

# Rail Delivery Group




RDG-GN/040

Issue Two

Date May 2019

## RDG Guidance Note - Delivering Good Schemes – Conventional Re- signalling

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### Synopsis

This Guidance Note draws together good practice and provides advice and prompts for those dealing with proposals to re-signal the railway, using conventional signalling technology.

### Applicability

This Guidance Note has been prepared for Train Operators. Its content may also be of use to others.

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### **Issue record**

This Guidance Note will be updated when necessary by distribution of a complete replacement.

Unless advised in the table below, amended or additional parts of revised pages will be marked by a vertical black line in the adjacent margin. The exceptions to this will be minor typographical or grammatical corrections, amended page breaks or changes to length or formatting of tables – these will not be marked, to allow clear identification of changes to the content of this document.

<b>Issue</b>	<b>Date</b>	<b>Comments</b>
One	April 2017	First issue following approval at the RDG Operations Scheme's Performance & Planning Forum meeting in February 2017
Two	May 2019	Incorporates major changes to Abbreviations, Definitions, Core Principles (Part 6) and Appendix B, reflecting improved knowledge since first issue. Also includes new Part 7.12 check-list dealing with Stations, with subsequent check-lists re-numbered. General update to remainder of document.  Changes to the previous version are not marked in the margin as it is considered that the document amounts to a complete re-issue

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## **Part 1 About this document**

### **1.1 Responsibilities**

- 1.1.1 Copies of this Guidance Note should be distributed by members of the RDG Train Operators' Operations Scheme (the Operations Scheme) to persons within their own organisations who liaise with an Infrastructure Manager (IM) when considering re-signalling of the railway.

### **1.2 Explanatory note**

- 1.2.1 The Operations Scheme produces Guidance Notes for the information of its members. The Scheme is not a regulatory body and compliance with its guidance is not mandatory.
- 1.2.2 These Guidance Notes are intended to reflect good practice. Members of the Operations Scheme are recommended to evaluate the guidance against their own arrangements in a structured and systematic way. Some parts of the guidance may not be appropriate to their operations. It is recommended that this process of evaluation and any subsequent decision to adopt (or not to adopt) elements of the guidance should be documented.

### **1.3 Guidance Note status**

- 1.3.1 This document is not intended to create legally binding obligations between Operators and should be binding in honour only.

### **1.4 Questions and supply**

- 1.4.1 Any questions concerning the content or supply of this document should be directed in the first instance to your company's Track Access Manager who will refer them onto RDG Operations as appropriate.
- 1.4.2 Copies of this Guidance Note may be obtained from the members' web site of the RDG Train Operators' Operations Scheme.

### **1.5 Review**

- 1.5.1 This document will be subject to regular review.
- 1.5.2 The RDG Performance and Planning Forum (meeting held 14 May 2019) considers that future versions of this document should distinguish between those criteria that inform the design of schemes and those that relate to construction and commissioning of schemes. This will be considered as part of any future review. The Forum also supports the continued involvement of Network Rail in developing future versions.

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## Part 2 Purpose and Scope

### 2.1 Purpose

- 2.1.1 This document seeks to introduce recommended practice as it applies in some parts of the industry, to provide an *aide memoire* to members of the Operations Scheme on what to look for when considering future proposals to re-signal the railway. As such, it advises members on that recommended practice, providing the opportunity for members to be better informed and to consider aligning their interests. The document also prompts Operators to seek early engagement with the IM and to use all opportunities to influence client specification at that early stage, to allow incorporation into the project planning and funding process and reducing the need to introduce late changes that would involve significant re-work.

### 2.2 Scope

- 2.2.1 This guidance applies to employees of Operators who are members of the Operations Scheme and who may be required to interface with a re-signalling project and those responsible for ensuring their levels of knowledge and competence.
- 2.2.2 No distinction is made between the various forms of re-signalling that can be proposed – whether renewal, enhancement, life extension, re-control, or re-lock.

## Part 3 Definitions

<b>Aided Despatch</b>	Use of Closed-Circuit Television or other technology to assist train despatchers where sightlines are constrained
<b>Conventional</b>	For the purposes of this document, the provision of lineside signalling to give movement authority information to train drivers
<b>Depot</b>	A location that permits trains to be stored (awaiting use), stabled, maintained or formed up (changes to consist). Can apply to both passenger and freight. For the purposes of this document, this definition also includes off-Network terminals, yards and stabling locations (except stations)
<b>Enhancement</b>	For the purposes of this document, expanding the capability of the infrastructure to advance customer outcomes around one or more of: <ul style="list-style-type: none"><li>a) performance (e.g. improving punctuality);</li><li>b) journey time (e.g. enabling higher speeds);</li><li>c) safety (e.g. enhanced train protection, speed control);</li><li>d) capacity (e.g. reducing headways or allowing heavier loads);</li><li>e) enabling efficiencies (e.g. smoothing speed profiles); or</li><li>f) realising latent potential of rolling stock (e.g. removing constraints)</li></ul>
<b>Life extension</b>	Prolonging the life of the asset through additional maintenance or partial replacement of critical components

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<b>National System Operator</b>	Can be abbreviated as SO or, as used in this document, NSO. The part of Network Rail that deals with: <ol style="list-style-type: none"> <li>1. timetabling and engineering access;</li> <li>2. capacity allocation, management and analysis;</li> <li>3. medium- and long-term planning, including Network Strategy.</li> </ol> These activities are best delivered centrally, so do not form a part of the activities that are devolved to Network Rail Regions or Routes. For the purposes of this document, very short-term timetabling (VSTP) and on-the-day regulation do not form a part of NSO activities
<b>Network</b>	The main line infrastructure controlled by an Infrastructure Manager in Great Britain, comprising railway tracks, signalling and electrification systems, bridges, tunnels, level crossings and viaducts, together with sidings and connections to infrastructure(s) controlled by other IMs. Typically, the extent of the Network will be shown in the Sectional Appendix
<b>Operational Capability Statement</b>	Previously known as the Operations Requirements Specification. The OCS describes the capability that is required from the re-signalled area and provides a reference for signal designers to use as part of scheme development. It records the outcome of consultations within an IM (e.g. Operations, Infrastructure Projects and Asset Managers) and those between the IM and Operators and other stakeholders
<b>Operations Scheme</b>	The RDG Train Operators' Operations Scheme, comprising and funded by Railway Undertakings who run regular, scheduled trains for the conveyance of passengers
<b>Operator</b>	Any public or private undertaking the principal business of which is to provide services for the transport of goods and/or passengers by rail, with a requirement that the undertaking must ensure traction. This also includes undertakings which provide traction only
<b>Re-control</b>	Replacement of a signalling panel, lever frame or manual operation with a workstation in a different location
<b>Re-lock</b>	Replacement of a relay interlocking with a computer-based version
<b>Renewal</b>	Also referred to as “like for like replacement” or “replacement in modern equivalent form”. Replacement of the signalling asset, normally initiated by an IM's Asset Manager and designed to replicate existing capabilities (e.g. headways, line speeds, junction margins). For the purposes of this document, also includes the renewal of level crossing control systems. By default, a renewal project will not necessarily set out to provide improvements, other than in terms of asset condition or reduced maintenance cost, although some would be obtained by the application of modern-day standards (e.g. immunisation against interference from a future electrification scheme or application of higher levels of protection to level crossings) – these are known as free benefits. Whilst it can be argued that a renewal should not lead to a loss of capability, unless <i>agreed</i> by the various stakeholders and recorded as part of the remit, the application of modern-day standards means that existing capability can never be replicated completely – there will always be some change

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<b>Re-signalling</b>	The provision of new signalling, whether through a renewal, an enhancement or a combination of the two. Includes both re-lock and re-control. For the purposes of this document, also includes the application of warning systems or signalling protection to level crossings
<b>Reversible Signalling</b>	For the purposes of this document, the provision of signalling on a track to permit train movements in either direction, whether for planned or emergency use, with such movements protected as appropriate. May also be called bi-directional signalling
<b>Route Supervisory Board</b>	Joint governance meeting within a Network Rail Route, comprising managing directors of that Route and its principal train operators, and independently chaired. These meetings are intended to align action plans, improve joint planning and drive targets that are centred on improving the customer experience. Most Network Rail Routes have introduced a Supervisory Board.
<b>Signal Overrun Risk Assessment Tool</b>	Can be abbreviated as SORAT - a bespoke web-based tool to quantify, mitigate and manage risk associated with signal overrun in UK rail infrastructure, developed by NR in conjunction with a third-party company
<b>Sponsor</b>	The individual (often a manager or executive) with overall accountability for the project delivering its specified outcomes and outputs. The Sponsor acts as the bridge between client desires and requirements on the one hand and project delivery (supported by advice as needed from the IM's Technical Authority) on the other. As such, it is likely that, under NR's Transformation Plan, many sponsors will be accountable to the relevant Network Rail Region or Route. As the sponsor commissions the industry formal consultation, the role should be approached from an all-industry perspective. The extent to which this happens currently is variable
<b>Standage</b>	The length of the train that can stand on a piece of track, without interfering with other train movements, considering stand-back distance from any signal, stopping tolerance and any additional room required for detaching
<b>Third-party</b>	For the purposes of this document, this includes suppliers, agencies or funders to the rail industry whose primary activities are not rail-related ( <i>incl.</i> local authorities, Enterprise Partnerships, utilities, sources of private finance, highways authorities, departments within governments other than those dealing with rail transport)

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### Part 4 Background

4.1 As a general principle, successful schemes are those that (a) meet business requirements, (b) deliver the expected business value and return on investment and (c) are delivered and maintained on schedule and within budget. Many factors contribute to the success or failure of projects, with some undoubtedly ranking above others in terms of criticality. These apply across projects whether rail-related or not; re-signalling or otherwise. In summary terms, twelve factors are considered to provide a framework for project success:

- 1) **Effective governance** - with identified leadership, responsibilities (including a RACI), reporting lines, and communication/engagement paths, and a clear understanding of the limits of any financial authorities;
- 2) **Goals, objectives, and outcomes** - clearly specified and recognised by funders and stakeholders, with an early definition of quality criteria (including complete and unambiguous business and technical requirements linked to specified outcomes and benefits) and a robust change management process to control scope changes and identify any resultant change to benefits;
- 3) **Commitment to joint and transparent working** - a competent and consistent team, with active executive and senior managerial support, across the industry, sharing and owning the vision and goal throughout the project's life, and committed to collaborative and transparent working;
- 4) **Capable sponsors** - playing an active role in the project lifecycle, and retaining accountability for the passing of a project through formal stage gates to successful delivery, identification of lessons learnt and handover to front-line managers and staff;
- 5) **Secure funding** - with tight control of budgets in place to ensure maximum value is realised;
- 6) **Project planning and review** - comprehensive, long-term and detailed planning, integrated across all parties, with realistic estimates of costs and durations, active risk management and post-project reviews, ensuring transition to business as usual operation is considered (including changes to roles or processes and fulfilment of identified recruitment, staff engagement and training needs). As part of this, there should be clearly defined and achievable stages, allowing consideration of access requirements for preparatory works, the construction phase, commissioning and post-implementation (snagging);
- 7) **Supportive organisations** - in which support and resourcing is provided for project activity, and access to stakeholders is facilitated;
- 8) **End users and operators** - fully engaged in the design of the project, from an early stage and continuing throughout the project life cycle, both informally and formally, and involved in the identification and mitigation of risks and resolution of issues, to the satisfaction of all parties. As part of this, the opportunities (where appropriate considering the size of the project) for sharing workspace or offices, with end-users integrated and valued as part of the project team, and for documents to be shared should be explored;



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- 9) **Competent project teams** - with proficient project professionals and subject matter experts, with suitable and sufficient resource, engaged in applying recommended practice;
- 10) **Aligned supply chain** - where suppliers are coordinated and aware of project needs, schedules and quality standards;
- 11) **Proven methods and tools** - applied consistently and in a way which maintains effective balance between flexibility and robustness;
- 12) **Appropriate standards** - used where applicable to drive quality of outputs, complemented by a monitoring regime which assures delivery is aligned to required outcomes and recommended practice, including the use of derogations where relevant and efficient.

4.2 It follows that the reasons for the lack of success of a project can be seen to be the opposite of these twelve factors. Typical examples can be found in Appendix A.

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### **Part 5 Comparing Renewals and Enhancements**

- 5.1 The tables that follow provide a high-level summary of typical Operator experiences with re-signalling proposals and offer a common way forward. This recognises that, although the guiding minds behind re-signalling proposals may differ, the solutions (to achieve greater Operator influence on outcomes) are similar. Whilst many in the industry can become focussed on bigger schemes (as the benefits to be realised are greater), the smaller schemes often demand as much attention. With funding likely to remain constrained in the foreseeable future, and (recognising political devolution) arising from various sources, it is considered that the need for common approaches will become increasingly important.
- 5.2 A further point to remember with larger schemes is that they may be part of a longer-term programme, which itself may not be fully developed. As such, a balance needs to be struck between waiting for the bigger vision to become clearer and implementing a scheme to realise benefits early, but which may require subsequent adjustment to align with later phases of the programme. This may cause tension between industry parties, as funders will be keen to ensure Value for Money is obtained, whilst Operators may wish to see benefits early, to assist in the delivery of franchise or business obligations.
- 5.3 (see next page)

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### 5.3 Renewals

Outcomes & outputs specified by	Operator involvement		Possible influencing meetings
	Current experience	Recommended position	
IM Asset Manager	<p>Can be limited; with the first real information provided late in the process (e.g. via network change or access discussions) – by which point changes become difficult to achieve</p> <p><sup>1</sup> contact with Network Rail Design Delivery (NRDD), Network Rail's internal multi-discipline design consultancy which completes early stage design projects. may also prove beneficial.</p>	<p>Operators to seek visibility of renewals workbanks and engage IMs in ensuring scope meets funding and wider need. Early discussions are recommended; the best time to have these is before signal designers are remitted to start work, so Operators should discuss with Asset Managers <sup>1</sup> and Sponsors (once appointed).</p> <p>Use meetings to</p> <ul style="list-style-type: none"> <li>• test the proposal against the longer-term route strategy or known or committed train service improvements;</li> <li>• identify opportunities to add benefits and create value (recognising these may require top-up funding);</li> <li>• ensure clarity over outcomes and purpose; with a record being kept of the results; perhaps as part of developing a strategy.</li> </ul> <p>It is suggested that project outcomes be detailed and include specific metrics, whilst avoiding use of phrases such as “same as current” or “like-for-like”.</p> <p>Work with IMs to develop Operational Capability Statements (OCS - see Appendix B) to describe both the current and future use of the railway. Ideally, OCS should be developed to inform signal designers</p>	<p>Bespoke meetings with IMs to examine renewals workbanks; Route Investment Review Groups; Route Supervisory Boards (when formed); Route or NSO Strategic Plan workshops; Continuous Modular Strategic Planning activities.</p> <p>To minimise re-work, it is recommended that examination of renewals workbanks should be at least 3-4 years in the future, <i>i.e.</i> before the scope is confirmed. A longer timeframe may be needed to examine level crossings, especially if closure is being contemplated, due to lead times and need to engage with Local Authorities and other stakeholders</p>

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### 5.4 Enhancements

Outcomes & outputs specified by	Operator involvement		Possible influencing meetings
	Current experience	Recommended position	
Funders ( <i>incl.</i> third-parties) using scheme specific business cases	Greater than with renewals but may not be early enough to allow Operators to have a full influencing role	<p>Operators to seek visibility of enhancements projects and engage IMs and NSO in ensuring scope meets funding and wider need. The best time to have such discussions is before signal designers are remitted to start work, so Operators should discuss with project clients and Sponsors (once appointed).</p> <p>Use existing meetings to</p> <ul style="list-style-type: none"> <li>• test the proposal against the longer-term route strategy or known or committed train service improvements;</li> <li>• identify opportunities to add benefits and create value (recognising these may require top-up funding);</li> <li>• ensure clarity over outcomes and purpose;</li> </ul> <p>with a record being kept of the results.</p> <p>It is suggested that project outcomes be detailed and include specific metrics, whilst avoiding use of phrases such as “same as current” or “like-for-like”.</p> <p>Work with IMs to develop Operational Capability Statements (OCS - see Appendix B) to describe both the current and future use of the railway. Ideally, OCS should be developed to inform signal designers</p>	Route Investment Review Groups; Route Supervisory Boards (when formed); Route or NSO Strategic Plan workshops; Continuous Modular Strategic Planning activities; individual project governance meetings (when formed)

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### Part 6 Core Principles

This section summarises how Operators regard, and expect to deal with, re-signalling proposals. These principles underpin the checklists that follow in Part 7 and the further detail contained in the Appendices.

- 6.1 Fundamentally, a proposal to re-signal is an exercise in:
- understanding the problem that requires to be addressed and the outcome(s) sought through re-signalling;
  - considering whether the reason for the re-signalling is time-limited and how it fits with broader strategic aims (whether IM-, Operator-, industry- or funder-led);
  - recognising options that have been examined, whether rejected or proposed;
  - ensuring that processes exist to identify changes to the capability, operational flexibility (*i.e.* avoiding hard-wiring outcomes to a particular timetable), safety risk, driveability, maintenance, reliability and availability of the railway;
  - determining the timetable, capacity, journey time, performance and commercial impacts of the proposal, both within the geographic area covered by the proposal and those seen through the railway as a system;
  - identifying mitigations to reduce those impacts, especially where the proposal will not improve on current levels; and
  - forming a view on whether the impacts that remain are material to the IM's infrastructure, other IMs and to Operators.
- 6.2 Operators want to receive proposals that have been well considered, because the proposed outcomes may influence or affect their businesses, potentially for many years in the future. It follows that proposals for change should be well articulated (*i.e.* make a compelling case for change) and accompanied by a summary of the anticipated impacts of the proposal being implemented, together with details of options that have been considered. This is as true of a renewal as it of an enhancement.
- 6.3 Given the complex system that is today's railway it is recommended that outcomes be detailed and include specific metrics, whilst avoiding use of phrases such as "same as current" or "like-for-like". An approach whereby the Operational Capability Statement – see Appendix B - is used to support the outcomes is to be encouraged;
- 6.4 Where insufficient information is provided, or further evidence is required, Operators should identify what they need to properly consider the proposal and ask for this to be supplied.
- 6.5 No single party has a monopoly of good ideas, so Operators are encouraged to collaborate with IMs when considering industry issues, so that sustainable and cost-effective solutions are developed jointly. Past experiences show that early engagement between IMs and Operators improves understanding of problems being addressed and desired outcomes and the chances of successfully finding solutions that are mutually acceptable, provided that all parties approach such engagement in an open, transparent and pragmatic manner. Key to this approach will be distinguishing between outcomes that represent needs (*i.e.* "must haves") and those that embody wants (*i.e.* "nice to have").
- 6.6 Although levels of IM funding and expected outcomes from such funding are projected to be constrained in the foreseeable future, it is appropriate that Operators should explore with IMs how best to achieve the outcomes desired, how to take advantage of benefits and, where necessary, how to mitigate any impacts. The use of technology or innovative solutions should be considered, recognising any constraints that may be in place and any applicable timescales.
- 6.7 Business cases are best developed from an industry perspective, rather than solely considering costs and benefits arising to any one party and should take due regard of applicable affordability and deliverability criteria, as well as to any strategic outcomes agreed or supported by the industry. Where a proposal permits opportunities to improve safety, operational flexibility or day-to-day efficiency, either to address previously tolerated deficiencies or achieve genuine improvement, these should also be recognised within business cases and be subject to similar affordability and deliverability tests, with the effect of such improvements analysed so that any detrimental operational consequences are understood and, where necessary, justified.

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- 6.8 Care is needed that Operator representatives are not perceived or seen to be agreeing to proposals without full consideration of the implications within the company, and to its suppliers and contractors. Records should be kept of all discussions held and agreements made, to provide an audit trail.
- 6.9 A Network Change should never come as a surprise to an Operator. Increasingly, IMs are ensuring discussion with Operators before formal proposals are issued. This may be via the issue of a pre-consultation draft, using the same distribution as would apply to a Network Change proposal, but other approaches and engagements may be employed. IMs may well provide opportunities to discuss developing ideas with, and seek feedback from, Operators, either through bespoke meetings or via additional agenda items at existing meetings.

Subject area	Summary of items to be considered	Rationale for that consideration
6.10 Why would Operators want well designed schemes (summary)?	<ul style="list-style-type: none"> <li>a) Railway that is improved, remains or becomes competitive, relevant, fit for purpose &amp; meets current and forecast resilience or performance requirements and timetable aspirations;</li> <li>b) Fit for purpose = run trains safely, efficiently and as close together as required &amp; possible;</li> <li>c) Where the outcomes align with existing capability elsewhere, or interventions being contemplated;</li> <li>d) That deliver on agreed outcomes, within applicable funding constraints and with industry benefits captured and used to drive operational efficiency;</li> <li>e) That allow schemes to be designed collaboratively, with early engagement of operators;</li> <li>f) That build in opportunities provided by renewals to provide better or more affordable outcomes.</li> </ul> <p>[Due to affordability or deliverability constraints, an acceptable alternative to renewal may be to consider life extension of an asset, thereby deferring renewal until future funding opportunities arise or franchise obligations / Operator business plans change.]</p>	<p>Operators will have to work with the scheme outputs for many years to come. End user input and assessment can assist an IM come up with appropriate and efficient answers to industry problems, e.g. assisting in developing options or making the most of (or minimising) disruptive possessions or offering solutions to train plans and train operations.</p> <p><i>N.B. Operators should take care to only specify outcomes where there is genuine need, and which generate value for money, rather than making proposals which “might prove useful” and either would be used rarely or would provide an expensive performance buffer. Operator scrutiny can apply the same rigour to an IM’s proposals</i></p>

Subject area	Summary of items to be considered	Rationale for that consideration
6.11 Organising to meet the challenge  <i>Continues on next page</i>	<p>Operators should:</p> <ul style="list-style-type: none"> <li>a) have a means of ensuring that meetings with IMs are recorded, to provide an audit trail of proceedings, and to allow information to be provided throughout the organisation;</li> </ul>	Care is needed that personnel are not seen as agreeing to propositions without full consideration of the implications within the organisation

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Subject area	Summary of items to be considered	Rationale for that consideration
6.11 Organising to meet the challenge (continued)	b) have a process in place to share information about the project within the Operator's organisation and with relevant suppliers;	The Operator's employees and suppliers should not be agreeing to propositions without full consideration of the implications within the organisation
	c) identify a single point of contact (individual or team) to liaise with the project – setting the pace of the Operator's engagement and participation – and to act as a focal point for the sharing of information within the Operator's organisation and with suppliers;	Operators seen as unwilling to engage with a project, or unable to identify and deploy adequate and competent resources, may find it difficult to influence project outcomes
	d) identify, and have in place, competency requirements and delegated authority levels (the ability to make decisions or incur expenditure on behalf of the Operator) so that staff and suppliers attending meetings with the IM or signing/approving scheme-related documentation are acting on the Operator's behalf;	Ensuring individuals possess the authority and competence to make decisions on behalf of the organisation.
	e) consider how third-party suppliers can assist in meeting the Operator's obligations;	Providing appropriate links with Business as Usual parts of the organisation
	f) seek to influence the project at an early stage, preferably by contributing to the client remit (also called the problem statement) and participating in scheme governance;	Attempts to influence the project after (1) outcomes have been agreed, (2) funding has been secured, (3) single option selection has been arrived at or (4) the point at which formal consultation is being undertaken, are unlikely to be successful
	g) contribute to the creation or review and subsequent agreement by all parties of Customer Requirements Documents and Operational Capability Statements	To record outcomes that are being sought and allow direct comparison between the capability and operation of the railway today and the intended capability and operations post-commissioning
	h) develop an "Entry into Operational Service" plan and monitor progress against this.	
	i) understand where similar signalling schemes have been deployed previously and have an appreciation of what the capability of the re-signalling will be in delivering benefits to, or achieving stable, outcomes	Identification of good practice and understanding of risks that materialised on previous projects, permitting inclusion in management plans

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- 6.12 The following diagram shows typical Operator activities that can be affected by a re-signalling scheme, and the relationship between these activities and any single point of contact project focus within the organisation.



**Fig. 1. Example of Operator activities affected by a project**



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### Part 7 Check-lists

*N.B.* Very few re-signalling schemes will require detailed deliberation of all items in these lists, or the more detailed iteration of Operational Capabilities in Appendix B. Nevertheless, it is recommended that each topic should be examined in turn.

Subject area	Summary of items to be considered	Rationale for that consideration
7.1 Scheme Governance	<p>a) Is transparent and effective governance in place that identifies risks and issues and addresses these as they arise? Does the governance process allow for an appropriate escalation process where agreement cannot be reached? Where derogation from standards may be appropriate, or is being actively explored, does the governance permit involvement of all relevant parties in understanding the impact of such derogations and seeks their support before proceeding with the application?</p> <p>[This recognises the long gestation period for projects, typically 4 or more years from start to commissioning.]</p>	Prevents risks or issues being “swept under the carpet” only to re-emerge later in the project, incurring cost and time penalties and eroding confidence of the parties. Effective governance ensures project scope and progress is monitored against required outcomes and outputs and assessed for continued relevance, with change control processes in place to ensure all parties remain engaged
	b) Are operators able to play a full role in the governance, such that their contribution is both of value in developing scheme outcomes, and in attaining those outcomes within the agreed timescales and funding?	
	c) Does risk evaluation and assessment conform to Common Safety Method principles?	Do project outcomes allow activity to continue as today, or will it be better? Any loss of capability should be agreed by the parties
	d) For larger schemes, does the governance recognise the importance of stage gates and have an appropriate process in place that these are not passed unless addressed to the satisfaction of all parties?	Prevents scheme development when one or more parties are not content with the direction of travel
	e) Is there clear separation between scheme governance and that required by internal (internal to any one company) processes?	Allows scheme governance to focus on achieving agreed outcomes
	f) Does the governance allow specialists & experts to be kept in the loop?	Allows input from professionals
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Subject area	Summary of items to be considered	Rationale for that consideration
7.1 Scheme Governance - continued	g) Are proposed alterations to the scheme properly considered within the governance structure and subject to change control, and related back to the outcomes expected?	Manages scope creep and recognises that there may be different ways to achieve the same outcome
	h) Does the governance process allow for change control after the design freeze?	Allows variations to be dealt with and communicated to all stakeholders
	i) Does the governance structure share the decision-making process?	Promotes transparency and reduces element of surprise overtaking one or more parties
	j) Does the governance structure permit effective communications with stakeholders & partner organisations?	Permits the sharing of knowledge and understanding
	k) Does the governance structure permit the possibility of third-party funding of the scheme, either in full or in part, without loss of focus on the agreed, required outcomes?	Recognition that funding for a project may come from more than one source

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Subject area	Summary of items to be considered	Rationale for that consideration
7.2 Problem Statement	<p>a) Is there agreement on the need to do the scheme and the outcomes and benefits that are being sought? In other words, is there a signed off Client Remit, informed by Operator priorities?</p> <p>Do the outcomes and benefits that are being sought reflect what the future railway will be required to deliver? What opportunities to modify or improve the Timetable Planning Rules will be provided?</p> <p>Consider the required balance between (a) quantum of trains (<i>i.e.</i> overall numbers, albeit at lower speeds, in a similar manner to “managed motorway”) or (b) speed (seeking journey time reduction but creating a situation where the range of train speeds influences overall capacity). Also recognise that a change of focus may be required at different times - peaks, off-peak, night hours, special events, weekends, bank holidays and maintenance periods (<i>e.g.</i> two-track railway)</p>	<p>Provides a shared master plan / scheme vision arrived at collaboratively &amp; agreed by industry.</p> <p>Early involvement by Operators should never be considered a bad investment. Effort expended at this stage, to understand (defining and quantifying) the outcomes and benefits and reach agreement on these, will be repaid later in the project.</p> <p>Route Investment Review Groups offer a useful introduction to projects and intentions and permit the collaborative approach to start. Other meetings between Operators and the IM can perform a similar function</p>
	<p>b) In addressing the problem statement, is it necessary for all benefits from the deployment to be realised immediately on commissioning, or is there an opportunity to phase the introduction? <sup>2</sup></p> <p><sup>2</sup> This theme is also explored in Parts 7.7 Assessments of Operations Risks, 7.8 Permanent Timetable and resourcing effects and 7.10 Performance effects</p>	<p>Depending on the scale of change proposed, a phased introduction may prove beneficial, perhaps over more than one timetable, to allow the reliability curve and front-line staff confidence and familiarity with the new technology to be built up</p>
	<p>c) Does the problem statement link to the appropriate Route or Market Study, or other agreed industry strategic plan, and align with franchise obligations and/or rolling stock changes?</p>	<p>Provides strategic fit. Operators can play a part in ensuring the links and alignment are identified</p>

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Subject area	Summary of items to be considered	Rationale for that consideration
7.3 Principles of Project Development (Operator perspective)	a) Remits to delivery agents, e.g. NR's Infrastructure Projects, should not be entered into too early in the project. Remits should link to the long-term strategy, and focus on desired outcomes (what is required), rather than specifying scheme requirements or solutions	
	<p>b) The problem statement should be used to work out what options can be considered to realise the required outcomes and benefits. Whilst some options need not be pursued in any detail and can be eliminated early, it is recommended that several good-quality options which maximise operations and (ideally) allow some future proofing are developed. Considerations should include:</p> <ul style="list-style-type: none"> <li>I. opportunities to incorporate or bring forward renewals and other enhancements to achieve greater value for money or support scheme outputs;</li> <li>II. identification of capabilities or assets that are no longer required, e.g. crossovers, siding connections;</li> <li>III. life extension of an asset, with deferral of renewal until future funding opportunities arise or franchise obligations / Operator business plans change;</li> <li>IV. [not used];</li> <li>V. the opportunities to phase the realisation of scheme benefits <sup>3</sup></li> </ul>	<p>Operators should be prepared to be open about their priorities but prepared to trade. This may allow identification of capability or assets that are no longer required, e.g. redundant crossovers, siding connections.</p> <p>Realism should be sought from all parties. This recognises that funding or deliverability may be constrained, or come from more than one source, so it might be better to get some improvement rather than none</p> <p><sup>3</sup> See Part 7.2 above</p>
	<p>c) Advantage should be taken of information that already exists, when considering options. This may not be 100% accurate but can be used as a guide to what is possible. Any such information should be verified as accurate before detailed design is complete.</p> <p>d) Similarly, table top exercises can be used to reduce spending time on site, especially in the early stages of a project, and informed by pictures, video &amp; individuals familiar with the location and its operational capability</p>	<p>Operators can assist early consideration by a willingness to share their own information, e.g. Forward-Facing Camera footage or Route Learning videos</p>

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Subject area	Summary of items to be considered	Rationale for that consideration
7.3 Principles of Project Development (Operator perspective) – continued	e) Where additional information is required, this should be commissioned early. The same applies to any consents that may be required and to any discussions with third-parties, e.g. utilities, temporary changes to surrounding roads, level crossing closures	e.g. surveys, environmental constraints, ground investigations
	f) Objective decisions should be reached on where sub-optimal solutions are required, how acceptable these will be and for how long, and how these will be resolved ultimately, e.g. further project phases or another scheme. Decisions should be transparent, recorded and not made by any single party in isolation	Difficult conversations should be had early, so that they can be resolved without impacting on project delivery
	g) Option selection should be undertaken with the involvement of Operators	Continuing alignment of outcomes
	h) Progress by the delivery agent should be monitored against time plans and for continued relevance	Ensuring delivery agent stays in time and on remit
	i) Project planning should be integrated	Avoidance of surprises or late changes to plan caused by one party being unable to deliver to schedule
	j) Detailed design, e.g. scheme plans, should not be undertaken too early	Avoiding some cost of re-work where inappropriate assumptions are used
	k) The detailed design should be modelled to prove it delivers the desired outcomes and benefits.	
	l) Opportunities to reduce costs or to make the best use of scarce resources are identified, if these are not to the detriment of agreed project outcomes	Financial efficiency. Examples of scarce resources include possessions, KIROW cranes, signal testers, front-line competent staff such as drivers

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Subject area	Summary of items to be considered	Rationale for that consideration
7.4 Commercial	<p>a) Has agreement with Operators been reached over the commercial principles that will apply to the project?</p> <p>b) To the extent that additional costs are recoverable in full or in part from the project, has the project sponsor been provided with details of:</p> <ul style="list-style-type: none"> <li>i anticipated Schedule 4 and 8 costs;</li> <li>ii data or system upgrades (including remote updating via laptops or “over the air”) and relevant staff costs;</li> <li>iii additional resources required to implement the scheme;</li> <li>iv changes to diversionary routes of front-line staff route knowledge, either permanently or during project construction / commissioning;</li> <li>v route proving or test trains to be provided; and</li> <li>vi other project costs (e.g. staff training)</li> </ul> <p>c) Has the IM aligned the project with the Sale of Access Rights process, so that subsequent applications for additional or altered services can be supported?</p> <p>[See also Part 7.13 Formal Consultation] [Other sections in this document may also lead to the incurring of cost by the Operator]</p>	<p>Avoidance of surprises or unexpected items later in the project</p> <p>Allows proper budgeting by sponsor and adequate funding to be sought.</p> <p><i>N.B.: claims received via Network Change should be netted off against benefits. The relevant IM Customer Relationship Executive, in conjunction with the project sponsor, should engage with Operators prior to consultation on Network Change, to agree the value of the benefits. Not all benefits that might be netted off should be included, e.g. those included in franchise agreements and therefore already accounted for</i></p>

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7.5 Operational Capability Statement	<p>a) Have the bespoke, common and shared operational objectives and requirements been captured into an agreed document that has fed into and influenced scheme development?</p> <p>b) Does the Operational Capability Statement:</p> <ul style="list-style-type: none"> <li>i link to the agreed problem statement (what capabilities or improvements are being sought)?</li> <li>ii articulate the functionality required from the scheme?</li> <li>iii include the needs of all access beneficiaries, including freight operators and those companies supporting network maintenance?</li> <li>iv allow for layouts to be designed around future maintenance opportunities and the identification of Golden Assets with policies to support the required levels of access?</li> <li>v considered how drivers will distinguish between safety critical and non-safety critical furniture in the four-foot and on the lineside?</li> <li>vi recognise the inability of most renewal schemes to provide wholesale improvements to the railway, within the funding and resources that are available?</li> </ul> <p>[A more detailed list of factors for consideration can be found in Appendix B.]</p>	<p>In seeking to apply the Operational Capability Statement, Operators should be mindful that the funding available for the project may be limited and should be realistic in the identification of their requirements. Alternatives or trade-offs may have to be considered. In extreme cases, it may be desirable to seek life extension of the signalling asset, to await greater funding or changed franchise obligation.</p>

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7.6 Signal Sighting	a) Is there a plan to support the Signal Overrun Risk Assessment Tool and signal sighting processes, with the outputs leading to scheme modification? Does that plan conform to RIS-0737-CCS Signal Sighting Assessment Requirements (June 2016), with involvement from competent staff recognised by the Operator?	Increasingly, signal sighting committee chairs are expected to check on the competence of individual committee members. Operators should review individual competences against the standard
	b) Have proposals for signal locations been informed by signal sighting considerations, such as: <ul style="list-style-type: none"> <li>i survey information of existing infrastructure, with use of Forward-Facing camera footage?</li> <li>ii location of neutral sections or conductor rail gaps?</li> <li>iii impact of line curvature and OLE stanchion positioning or other structures?</li> <li>iv lighting sources likely to impede visibility or interpretation of the signal, whether on or adjacent to the railway or from external sources?</li> </ul>	e.g. yellow street lamps or vehicles using car parks on same line of sight as signal
	c) Are the proposed signal locations acceptable for both existing and planned future rolling stock, so far as is known?	Future planned rolling stock could alter driver position in the cab, affecting locations where trains come to a stand as well as sighting angles
	d) Has use been made of Virtual Reality tools and table-top exercises before considering working lineside? e) Are the models used for Virtual Reality and the information used in table-top exercises or surveys accurate?	Reduces time taken at the lineside. Reduces post-commissioning issues and unforeseen sighting risks arising



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7.7 Assessments of Operations Risks	a) Is there a process to identify, with Operator involvement, changes to Operations Risks arising from the project, and any additional or changed mitigation? Have these changes been modelled and agreed with all parties and included in joint safety improvement plans? Is the modelling tool used able to offer enough assurance to, and accuracy for, all parties?	Ensuring continued relevance. Involvement of appropriate and competent individuals and consideration at existing joint (IM/Operator) meetings (e.g. OPSRAM). Additional or modified safety systems may give rise to unintended operational consequences. Whilst the project may not offer opportunities to manage out or reduce existing identified risks, it should not lead to increased overall safety risk for Operators
	b) Have Operator route risk assessments been reviewed to consider changes to: <ul style="list-style-type: none"> <li>i Signal Passed at Danger risk;</li> <li>ii speeding risk;</li> <li>iii driveability of new signalling and changed layouts, including application of Professional Driving Policies;</li> <li>iv. consequences of and mitigations against failure to receive information from a balise <sup>4</sup>;</li> <li>v. consequences of and mitigations against reduced functionality in degraded working, and management of degraded operations <sup>5</sup>;</li> <li>vi. low rail adhesion and mitigation measures</li> </ul>	Ensuring continued relevance <sup>4</sup> balises and trackside beacons may be used to assist with Correct Side Door Enabling, ABDO, SDO/ASDO and PCO/APCO <sup>5</sup> Consider degraded from perspective of planned or unplanned non-availability of infrastructure, as well as planned or unplanned non-availability of timetabled train service
	c) Do front-line staff ongoing training materials and assessments reflect changes made by the project?	

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7.7 Assessments of Operations Risks - continued	d) Is there an agreed process to review the attainability of the route speed / risk profile, post commissioning, with changes made either to timetable values or to the route profile?	Ensuring required scheme outputs are either delivered or differences do not affect ongoing timetable performance. Consider speeds & profiles associated with changes to, or new provision of, reversible signalling

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Subject area	Summary of items to be considered	Rationale for that consideration
7.8 Permanent Timetable and resourcing effects	<p>a) Has agreement been reached with the IM on:</p> <ol style="list-style-type: none"> <li>1 required permanent changes to EAS or TPR, and geographies contained within planning systems, <i>incl.</i> use of values less than ½ minute?</li> <li>2 required permanent changes to the detail required in timetable bids and offers (e.g. use of values with greater granularity than ½ minute, addition of new timing points)?</li> <li>3 the date at which any changes are to be introduced? and</li> <li>4 where the agreed date for implementing changes is after commissioning, how changes that impact on the timetable or on performance will be accounted for in the interim?</li> </ol> <p>b) Attention should be paid to any new, withdrawn or revised application of Conditional Double Red signals, Approach Controls, signalling imposed speed restrictions or flank protection. Consider also any changed or new provision of reversible signalling (e.g. TPR).</p> <p>c) Agreement should be two-fold. Firstly, in principle, as part of the required project outputs (see also Part 7.5 Operational Capability Statement and Appendix B) and secondly immediately prior to the scheme plan being signed off.</p>	<p>Industry processes require joint consideration of any proposals to change TPR or EAS with joint agreement reached. Changes that worsen TPR values will lead to performance impacts, unless reflected in a timetable at, or shortly after, implementation of the changes, and could lead to breach of franchise service level agreements. The scheme may impact lineside maintenance access, potentially improving one location but worsening elsewhere. Check also possession limits used for cyclical maintenance</p>
Continues on next page	<p>d) Are train planners aware of any permanent infrastructure changes, and the implementation date(s), so that they do not bid for future paths that the infrastructure will not support?</p> <p>e) Has a check been made of previously bid for and validated train paths, both STP and LTP, to ensure that these will continue to work after the infrastructure changes have been introduced? As part of this, consider ECS and locomotive paths, especially those from/to depots and stabling locations at start/end of day.</p>	<p>Ensuring train plans are workable against available infrastructure and avoiding late changes under STP, VSTP or Control processes</p>

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7.8 Permanent Timetable and resourcing effects (continued)	f) Have existing contingency plans been examined and amendments issued as necessary to reflect infrastructure changes post-implementation?	Ensuring continued relevance
	g) Are any special instructions or Sectional Appendix / Operating Notice entries required for the post-implementation railway? Have these been prepared and agreed as ready for publication on a specific date? Does the date allow time for front-line staff briefing / training?	
	h) Is the realisation of project benefits phased across more than one timetable?	Depending on the scale of change proposed, consider a phased introduction, perhaps over more than one timetable, to allow the reliability curve and front-line staff confidence and familiarity with the new arrangements to be built up
	i) Is there an agreed process to review the attainability of the route speed / risk profile, post commissioning, with changes made either to timetable values or to the route profile?	Ensuring required scheme outputs are either delivered or differences do not affect ongoing timetable performance. Consider speeds & profiles associated with changes to, or new provision of, reversible signalling
	j) Are changes required to walking times or train preparation times, because of the project?	Roster efficiency <i>E.g.</i> changes to stopping points affecting crew relief, removal of station barrow crossings affecting walking routes, changed protection arrangements for using walking routes

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7.9 Planning and resourcing possessions	<p>a) Has there been early engagement with the IM to secure:</p> <ol style="list-style-type: none"> <li>1 buy-in from all parties to avoid clashing with external activities that lead to additional peak demand, e.g. major roadworks or special events?</li> <li>2 agreement on the outline possession strategy and train plan required for project construction, delivery, commissioning and post-commissioning recovery of redundant assets, with anticipated costs (including rail replacement services) understood, and agreed in principle, by the IM and included in the project's Anticipated Final Cost?</li> <li>3 agreement on how any reduced capacity available during the construction and commissioning phases will be allocated and used?</li> </ol> <p>b) Has the availability of reduced capacity been modelled to provide assurance that the possession strategy and revised train plan is robust?</p>	<p>Ideally, discussions on outline possession strategies and train service alterations, with or without rail replacement, should be held with the IM before the project contractor is appointed. This will allow consideration of the balance between contractor activity and possession requirements/timetable alterations – both directly impact on project costs. Industry processes require joint consideration of possession proposals that fall outside the Engineering Access Strategy – all parties should be looking to minimise disruptive possessions and achieve synergies with pre-existing requirements</p>
	<p>c) Does the possession strategy take account of</p> <ol style="list-style-type: none"> <li>1 altered customer flows and arrangements to inform all passenger types (leisure, regular and commuter) of the planned works?</li> <li>2 Information to local rail user bodies, local authorities, affected businesses and retail outlets, other neighbouring properties, etc.</li> </ol>	<p>Communications to customers and industry neighbours – reasons for the works and altered arrangements</p>
	<p>d) Is the possession strategy understood sufficiently to permit possessions to be booked in good time and for the correct purpose?</p>	<p>Avoiding late notice alterations or additional possessions</p>
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7.9 Planning and resourcing possessions - continued	e) Has assurance been sought from the IM that all activities within each possession are compatible (to avoid delays “on the day” and/or lost work) and that the possession strategy is robust (to deliver all intended works within the time)?  Particular attention should be paid to whether there is adequate time to test signalling changes once the signalling has been enhanced / renewed?	Avoiding late changes to possessions and reducing need for extra possessions, often at short notice. Quantitative schedule risk assessment or similar techniques may provide such assurance
	f) Are possessions agreed sufficiently in advance to permit inclusion in Informed Traveller processes?	Incorporation of revised train plans in industry processes
	g) Do the possession requirements for <b>all</b> schemes that the Operator is affected by on a given day/time create insurmountable or avoidable problems?	Clashes between different projects’ possessions – can the Operator resource all revised train plans at the same time?
	h) If possession strategies require electrical isolations ( <i>i.e.</i> overhead line or third rail), has the impact on stabled rolling stock been considered?	Do revised arrangements allow vehicle cleaning and maintenance activities to take place, and pre-heating during winter?
	i) Are train planners aware of any TSRs required for project works ( <i>e.g.</i> to safely pass worksites) and have these been incorporated into STP bids?	Ensuring train plans are workable against available infrastructure and avoiding late changes (STP, VSTP or Control processes)
	j) Are train planners aware of any altered stabling requirements imposed by possessions?	Planning of ECS & locomotives to/from altered places
	k) Is there a resourced plan to allow ECS trains and locomotives to move to/from out-stabled locations? Does this plan require any new or altered rolling stock clearances or additional route learning to be undertaken, and has it been validated against other possession requirements to ensure a path is available at the required time(s)?	When examining out-stabling options, Operators may wish to consider “off-route” locations
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7.9 Planning and resourcing possessions - continued	l) Has the impact on resource plans been assessed to ensure an orderly transfer for work between traincrew depots, or link structures, to minimise overall cost whilst according with national and local agreements? Does the transfer of work create the need for any additional route or traction training, or walking route provision, with costs identified?	
	m) Has the impact on customer journeys caused by the revised train plan been assessed and is information available in good time to inform/ assure customers of alternative arrangements?	
	n) Have normal contingency plans been examined and amended as necessary to ensure continued relevance during the period that the revised train plan is in force?	
	o) Have changes to customer information been identified and briefed to affected staff? Are customers aware – posters, announcements at stations and on-trains, leaflets, email contact via databases of regular patrons, company websites, National Rail Enquiries and other information websites, social media?	Ensuring that customers are aware of changes to journeys and can plan with confidence during the blockade
	p) Does the revised train plan allow for an orderly winding down of the service before the possessions come into effect? Does this plan include ECS and locomotive workings to depots and stabling locations? Have suitable alternative stabling locations been identified?	Ensuring train plans are workable against available infrastructure and avoiding late changes (STP, VSTP or Control processes).
	q) Have the extra resources to support the revised train plan been identified? Does the train plan reflect any possessions, TSRs (e.g. for workforce protection) or electrical isolations? Stage works or commissioning phases should each be considered.	
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7.9 Planning and resourcing possessions - continued	r) Does the revised train plan allow for an orderly starting up of the service after commissioning has been completed? Does this plan include ECS and locomotive workings from depots and stabling locations?	
	s) Is there a need, immediately following the giving up of commissioning possession(s), for: <ul style="list-style-type: none"> <li>i A temporary train plan to be in force for an initial period whilst staff become familiar with new practices and changed infrastructure, or whilst any remaining TSRs remain in force?</li> <li>ii The operation of test or route proving trains?</li> <li>iii The first few trains to be retimed to reflect any need for route proving or axle counter sweeps?</li> </ul>	
	t) Are any required special instructions or Operating Notice / Sectional Appendix instructions required during construction (e.g. to support adjacent line open working) prepared and agreed as ready for publication on a suitable date? Does the date allow time for briefing or training of front-line staff?	
	u) What arrangements are in place to monitor late running trains, and mitigate the risk that possessions cannot be taken on time?	
	v) Whilst the revised train plan is in operation, what altered arrangements are in place to monitor late running trains, to minimise customer inconvenience and expedite the recovery of the service?	Operator Controllers may have to intervene differently to normal, especially if capacity is reduced
	w) What arrangements are in place to monitor the possession and assess the risk of overrun? Is there a contingency plan in place to cater for a possession overrun, including advice to customers of alternative travel arrangement?	



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7.10 Performance effects	a) Have the performance impacts arising from the post-implementation infrastructure been modelled and the anticipated impacts agreed with all parties and included in joint performance plans? Is the modelling tool used able to offer enough assurance to, and accuracy for, all parties?	This agreement should be reached before the scheme plan is signed off, to avoid misunderstanding over realisation of project benefits
	b) Has the reliability curve of any changed infrastructure been included in the modelling?	Lower reliability may be seen in changed infrastructure in the early days post-commissioning. Mitigation may include additional response teams in the short-term
	c) Is it appropriate to consider changes to the schedule 8 benchmarks, arising from implementation of the project?	
	d) Has any modelling work considered the impact of autumn and periods of reduced adhesion?	
	e) Are changes to berth offsets or monitoring points understood at least in principle, with a clear understanding reached on when any changes will take effect?	Avoids unplanned effects on performance monitoring
	f) Does the project hinder or enable changes to performance reporting?	<i>E.g.</i> moves towards reporting on-time performance at stations
<i>Continues on next page</i>	g) Have the IM's Data Quality professionals had input into the project requirements?	Data quality may not be considered early enough in the project

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7.10 Performance Effects - continued	h) Does the project introduce any changes to existing performance reporting?	<i>E.g.</i> I. manual reporting at a remote location replaced by automatic reporting, II. new timing points required, III. greater consideration required of sub-threshold delays, IV. accommodating any timetable changes with use of values less than ½ minute
	i) Have contingency plans (both the IM & Operator) been reviewed?	Ensures contingency plans reflect any changes to infrastructure
	j) Is there an agreed process to allow front-line IM and Operator personnel to experience each other's working environment? <i>E.g.</i> signallers provided with cab rides; driver visits to Rail Operating Centres	Knowledge share and familiarisation, leading to closer working and understanding of performance issues
	k) Has the IM provided assurance that new or changed assets will be entered into appropriate logs and databases and that maintenance staff will be aware of changes, have access to necessary records and receive applicable training?	Ensuring incident response teams can deal with post-commissioning failures efficiently
	l) Is there an agreed process to review the attainability of the route speed / risk profile, post commissioning, with changes made either to timetable values or to the route profile?	Ensuring required scheme outputs are either delivered or differences do not affect ongoing timetable performance. Consider speeds & profiles associated with changes to, or new provision of, reversible signalling

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Subject area	Summary of items to be considered	Rationale for that consideration
7.11 (Operator) Engineering & fleet effects	a) Has an assessment been conducted to review the impact of the project on the working of depots and train stabling? Are changes to depot or stabling infrastructure required to support project outputs (e.g. higher entry/exit speeds between depot and the Network)?	Efficient working of depot or stabling location  Avoiding loss of main line capacity due to moves to/from depot or stabling location
	b) Does the scheme provide any required AWS or TPWS equipment for testing purposes or for trains entering service from a location?	To meet Rule Book requirements
	c) If depot/stabling access is to be provided by a single entrance / exit line, are the operational risks of this fully understood with appropriate mitigations in place?	What would be the effect if an entrance / exit line were to be blocked by fault or failure?
	d) Does the project support efficient train movements around the depot or stabling location, trains entering service (e.g. from depot at start of day/journey) and leaving the Network (at end of day/journey) at the intervals required by the timetable?	Maintenance of existing timetable and resource plans.  Are there opportunities for trains to leave the Network clear of the main line without depot or stabling location staff being present?
	e) Does the project change the way in which 1 signallers are aware of the identity of trains entering service from depot/stabling? 2 depot/stabling location staff become aware of the identity of approaching trains?	
	f) Is the Operator undertaking any additional tasks as a result of such changes and have any costs that arise been identified?	Consider changes to working practices or undertaking additional responsibilities, e.g. interposing headcodes into the signalling system or use of acceptance switches
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Subject area	Summary of items to be considered	Rationale for that consideration
7.11 (Operator) Engineering & fleet effects - continued	<p>g) During project construction and commissioning:</p> <ol style="list-style-type: none"> <li>1 has agreement been reached with service providers regarding any change in out-stabling requirements?</li> <li>2 is any out-stabling of rolling stock required and has that been assessed to understand the impact on fuelling, tanking, cleaning and maintenance regimes?</li> <li>3 if electrical isolations are required as part of the possessions, what is the impact on stabled rolling stock?</li> </ol>	<p>Out-stabling need not be at a location usually used by an Operator</p> <p>Avoids in service failures or the need for Control interventions</p> <p><i>E.g.</i> to allow pre-heating during winter</p>
	h) Is the Operator undertaking any additional tasks because of project changes and have any costs that arise been identified?	
	i) Is there an opportunity to use the project's possessions to undertake depot / stabling infrastructure changes in parallel?	Possible reductions in cost of making changes within the depot
	j) Have changes required to data or system upgrades (including remote updating via laptops or "over the air") been identified with a plan to deliver these?	<i>E.g.</i> updating of in-cab GSM-R handset telephone directories

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Subject area	Summary of items to be considered	Rationale for that consideration
7.12 Impacts on Stations	This check-list is intended to assist station management duty-holders, irrespective of whether they are employed directly by Train Operators. Reviewing and updating of risk assessments (e.g. Passenger Train Interface) to ensure continued relevance will assist consideration	
	1) Has an assessment been conducted to review the impact of the project on the working of stations?	This check-list and Appendix B Operational Capability Statements include factors for consideration. Examine all times of day and staffing levels
	2) Are changes to station infrastructure required to support project outputs?	Changes to station furniture required to facilitate signal sighting; clear spaces behind buffer stops for overrun protection; lock-out control cubicles for protecting walking routes or possessions for litter picking or maintenance; provision and location of CD/RA, TRTS, OFF equipment
	3) Does the project impact on customer circulation, waiting areas ( <i>incl.</i> platform canopies) or security measures?	Good customer experience, ability to meet timetabled dwells and control safety risks. <i>E.g.</i> shortening or non-availability of platforms or reductions in width; train stopping positions and platform markings that aid positioning of customers; platform canopies to shelter waiting customers; altered customer behaviour when waiting or seeking information; customer wayfinding; slip, trips and falls risks; provision and suitability of platform edge yellow lines; platform end fencing and anti-trespass measures; impact on Passengers of Reduced Mobility
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Subject area	Summary of items to be considered	Rationale for that consideration
7.12 Impacts on Stations - continued	4) Does the scheme design support efficient station operational working and train despatch?	<p><i>E.g.</i> closing-up signal berths to minimise re-occupancy time; opening-out signal berths to provide early proceed aspect; visibility of signals; efficient permissive working; arrival and departure train speeds; provision of mid-platform signals, with enough allowance for ends of train to overhang signal berths; provision and location of TRTS, OFF, CD/RA or Aided Despatch equipment.</p> <p>How will station staff and train crew become aware of a train having a proceed aspect?</p> <p>How will signallers become aware of a train that is ready to start (ECS, locomotives or in service)?</p> <p>Impact on DOO/DCO or Aided Despatch equipment, whether provided in-cab or on platforms, especially if stopping positions change? Can stop-boards be rationalised?</p> <p>Consider trains of varying length, different stock that may use station, and different Operators</p>
	5) Does the project support trains entering / leaving service at the intervals required by the timetable ( <i>e.g.</i> following detachment, staff relief, drivers changing ends, attachment or headcode change)?	<p>Maintenance of existing timetable and resource plans. Ability to couple/uncouple trains.</p> <p>Consider impacts of GSM-R, including multiple, registrations</p>

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Subject area	Summary of items to be considered	Rationale for that consideration
7.12 Impacts on Stations - continued	6) Does the project change the way in which <ul style="list-style-type: none"> <li>I. signallers are aware of the identity of trains entering service?</li> <li>II. station staff become aware of the identity of approaching trains?</li> <li>III. station staff and signallers communicate?</li> </ul>	<i>E.g.</i> changes to radio communications; customer information <i>incl.</i> advice of platform changes; delayed trains requiring signal replacement. Some locations employ GSM-R broadcast messaging from drivers to advise signallers that a train is ready to enter service. In current form, this is not considered sustainable as the industry moves away from signallers manually setting routes
	7) Are changes to station infrastructure planned and is the re-signalling project aware of these?	Ensuring signalling schemes take cognisance of any proposed station works to avoid unintended consequences
	8) Is the Operator to undertake any additional tasks, permanently or temporarily, because of changes introduced by the project and have any costs that arise been identified?	Consider changes to working practices or undertaking additional responsibilities, and determine any additional competency needs, <i>e.g.</i> <ul style="list-style-type: none"> <li>i. interposing headcodes into the signalling system;</li> <li>ii. use of station staff to position incoming trains or confirm train arrived complete;</li> <li>iii. provision of customer information where previously supplied by local signal box;</li> <li>iv. alterations to staff walking routes (<i>e.g.</i> removal of barrow crossings)</li> </ul>
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Subject area	Summary of items to be considered	Rationale for that consideration
7.12 Impacts on Stations - continued	9) Is there an opportunity to use the project's possessions to undertake station infrastructure changes in parallel?	Possible cost reductions when making changes within the station. Efficient use of possessions
	<p>10) During project construction and commissioning, consider both the above sections and these items:</p> <p>I. is any out-stabling of rolling stock required and has that been assessed to understand requirements for tanking, replenishment, cleaning and maintenance?</p> <p>II. if electrical isolations are required as part of the possessions, what is the impact on stabled rolling stock or station supply?</p> <p>III. are platforms or station facilities to be reduced temporarily, or stopping positions altered?</p> <p>IV. does project require access that makes use of station facilities?</p>	<p>To minimise impact on, and risks to, the timetable and customers and identify additional costs. Examine scope for temporary alternatives.</p> <p>Out-stabling need not be at a location usually used by an Operator. Avoidance of in-service failures or the need for Control interventions. Impact on cleaning staff.</p> <p><i>E.g.</i> to allow pre-heating during winter.</p> <p><i>E.g.</i>; non-availability of CIS or train despatch equipment; changes to platform markings; project works affecting platform surfaces or creating hazards; storage of materials.</p> <p><i>E.g.</i> access via ticket gates; out-of-hours access to toilets or staff rooms; delivery of materials; impact on cleaning, security and retail arrangements</p>



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Subject area	Summary of items to be considered	Rationale for that consideration
7.13 Formal Consultation (incl. Network Change, Station Change, GE/RT8270 assessments)	a) Can formal consultation be undertaken efficiently and without surprises, whilst still protecting each parties' interests?	This is the crux of any consideration of formal consultation
	b) Has the need for formal consultation to be undertaken with stakeholders been identified early in the scheme, so that it can be properly incorporated into the project plan? Have the views of Operators been sought?	Enough time should be allowed to follow due process, including the resolution of disputes
	c) Does the project plan allow for escalation of formal consultation into any identified dispute procedure, and allow time for objections to be resolved?	Resolving objections may cause the scheme plan to change
	d) Has formal consultation been completed to the satisfaction of all parties before work commences?	Enough time should be allowed to follow due process, including the resolution of disputes
	e) Once the project has commissioned, have the proposed alterations been installed correctly?	A Variation to the formal consultation may be required, unless the installation can be corrected, or the parties agree that no further action is required
	f) Have documents issued to front-line staff (e.g. Sectional Appendix) been updated following commissioning?	Avoidance of issues in future
	g) <b>Formal consultation should be a repeat of previous, informal discussions, and accompanied by enough information to allow the recipient to adequately assess the impact of the proposal on their business.</b>  <b>In principle, it should not be necessary for operators to receive signed scheme plans (see Part 7.14) as part of formal consultation, provided there is a clear control process in place to identify late changes to project outputs that have been agreed as part of formal consultation</b>	An objection to the formal consultation from an Operator can be viewed as a failure on the parties to engage sufficiently and effectively
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Subject area	Summary of items to be considered	Rationale for that consideration
7.13 Formal Consultation (incl. Network Change, Station Change, GE/RT8270 assessments) - continued	<p>h) Additional notes on Network Change</p> <ol style="list-style-type: none"> <li>1 Some schemes might require the use of more than one method of formal consultation</li> <li>2 It should not be assumed that projects that replace existing signals with 'modern equivalent form' do not need Network Change – signal locations or functionality may change.</li> <li>3 The use of No Material Effect letters is not officially recognised within part G of the Network Code but may be appropriate where all parties agree to its use.</li> </ol>	<p>No Material Effect does not offer Operators any protection under the Network Code.</p> <p>Some Operators consider that No Material Effect should be accompanied by the same detail as would accompany a Network Change to allow full examination of the proposal. On that basis, there is little to be gained through this approach.</p>

- i) Project sponsors should ensure all 'processes' are in place and this includes any formal consultation required to meet legislative or industry requirements. IM sponsors are increasingly being encouraged to undertake pre-consultation with stakeholders. This includes the issuing of draft documentation (which can be in the form of simple emails) before the formal process commences and designed to tease out areas of disagreement in advance of formal deadlines, thereby allowing more time for resolution to be achieved; Operators are encouraged to use these opportunities.

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Subject area	Summary of items to be considered	Rationale for that consideration
7.14 Scheme Plans  (reading what it is telling you and interpreting what it is not telling you)	<p>a) Signed scheme plans are produced late in a project, after the principles are understood and agreed, and are a formal output. Sketch plans are used during development.</p> <p>b) Developing scheme plans too early in the project can represent a waste of scarce design resources, as considerable cost can be incurred through the need for re-design. Operators should consider whether outline scheme diagrams (sometimes called “fag-packet”) are sufficient to describe what is required in the early stages of project development.</p> <p>c) Scheme plans should contain a table of routes – this will indicate which routes apply where, what signals will clear and what point positioning and overlaps are required.</p> <p>d) The table of routes should be backed up by Control tables and Operators should request these if clarification is required on any aspect of the plan.</p>	<p>Operators need to be satisfied that the scheme plan provided by an IM meets the agreed remit for the project.</p> <p>It is important that signalling scheme plans are signed and version controlled. Processes should exist to ensure that Operators have access to the most up-to-date information.</p> <p>It is recommended that Operators provide, or have access to, a proficient resource, able to interpret scheme plans, independently from an IM.</p>
Continues on next page	<p>e) Scheme plans will show the provision of:</p> <ul style="list-style-type: none"> <li>• Permissive working;</li> <li>• flashing aspects;</li> <li>• flank protection,</li> <li>• full, reduced and swinging overlaps;</li> <li>• TPWS;</li> <li>• AWS;</li> <li>• Limits of Shunt</li> <li>• PSRs;</li> <li>• Neutral sections</li> <li>• Conductor rail gaps</li> <li>• Changes to signal positioning;</li> <li>• Lineside telephones;</li> <li>• Lineside signs and positioning;</li> <li>• Balise / marker board and positioning;</li> <li>• Balise information;</li> <li>• Reversible signalling;</li> <li>• Level crossings and barrow crossings at stations and any technology that is employed to control risk to users, <i>incl.</i> indications and information provided to train drivers from the lineside.</li> </ul>	<p>Scheme plan information will be key to developing any subsequent operational documentation (e.g. Sectional Appendix entries)</p>

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Subject area	Summary of items to be considered	Rationale for that consideration
7.14 Scheme Plans - continued  (reading what a plan is telling you and interpreting what it is not telling you)	f) Is it clear on the scheme plan what assets will be identical, what is to be removed and what is to be provided for the first time?	Scheme plans show in green what is to be removed and in red what is to be installed. Black signifies what exists currently and will be unaltered; blue shows what is to be constructed but is to be commissioned later
7.15 Employee and Supply Chain Effects	a) Has the Operator been able to share details of the scheme with its employees, contractors and suppliers and reached an understanding over short-term effects (during construction) and long-term effects (post-implementation)?  b) Has the Operator been able to have appropriate and timely discussion and reach agreement with staff representatives (safety and trade union)?	Good relations with employees, contractors and suppliers and continuance of the “no surprises” principle

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Subject area	Summary of items to be considered	Rationale for that consideration
7.16 Operator Resources and Training (incl. briefing)	a) Has Operator been able to develop a properly conceived training plan, based on training needs, with key milestones?	What does the Operator need to have in place to enable project go-live?
	b) Has a training need analysis been conducted of the changes being introduced, with appropriate assessments undertaken to identify the difficulty, importance and frequency of (any) revised tasks?	Provides a baseline for the appropriate knowledge, skills and attitudes and training required by staff performing revised roles or tasks, or working to altered location-specific methods of working
	c) Does this include roles such as train planners, controllers, maintenance staff and managers, as well as train crew, station and depot operations staff?	
	d) Does the plan allow training materials to be developed, verified as accurate, delivered in enough time and in the required form and quantities as are required? Has agreement been reached with any third-parties?	Project agreement may be needed to ensure access to appropriate materials
	e) Does the plan allow for the provision of champions within the business (advocates of the scheme to help win 'hearts and minds') and super-users (early adopters to allow "train the trainers")?	
	f) Is there a need to recruit additional staff and is the need recognised for these to gain required competence?	Establishments may need to be temporarily increased, if extensive training is required
	g) Can staff release be accommodated, where required?	
	h) Can training be accomplished within rolling safety briefing cycles (where company procedures allow), or are bespoke sessions required? i) Is it better to train early, with resultant loss of knowledge or confidence and a need for refresher training, or train immediately prior to project implementation?	Maintaining efficient use of resources. Much will depend on levels of training required, the number of staff involved and the extent to which technology (e.g. Virtual Reality, or DVDs) can play a part
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Subject area	Summary of items to be considered	Rationale for that consideration
7.16 Operator Resources and Training (incl. briefing) - continued	j) Are arrangements in place to publish any revised operational instructions?	
	k) Is progress against training plan(s) monitored with corrective action taken to ensure progress meets overall implementation timescales?	Early identification of issues allowing these to be addressed in a planned manner
	l) Schemes rarely present themselves in isolation, so Operators may have more than one “approaching commissioning” at any one time. When considering resource planning, Operators should determine whether training for more than one scheme can be aligned to allow for efficiencies, and whether the company has the capacity to deal with multiple schemes	Where problems are foreseen, early discussion with scheme sponsors to re-plan activity or to explore other avenues (e.g. provision of additional staff resources)
	m) Does the project allow non-core activities to be practiced in a planned way, e.g. wrong line running (using reversible signalling) or degraded working (non-availability of infrastructure), subject to the timetable accommodating this?	Allowing front-line staff familiarity and the opportunity to practice activities that are not normal, in a controlled and planned manner

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Subject area	Summary of items to be considered	Rationale for that consideration
7.17 Review	a) Scheme sponsors compile a closing out report which reflects on the delivery/lessons learnt. This should cover all aspects of the project. It is recommended that Operators should input into any review, and that the resultant document be shared within the governance process and subsequently shared with other sponsors and projects.	
	b) Is there a process to assess whether the scheme has delivered against the desired outcomes and its specification, and are Operator contributions sought?	
	c) Has the Operator conducted its own review and lessons learnt exercise, and fed the results into the process being run by the sponsor?	
	d) Are Operators informed of the results of the sponsor's scheme review?	
	e) What lessons have been learnt about funding and the budgeting process?	
	f) Were construction and commissioning timescales achieved?	
	g) Was post-commissioning snagging effective before handover to Business as Usual?	
	h) Have redundant assets been recovered and the work sites left in a tidy condition?	Removing temptation from thieves and trespassers
	i) Is there a need for formal consultations (e.g. Network Changes) to be <ul style="list-style-type: none"> <li>amended (<i>i.e.</i> if an error was made in the proposal when consulted), or</li> <li>varied (<i>i.e.</i> if what was consulted needs to be changed, either because the scheme has changed, or the implementation did not proceed in accordance with the proposal)?</li> </ul>	To ensure there is clear understanding of what infrastructure has been provided on the ground
	j) Has the success of the project been celebrated with recognition of the contribution from each party?	

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### **Part 8 References**

GE/RT8270 Assessment of Compatibility of Rolling Stock with the Infrastructure  
Network Code  
Network Rail's Clienting Requirements  
Network Rail's Transformation Plan  
NR/OCS/123456/GS0 Operational Capability Statements  
RIS-0737-CCS Signal Sighting Assessment Requirements (June 2016),  
RIS-3703-TOM: Rail Industry Standard for Passenger Train Dispatch and Platform Safety  
Measures (2013)  
RIS-8060 CCS (2017) Engineering Requirements for Dispatch of Trains from Platforms  
RIS-8217-TOM (2016), Introduction and Use of Axle Counters – Managing the Risk  
RDG GNNTI001 Delivering Good Schemes – ETCS (RDG issued Guidance Note)  
Signal Overrun Risk Assessment Tool



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### Part 9 Abbreviations

ABDO	Assisted Braking and Door Opening
APCO	Automatic Power Changeover - an automatic form of PCO (see below)
ASDO	Automatic Selective Door Opening
AWS	Automatic Warning System
CD	Close Doors or Commence Despatch (use of platform control box to provide visual indication to driver to Commence Despatch by closing train doors)
CIS	Customer Information Systems
EAS	Engineering Access Strategy
ECS	Empty Coaching Stock train
GSM-R	Global System for Mobile Communications-Railway: a radio system
IM	Infrastructure Manager (e.g. Network Rail)
LTP	Long Term Planning
OPSRAM	Operational Risk Reduction and Mitigation
NR	Network Rail
NSO	National System Operator (see Definitions)
OCS	Operational Capability Statement (previously known as the Operations Requirements Specification) – see also Definitions
OFF	Platform indicator confirming starting signal is displaying a proceed aspect (usually employed where despatch staff are unable to see the relevant signal)
OLE	Overhead Line Equipment (a reference to electrification)
PCO	Power Changeover (e.g. bi-mode train switching between a power supply drawn from an electrification system and that generated on-board)
PSR	Permissible Speed Restriction
RA	Right Away (use of platform control box to provide visual indication to driver that station despatch is complete)
RACI	Responsible, Accountable, Consulted and Informed. (A RACI matrix illustrates all the activities or decision-making authorities undertaken within a project set against all the people or roles)
RDG	Rail Delivery Group
REC	Emergency call using GSM-R
SDO	Selective Door Opening
STANME	Station Number Names (used for timetable construction)
STANOX	Station Numbers (used for timetable construction)
STP	Short Term Planning
TIPLOC	Timing Point Locations (used for timetable construction)
TPR	Timetable Planning Rules

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TPWS	Train Protection Warning System
TRTS	Train Ready to Start (use of platform control box to provide visual indication to signaller that a train's station duties are complete. Where Automatic Route Setting is employed by the signalling, operating TRTS can cause the route from a platform to be set and a movement authority to be granted or the associated signal to clear to a proceed aspect).)
TSR	Temporary Speed Restriction
VSTP	Very Short-Term Planning

**[Appendices follow]**

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### **Appendix A Typical factors contributing to project failure**

- Failure to learn lessons from previous projects/programmes of a similar nature;
- Change of sponsor and/or team members;
- Uncertainty over funding, or authorised funding is exceeded;
- Unrealistic financial goals or limits, which may lead to ill-defined 'across the board' cost cutting (with resultant increased overall industry cost whilst delivering less);
- Lack of robust records;
- Lack of, or late stakeholder / end user input;
- Lack of executive support or agreement at the correct levels within organisations;
- Incomplete and/or vaguely defined requirements or specifications;
- Uncontrolled scope creep and changing requirements / specifications;
- Lack of trust between parties;
- Insufficient planning, particularly in the development phase of a project, *i.e.* pushing to reach a preferred option and contractor appointment as quickly as possible;
- Failure to integrate planning with other projects/programmes that affect any of the parties involved;
- Underestimated time and/or resources allocated for design, development, quality assurance, quality control, and/or project management;
- Technological or operational incompetence;
- Unrealistic expectations;
- Unclear objectives;
- Unrealistic timeframes;
- End user training shortcuts or lack of end user training;
- New or untested technology;
- Lack of understanding of roles;
- Failings or errors in contractor procurement and/or tender selection.

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**Appendix B Operational Capability Statement detailed check-list**

Network Rail's processes seek to capture information on how the railway is to be used once a project has been commissioned and to use that knowledge to assist signalling designers produce better outcomes. It follows that information should be recorded in advance of scheme design, examined systematically and with inputs from many parts of the industry. This Appendix summarises NR/OCS/123456/GS0 and will assist Operators to prepare their involvement.

Consider both current arrangements and capabilities and those that will exist post project commissioning. This will enable an appreciation to be gained of the effect of the project. If stage-works are to take place, then both the stage(s) and final commissioning should be considered.

Suggestions of items to be considered (neither exhaustive nor prioritised)	Points to consider include
Project, Objectives & Targets – desired outcomes	Client requirements over scope and cost & any Operator proposals agreed for inclusion, e.g. capability, capacity, journey time, performance, operational flexibility ( <i>i.e.</i> avoiding hard-wiring outcomes to a particular timetable), maintenance, reliability and availability. It is recommended that outcomes be detailed and include specific metrics, whilst avoiding use of phrases such as “same as current” or “like-for-like”
Geographical Boundaries & Interfaces, including Fringe areas	Impact on adjoining areas and methods of operation, both existing and planned, including any renewal, intervention or enhancement schemes that is either adjacent or near. Changes to Methods of Working ( <i>e.g.</i> Track Circuit Block, Tokenless Block, No Signaller Token) and relationships with infrastructure controlled by other IMs
Project Staging Strategy	
Interfaces with other Projects	Possibility to align possessions or benefits; understanding of dependencies between projects that may influence designs, stage-works, possessions and / or temporary working solutions. Impact on adjoining areas and methods of operation, both existing and future, including any renewal, intervention or enhancement that is either adjacent or near, including those not directly railway related. Consider projects that are planned to impact on an Operator at a similar time, affecting the ability to agree possessions, divert services or efficiently train and brief front-line staff

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### Appendix B Operational Capability Statement detailed check-list - continued

Suggestions of items to be considered (neither exhaustive nor prioritised)	Points to consider include
Engineering Line References Directly affected by the project Fringe areas	
Operations & Control Functionality	Changes to TRUST, CCF, Traffic Management or to the systems
Means of train detection, e.g. axle counters, track circuits	Compliance with RIS-8217-TOM (2016), Introduction and Use of Axle Counters – Managing the Risk
Line Names	Avoiding duplication or ambiguity for safety critical communications
Junction Names	Avoiding duplication or ambiguity for safety critical communications
Track Layout Changes	<p>Effect on functionality (in both normal and degraded conditions), signalling, TPR, standage and platform lengths and performance monitoring.</p> <p>Degraded conditions from perspective of planned or unplanned non-availability of infrastructure, as well as planned or unplanned non-availability of timetabled train service.</p> <p>Consider the train length that will be the most prevalent and how trains that exceed this length could be accommodated – not everything needs to cater for 775m freight trains.</p> <p>Ideally, layouts should be optimised to meet requirements, both projected and aspirational. Examination should include the impact on PSRs, especially if junction layouts are altered or if flank protection arrangements are introduced or changed. Signals and marker boards should serve the layout and be positioned accordingly; layouts should not be led by signals</p>

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### Appendix B Operational Capability Statement detailed check-list - continued

Suggestions of items to be considered (neither exhaustive nor prioritised)	Points to consider include
Safety & Environmental / Operational Safety Systems	<p><i>E.g.</i> noise sensitive areas, sites of Special Scientific Interest, walking routes, lineside access points and any associated staff safety protection systems, emergency tripwires – all may affect placement of signals or limits on idling trains);</p> <p>How systems to improve trackside worker safety, <i>incl.</i> staff lockout/protection systems (which Operator personnel may have to use) are intended to be used and their impact on engineering access or ability to stable trains;</p> <p>Opportunities to use technology to reduce need for “boots on the ground”;</p> <p>Understanding any detrimental impacts on operations or the timetable caused by the introduction of new or modified safety systems</p>
Train / traction types, existing and future aspirational	<p>Acceleration and deceleration rates;</p> <p>Location of traction changeovers and associated signage and OLE “run-off” provision;</p> <p>impact on line speed signage brought about by introduction of new rolling stock, <i>e.g.</i> SP (Sprinter) to MU (Multiple Unit) designation change (although this is unlikely to be a change introduced by re-signalling)</p>
<p>Line Speeds</p> <p>Changes to speed profiles</p> <p>Driveability of a route in its post-scheme altered form, with smooth speed profiles and minimise acceleration and braking</p>	<p>Identification of risks where train speeds are artificially kept low, only to have to accelerate towards a further lower speed PSR;</p> <p>Including turnouts or reversible signalled lines and any differential or Enhanced Permissible Speeds;</p> <p>Application of closing-up or opening-out signal berths to smooth services, either where speed restrictions apply or around stations to reduce chances of non-stopping trains coming to a stand when following stopping services;</p> <p>Speed profiles when using reversible signalling</p>

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## Appendix B Operational Capability Statement detailed check-list - continued

Suggestions of items to be considered (neither exhaustive nor prioritised)	Points to consider include
<p>Timetable Planning Rules (<i>incl.</i> both current &amp; aspirational)</p> <ul style="list-style-type: none"> <li>Train/traction types and speeds</li> <li>Platform, loop and train lengths</li> <li>Station dwells</li> <li>Frequencies</li> <li>Effect of running under cautionary aspects</li> <li>Changes to TIPLOCS, STANOX, STANME</li> <li>Sectional Running Times</li> <li>Additional timing points</li> </ul>	<p>Headways and signal positioning drive signal spacing. Train lengths complement braking and acceleration characteristics and standage considerations. Examine interaction between passenger and freight services and need for seasonal additional services (<i>e.g.</i> autumn), together with those that are contractually committed in the future and any further aspirational developments;</p> <p>Impact of EAS (<i>e.g.</i> two-track railway);</p> <p>Changes required to support short-distance ad-hoc moves, banking, run-round moves, attaching &amp; detaching and propelling moves, including shunting</p>
<p>Headways</p> <ul style="list-style-type: none"> <li>Services planned to run under cautionary aspects (<i>e.g.</i> during peak hours or closely following a preceding train) and/or planned to run on green aspects</li> <li>Junction margins</li> <li>Platform re-occupancy</li> </ul>	<p>Professional driving policies differ across Operators.</p> <p>Headways and signal positioning drive signal spacing.</p>

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Suggestions of items to be considered (neither exhaustive nor prioritised)	Points to consider include
<p>Standage</p> <p>Stand Back (from signals / stop boards)</p> <p>Freight Standage</p> <p>Station Platform Standage</p> <p>Mitigations where loops and regulating points are found to offer insufficient length</p>	<p>Professional driving policies differ across Operators.</p> <p>Standage requirements</p> <ul style="list-style-type: none"> <li>• determine “back-end clear” calculations, and control the risk of trains standing foul of junctions;</li> <li>• ensure loops and locations where trains are expected to come to a stand are of the correct length for the trains that will be planned to use them;</li> <li>• allow consideration of Selective Door Opening at short platforms; and</li> <li>• enable trains to come to a controlled stand at the correct location.</li> </ul> <p>Additional distance may be required at locations that allow detaching or splitting, any run rounds, or stopping short prior to attaching. Some types of rolling stock have aerodynamic noses at the ends of the train – these can overhang signal berths</p> <p>Trains standing at red signals, potentially for long periods, if in loops or regulating locations, with part of train affecting level crossing use</p>
Signal Numbering	
Comprehensive Approach Locking	
Train Operated Route Release	Aid to signaller workload – allowing new routes to be set more quickly
Auto Working Facilities	Aid to signaller workload

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Suggestions of items to be considered (neither exhaustive nor prioritised)	Points to consider include
Automatic Route Setting Limitation of ARS where drivers can observe several signals ahead (e.g. on long straights). <sup>1</sup> Trains entering service / the Network <sup>2</sup> Look-back. <sup>3</sup>	Aid to signaller workload <sup>1</sup> Avoiding drivers making false assumptions that they are following another service when they can see signals stepping up in front of their train, resulting in lower running speeds; <sup>2</sup> How does ARS know that a train is ready to start? Reliance on exchanges of GSM-R broadcast messages between driver and signaller (after system registration) may not be a sustainable solution; <sup>3</sup> Visibility of approaching trains to make good quality regulation decisions – has performance implications if this is mis-understood
Signals to facilitate Single Line Working, including level crossing wrong direction controls	
Provision of Warner controls (that operate from a fixed point in advance of a signal or via a timer linked to actuation of a treadle or track circuit occupancy)	
Swinging / Preferred overlaps	Mitigations for overlaps that are shorter than the norm

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Suggestions of items to be considered (neither exhaustive nor prioritised)	Points to consider include
Reversible Signalling (bi-directional)	<p>Does the scheme increase (or reduce) reversible signalling provision, impacting on maintenance access, capacity or contraflow working or creating parallel running opportunities?</p> <p>Business cases and how best to use reversible signalling functionality, including:</p> <ol style="list-style-type: none"> <li>I. The capability (headways and speed of movements) required when trains are run reversibly;</li> <li>II. Minimising operational risks when trains are run reversibly, <i>e.g.</i> pilot working or achieving driveable layouts that can be used with confidence;</li> <li>III. The ease with which trains can be run using reversible signalling, <i>e.g.</i> additional staff requirements if trains must be set back over trailing points;</li> <li>IV. Frequency of likely use, <i>e.g.</i> access for routine or unplanned maintenance;</li> <li>V. Requirement for operational flexibility to be maintained, <i>e.g.</i> coping with train or infrastructure failure;</li> <li>VI. Protection arrangements for staff working lineside;</li> <li>VII. Effects on station and depot / stabling operations, <i>incl.</i> customer information;</li> <li>VIII. Incorporating the use of reversible signalling into timetables to allow front-line staff to regularly experience its use</li> <li>IX. Impact of flank protection</li> </ol>

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Suggestions of items to be considered (neither exhaustive nor prioritised)	Points to consider include
Emergency (all) Signals-On Controls / Signal Group Replacement	To enable all signals in a defined area to be replaced to danger at the same time
Proceed on Sight Signals	
Closing-up signals	To minimise re-occupancy time – an option to meet capacity / headway requirements, to increase number of trains that can be accommodated in a given section of track or to smooth the operation of services, either where speed restrictions apply or around stations to reduce chances of non-stopping trains coming to a stand when following stopping services
Opening-out signals	To provide earlier proceed aspect, allowing earlier start to train despatch – an option to meet capacity / headway requirements, to increase number of trains that can be accommodated in a given section of track or to smooth the operation of services, either where speed restrictions apply or around stations to reduce chances of non-stopping trains coming to a stand when following stopping services
Signals Passed at Danger alarms	Understanding which signalling control point will receive alarms; Likelihood of trains occupying berth train detection sections during regular shunting movements and thus activating alarms
Banner repeaters & preliminary route indicators	Form and location
Signals or stations in recognised areas of low adhesion with mitigations to overcome	
Lineside signs	<i>E.g.</i> provision and location of stop-boards, limits of electrification signs, train length markers
Point Numbering	
Point Heating	

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Suggestions of items to be considered (neither exhaustive nor prioritised)	Points to consider include
<p>Required Routes</p> <ul style="list-style-type: none"> <li>Main</li> <li>Alternate Main <sup>4</sup></li> <li>Shunt <sup>5</sup></li> <li>Call- on / Permissive Working <sup>6</sup></li> <li>Concurrent parallel moves required to deliver the timetable both when operating correctly and when in perturbation <sup>7</sup></li> <li>Provision of flashing yellow signal sequences and mitigations (e.g. additional PSRs) where flashing yellow sequences might apply to more than one route</li> <li>Use of Free Greens where line speeds and turnout speeds are consistent</li> </ul>	<p><sup>4</sup> Alternate Main Route facilities permit additional operational flexibility, especially within complex layouts;</p> <p><sup>5</sup> Shunt routes should include need for banking locomotive attachment/detachment and run rounds;</p> <p><sup>6</sup> Incl. attaching/detaching within platforms/loops and occupancy of platforms/loops by more than one train at a time;</p> <p><sup>7</sup> Allows consideration of the trade-off between short overlaps and effect of any consequent mitigations</p>
<p>Lineside Detectors</p> <ul style="list-style-type: none"> <li>Hot Axle Box</li> <li>Wheel Impact Load</li> <li>Pantograph</li> </ul>	<p>Understanding which signalling control point will receive alarms, identification of examination points for trains that activate detectors and siding facilities to detach unfit vehicles. Walking routes and access points for engineering staff and any associated staff protection systems</p>
<p>Point Detection/ Indication, including consideration of whether split detection would be beneficial</p>	<p>Split detection may be useful in failure conditions, to minimise impact on trains travelling on unaffected lines</p>
<p>Axle Counter Reset / restore</p>	<p>Potential timetable or performance impact on first trains over an area that has been reset/restored</p>

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Suggestions of items to be considered (neither exhaustive nor prioritised)	Points to consider include
Tilt Authorisation and Speed Supervision (TASS)	
Automatic Train Protection / trip-cock apparatus	
Assisted Braking and Door Opening	Alignment of any balise positioning with other equipment in the four-foot, provision of lineside signage
Level Crossings Manual vs. automatic; vehicle vs. foot-user; public vs. user worked or footpath) Technology to be applied to change or control level crossing risk	<p>How are the risks associated with level crossings to be controlled? Ideally, opportunities to close crossings should be taken but these can be out of scope for a re-signalling scheme. IMs may use re-signalling schemes to convert level crossings to improve levels of protection. In some case, this may mean automatic crossings becoming manual, with obstacle detection, additional barriers and protecting signals. Confirmation should be sought of the impact of such upgrades on driveability and Timetable Planning Rules.</p> <p>Increased train speed or frequency of trains will change level crossing risk profiles so any project looking to increase capability, or provide passive provision for future increases, needs to examine the effects on such risks.</p> <p>Information to drivers on approach to level crossings and, where applicable, their status.</p> <p>Restoration of crossings to normal working after possessions or periods of local control</p>
Gradients	<p>Impact of these on SRTs – consider both pre-existing and proposed (e.g. additional grade separation). Could affect stopping points, signal locations, loops and regulating points, neutral sections and conductor rail gaps. Examine PSRs on approach to rising gradients to consider risk of train stalling (becoming over-powered) &amp; need for banking.</p> <p>Also risk of unsecured vehicles rolling away</p>

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Suggestions of items to be considered (neither exhaustive nor prioritised)	Points to consider include
Radio systems System capability Cell coverage User set-up effects	In axle counter areas, will additional lineside telephones be provided to support inability to use GSMR for REC calls (Secondary Collision Communication)
Conductor Rail Heating	
Ground Frames	Retained as frames or motorised with signalled routes controlled by signaller? Means of release, any associated stop-boards, walking routes, staff lock-out or protection systems, safe ground conditions for drivers changing ends, and access points and communications with signaller
Manual Operation of failed Point Operating Equipment	Suitable storage [e.g. padlocked location case] for equipment to allow the manual operation of failed point operating equipment where Operator or depot / stabling staff responsibilities to attend under failure conditions
Lineside Telephones	Provision of Signal Post Telephones (stop signals, junctions and elsewhere), those required for level crossing users, ground frame operatives or station staff (on platforms), or for Secondary Collision Communication in axle counter areas
Units of Measure	Ensuring all parties have a mutual understanding
Adherence to industry or duty-holder standards	Any derogations required? Corrections required to previously identified deficiencies? Any new standards, novel operation or equipment being developed specifically for the scheme or applicable to introducing new technology? Requirements for, or changes to, special instructions, and publication in Weekly or Periodic Operating Notices, Sectional Appendix or Signalbox Instructions. Also, standards used by neighbouring IMs

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Suggestions of items to be considered (neither exhaustive nor prioritised)	Points to consider include
AWS	General aim to examine positioning and assess likely benefits against geographical and operational risks. Specific examples include: Have the needs of the driver and the likely headway impact been considered when setting loop and magnet locations and speed settings? Consider loop & magnet positioning for speed restrictions, signals, and those on reversibly signalled lines that would apply to moves in the opposite direction (including suppression, where appropriate).
TPWS TSS & OSS	Have stopping positions been considered to avoid trains coming to a stand on top of magnets / loops, e.g. where trains terminate and reverse, or to where split platform occupancy will be required? Position and assessment of likely benefits against geographical and operational risks, e.g. additional magnets / loops required to protect sharp curves with significant PSRs
TPWS OSS and OSS+	General aim to examine positioning and assess likely benefits against geographical and operational risks. Specific examples include: Have the needs of the driver and the likely headway impact been considered when setting loop locations and speed settings? Consider loop positioning for speed restrictions, signals, and those on reversibly signalled lines that would apply to moves in the opposite direction (including suppression, where appropriate). Have stopping positions been considered to avoid trains coming to a stand on top of loops, e.g. where trains terminate and reverse, or to where split platform occupancy will be required? Position and assessment of likely benefits against geographical and operational risks, e.g. additional loops required to protect sharp curves with significant PSRs

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Suggestions of items to be considered (neither exhaustive nor prioritised)	Points to consider include
<p>Stations, with consideration of</p> <ul style="list-style-type: none"> <li>Station operations / footfall management<sup>8</sup></li> <li>Platform extensions / alterations<sup>9</sup></li> <li>Additional selective door opening, <i>incl.</i> balise positioning where ASDO to be deployed<sup>10</sup></li> <li>Effects on Customer Information provision or station furniture, <i>incl.</i> TRTS or CD/RA/OFF indicators<sup>11</sup></li> <li>Changes to despatch procedures, <i>incl.</i> new or altered TRTS, Aided Despatch or CD/RA/OFF indicator provision<sup>12</sup></li> <li>Compatibility with platform awning design and structures that might affect signal sighting<sup>13</sup></li> <li>Split platform occupancy<sup>14</sup></li> <li>How does signalling system know a train is ready to start? <sup>15</sup></li> <li>Turnback facilities for timetabled use or during engineering works or perturbation<sup>16</sup></li> <li>Proposed station works (e.g. new CIS provision) that may affect a re-signalling project</li> </ul>	<p>See also Part 7.12. Consider all times of day and staffing levels.</p> <p>RIS-3703-TOM: Rail Industry Standard for Passenger Train Dispatch and Platform Safety Measures (2013), and any additional measures required by the Station Manager, <i>incl.</i></p> <p><sup>8</sup>Additional or changed station staffing requirements or responsibilities; alignment of waiting areas &amp; shelters or canopies with train positioning;</p> <p><sup>9</sup>Platform width and pinch points during peak times impacting despatch or extending staff walking times;</p> <p><sup>10</sup>Passenger with Reduced Mobility access position for rolling stock and provision of appropriate stop-boards and platform markings; how does ASDO balise positioning affect stopping points and placing of stop-boards?</p> <p><sup>11</sup>Consideration of Customer Information if adjacent signal box is closed;</p> <p><sup>12</sup>Changes to signal positioning affecting despatch staff sightlines; positioning of plungers/control equipment and provision of more than one set per platform (to allow for trains of varying length, different stock or different Operators), positioning of indicators. Impact on self-despatch or DOO arrangements;</p> <p><sup>13</sup>Position of CIS or other information systems in potential conflict with CD/RA/OFF indicators, Aided Despatch equipment or Banner repeaters for Train Despatch staff or drivers of short trains or locomotives starting from the buffer stops</p> <p><sup>14</sup>Influences on customer behaviour during all weather conditions (e.g. wind, rain), and information to customers regarding the correct train to join. Also, additional signalling controls, leading to allowance being added to timetable;</p> <p><sup>15</sup>General aim to reduce verbal communications between station staff and signallers;</p> <p><sup>16</sup>Despatch arrangements for use of turnback and suitability of customer information</p>

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### Appendix B Operations Requirements Specifications detailed check-list - continued

Suggestions of items to be considered (neither exhaustive nor prioritised)	Points to consider include
<p>Electrification</p> <p>Run-offs and signage for electric traction</p> <p>Turnbacks for electric traction</p> <p>Neutral sections or conductor rail gaps</p> <p>Mast positioning relative to railway boundary or to the 4 foot</p> <p>Mast positioning adjacent to trap points</p> <p>Conductor Rail supply and return feeds adjacent to trap points</p>	<p>Signal sighting and approaches to red signals, impediments to acceleration caused by neutral sections or conductor rail gaps, changes to staff access to the lineside, compatibility with rolling stock, arrangements to avoid electric traction entering non-electrified sections of line</p>
<p>Depot / Stabling Locations</p> <p>Advice to depot / siding shunting staff of approaching trains</p> <p>Advice to signallers of train ready to enter the Network</p> <p>Shunters acceptance arrangements</p> <p>Interface with Depot / siding signalling or internal shunting</p>	<p>Requirements for, or changes to, Methods of Working.</p> <p>General aim to reduce verbal communications between depot /stabling staff and signallers, using plungers, slots, releases, indications and displays, also facilitating use of ARS and avoiding manual setting of routes;</p> <p>Are there opportunities for trains to leave the Network clear of the main line without depot / stabling staff being present?</p> <p>See also Part 7.11</p>
<p>Power Changeovers (PCO) / Automatic Power Changeovers (APCO)</p>	<p>Alignment of any balise positioning with other equipment in the four-foot, provision of lineside signage and OLE / conductor rail run-offs;</p>
<p>Provision for Future Development, <i>incl.</i> passive provision</p>	<p><i>E.g.</i> new train types, line speed increases, electrification and immunisation against future electrification, timetable enhancements, changes to Route Availability, speed signage changes brought about by introduction of new rolling stock, <i>e.g.</i> SP (Sprinter) to MU (Multiple Unit) designation change</p>

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### **Appendix C Examples of Case Studies**

The following have been suggested by Operator representatives as examples where a number of the points outlined in the Guidance Note were applied, to the overall benefit of the scheme and the relevant Operators. Space precludes a detailed exposition in this document but further information can be made available.

- 1.) The re-signalling of the Mid-Sussex (Arun Valley) south of Horsham (*circa* 2012/13), although delayed by the Obstacle Detector level crossing technology, is itself seen as excellent. Train Operator collaboration resulted in simplicity around signalling and layouts and there was general ‘thoughtfulness’ for signal sighting, with resultant ease of use. The Route delivered a good product and deserved a pat on the back for it.
- 2.) Reading remodelling (RSAR) and Reading New Depot (RTCD) are examples of good practice with operator involvement at an early stage. Also, the principal Train Operator’s project team was co-located in the same project building as NR and the construction team, so that the Train Operator was part of the project team rather than there as support.
- 3.) East Kent Re-signalling (details awaited at the time of publication).