unknown	DB
Barmouth	Platforms not maintained to full length for the charter train the operator wants to use	DB
York Holgate siding No2	July 2021 track condition rendered it unusable but no temporary Network Change has been issued yet	DB
Kintore	Doubling of track – took a long time to get TPR's and SRT's	Scotrail
St Pancras platforms	Manual measurements undertaken ahead of use as contingency during engineering works to verify the information in documents like NESA	Hull Trains (in Lumo interview)
Data sources	Many sources are in pdf or other 'non accessible' formats. Some businesses have become completely digital now and the method of storing and accessing network capability data is outdated and clunky	Lumo
Bristol East depot St Phillips Marsh depot access	Despite knowing Voyagers have operated there before, the NESA and other data suggested they hadn't been cleared. Extensive efforts were required by the operator to prove they could run.	CrossCountry
Totnes platforms	2017/18 Short Term Network Change was issued. No notice was given of the works to reduce the operating length of the platforms. Station change was issued but this didn't take account of the effect on operability of trains.	CrossCountry
Bath Spa	Came to light that the platforms were not the same length in both directions (shown as the same in the capability data). The operator could stop in one direction but not the other which during the Filton 4 tracking work caused a big issue when 10 car operation was needed.	CrossCountry
South Kirby	Positive example of Informal Network Change providing confidence in the process early on.	CrossCountry
Darlington station	Negative example of Informal Network Change process being adopted. The operator asked several questions during the process and they were left unanswered.	CrossCountry
Cleethorpes platforms	Full length shown as operable in sectional appendix but significant amount not maintained or usable. After extensive debate Network Rail produced a change notice from around 20 years ago that hadn't been properly incorporated via the Network Change process.	TPE
Darlington platforms 5&6	Example of where all Network Change notices, including 'off route' (ie don't use for normal operation) still need to be checked in detail to make sure there is no indirect effect on operators.	TPE