



**Project
Speed**
Briefing

Project Speed **& the rail sector**

February 2021



As Government plots our economic recovery from the pandemic, it has emphasised the importance of investing in our built environment.

In June 2020, the Prime Minister highlighted the need to deliver new infrastructure and buildings quicker, under the banner of Project Speed¹.

At the same time, he spoke of “building back better” and the subsequent National Infrastructure Strategy emphasised that through Project Speed, “vital infrastructure like schools, hospitals, transport and other networks will be delivered better, greener and faster”².

The COVID-19 pandemic has already produced examples of project delivery being accelerated, notably the Nightingale hospitals. Similar approaches will be required if we are to full reshape how we deliver future infrastructure programmes.

The Association for Consultancy and Engineering (ACE) has produced this briefing note as part of a series on Project Speed, with others exploring schools, hospitals and homes. This paper was written following a joint industry roundtable held with Network Rail in Q4 2020.

Find out more at www.acenet.co.uk/project-speed.



Opportunity in the rail sector

Our railways are under pressure, facing new and historic challenges, however it still offers many benefits as we plan for a post pandemic future.

Page 3



Focusing design at the start of projects

Rail projects are often large and complex but the risk of cost overruns can be exacerbated by too much unfocused preliminary work.

Page 4



Role of the design integrator and a ‘one team’ approach

It is important to treat the project as a unified whole with a single team spearheading delivery.

Page 4



Digital approaches for more efficient assurance

There is a real opportunity to digitalise the process, reduce number of key decision points and create efficiencies.

Page 7

¹ Prime Minister, ‘A new deal for Britain’ speech (2020); www.gov.uk/government/news/pm-a-new-deal-for-britain

² HM Treasury, National Infrastructure Strategy (2020); www.gov.uk/government/publications/national-infrastructure-strategy

OPPORTUNITY IN THE RAIL SECTOR

Our railway system is under pressure, facing a mix of new and historic challenges:

- **Demand interruption due to COVID-19.** Between 2002 and 2016 rail usage grew by 56%³, creating significant network pinch points. Rail demand has collapsed during the pandemic and while it is expected to return, it is possible that demand patterns may be significantly altered⁴.
- **Financial pressures.** Owing to the pandemic, passenger revenue has fallen dramatically – by £500 million between October 2019 and March 2020⁵. While the Government has significant revenue support to Train Operating Companies (TOCs), in the November 2020 Spending Review, it cut rail capital spending by £1 billion⁶.
- **Historic performance issues.** Capacity constraints along with an overly complex rail industry structure are some of the causes behind poor performance across CP5, for example train reliability was only 68% pre-pandemic⁷.
- **Capital rail projects are lengthy and expensive in delivery.** There are also wider concerns around cost overruns on capital projects⁸. The rail sector needs to demonstrate that it can invest effectively and efficiently and deliver rail projects at real pace if it is to make a strong case for future public investment.

Despite these challenges the rail sector has many benefits to offer as we plan the future of infrastructure post pandemic. It has potential to offer low carbon transport for both people and freight and to positively contribute to the levelling up agenda⁹.

To realise this potential in the face of the challenges described, we need to improve the way rail engineering projects are carried out. Some changes are already underway, with the Williams review expected to set out a blueprint for rationalising the rail industry's structure. In September 2020 transport secretary Grant Shapps said that the Review, "Will be published when the course of the pandemic becomes clearer"¹⁰.

Meanwhile Network Rail is reforming the standard process it uses to deliver major engineering projects. The current Governance for Railway Investment Projects (or GRIP) process, will be replaced by Project Acceleration in a Controlled Environment (or PACE) process, which Network rail hopes will, "deliver projects more quickly, at lower cost and higher quality"¹¹.

But more change is needed. This short brief draws on experience of ACE members to suggest how we can collectively do better. In particular, it emphasises:

- Focusing consultancy design skills on the right issues at the start of projects
- Reinforcing the role of the design integrator and a 'one team' approach
- Using digital approaches to make assurance systems more efficient

3 Office of Rail and Road, Passenger Journeys, Table 1220 (2020); www.dataportal.orr.gov.uk/statistics/usage/passenger-rail-usage/table-1220-passenger-journeys/

4 Office of Rail and Road, Passenger Rail Usage, Q1 20/21 (2020); www.dataportal.orr.gov.uk/media/1836/passenger-rail-usage-2020-21-q1.pdf

5 House of Commons, Future of Rail, (September 2020); www.commonslibrary.parliament.uk/research-briefings/cbp-8961/

6 BBC, Government to Cut Rail Budget (December 2020); www.bbc.co.uk/news/business-55182000

7 Office of Rail and Road, Passenger rail performance; www.dataportal.orr.gov.uk/statistics/performance/passenger-rail-performance/

8 National Audit Office (NAO), Lessons learned from major programmes (2020); www.nao.org.uk/wp-content/uploads/2020/09/Lessons-learned-from-Major-Programmes.pdf

9 Network Rail, Traction Decarbonisation Network Strategy (2020); www.networkrail.co.uk/wp-content/uploads/2020/09/Traction-Decarbonisation-Network-Strategy-Interim-Programme-Business-Case.pdf

10 House of Commons, Future of Rail, (September 2020); www.commonslibrary.parliament.uk/research-briefings/cbp-8961/

11 Friends of Suburban Bristol Railways, Gripping News (2020); www.fosbr.org.uk/gripping-news/

FOCUSING DESIGN AT THE START OF PROJECTS

Rail projects are often large and complex but the risk of cost overruns can be exacerbated by too much unfocused preliminary work. When this is done before the core outcomes of the project are agreed by all parties then the risk is poor scoping and design creep which will only add to cost later on. For example, surveys at GRIP Stage 2 mean surveying options that do not progress.

The solution is not to cut out good optioneering and scoping work but to make sure this is based on a clear understanding of what the project is trying to achieve. For example, on one rail project where the aim was to reduce passenger journey time, an assumption was made that this could only be achieved through increasing line speed. This would inevitably involve high cost engineering and other ways of reducing journey time were not explored. The solution is greater use of value based decision making where a common, transparent understanding of how value is defined against different metrics is achieved at the outset. The Construction Innovation Hub's Value Toolkit¹² provides a good framework of how this can be practically incorporated into business case development.

This process must happen collaboratively, and lead to an agreed output-based scope. Once this has been done, digital design tools can be used to model and scope potential options at a much faster rate, effectively giving a digital model of the business case which can be interrogated, rather than a static paper-based one.

ROLE OF THE DESIGN INTEGRATOR AND A 'ONE TEAM' APPROACH

Rail engineering projects tend to involve many different parties including Network Rail, TOCs, consultants, and contractors. Once the value outputs have been defined, it is important to treat the project as a unified whole with a single team spearheading delivery. Key members of the team will include Network Rail – which itself needs to co-ordinate all its work which may impact of the project, such as renewals and maintenance to assets affected by the main project – relevant TOCs, and the relevant consultants and contractors themselves, but other stakeholders such as Department for Transport (DfT), local authorities, passenger bodies and local communities, also need to be involved as appropriate.

In the past such a 'one team' approach has often been frustrated by a rigid application of GRIP, leading to unnecessary hiatuses and project segmentation alongside frequent changes of personnel between GRIP stages which leads to inefficiency and delivery risks.

A better approach is to maintain a unified team throughout the project under the oversight of a design integrator. This integrator is more than a project manager, and must be able to bring together the disparate strands of the project, challenge detailed focused designers, and deliver to agreed outcomes, rather than solving detailed technical challenges.

This ensures the overall design remains fully focused on the outcomes the client has asked for, allows more flexibility to deliver productively and add value, while encouraging the introduction of innovative technology.

The design integrator facilitates top-down, value-added design, where the overall route is optimised against programme objectives. In turn, this supports individual delivery packages by providing contractors with a clearer reference design and suite of requirements with limited scope for change. This approach avoids over-specification and over-design.

The design integrator will also ensure that the full potential for digital design techniques are explored. For example, design material that can be accessed digitally by different partners in a collaborative way and through common data environments.

Digital design also enables 'design rehearsals' to be carried out to prepare for construction, which in turn should ensure smoother implementation and less disruption to the day-to-day running of the network.

12 Construction Innovation Hub, Value Toolkit (2020); www.constructioninnovationhub.org.uk/value/

Case study:
Northumberland Line, Northumberland

The Northumberland Line will bring passenger trains back into service between Ashington and Newcastle upon Tyne for the first time since the Beeching cuts.

It is a great example of the type of rail scheme central to levelling up as it will improve access from towns such as Ashington and Blyth to employment in Newcastle, as well as opening up new opportunities for education and travel.

It will provide a real incentive for employers to potentially relocate to and invest in the area, attract more visitors and improve local tourism, and enhance public transport connectivity within and beyond the region. It is expected to generate more than £450 million of economic benefit.

AECOM have been working with Northumberland County Council (NCC) on an alternative delivery model for the line that would allow it to be delivered quicker and more cost effectively than traditional approaches.

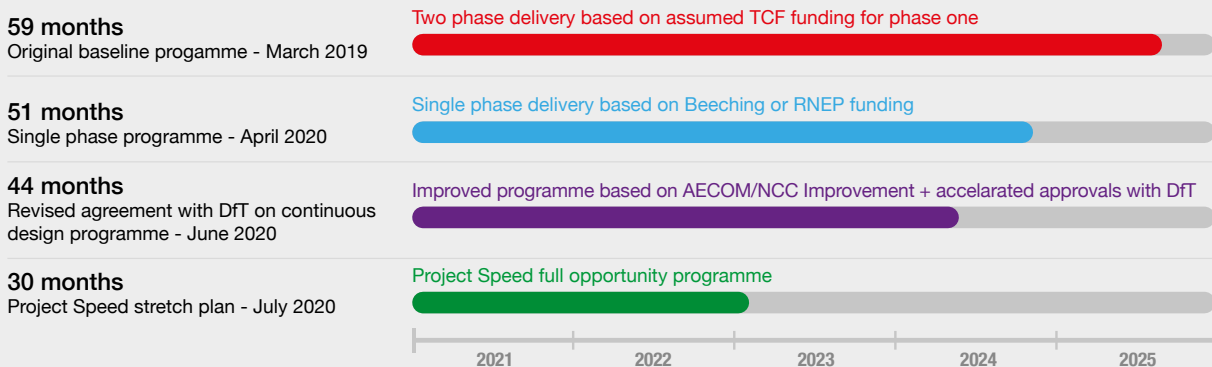
This approach includes:

- NCC being the project promoter, with Network Rail involved largely in terms of asset protection only.
- A strong focus on the cost vs. benefits that makes the project viable.
- Work aligned to likely funding sources and spend timescales.
- Rail network enhancements pipeline (RNEP) provides governance stage gates and a potential funding route.
- A ‘one team’ approach where AECOM brought together key stakeholders to form a coherent group and oversee programme integration.

This approach is already leading to significant benefits and a robust business case and narrative that is ‘owned’ by all key stakeholders has been collectively developed up-front.

The engineering is led by the business case and by operational requirements, with the governance designed to be agile to allow for decisions to be tested and made quickly. Network Rail are fully involved to ensure that the existing rail network will not be disrupted and a strong relationship with DfT has been established.

Improving programme times and the final Project Speed stretch plan



Case study: Thameslink, London

One of WSP in the UK's many roles on the Thameslink programme was as part of its systems integration team.

The company's System Migration Plan (SMP) choreographed the intricate process that all parties needed to perform so they could deliver this enormous upgrade without disruption and ensure the railway could remain in use throughout.

The SMP identified the stages of the project which involved the greatest risk of disruption, and established them as the primary milestones in the SMP. A series of detailed systems architectures – physical, geographical and operational – were linked to each of these milestones to ensure all parties involved knew exactly what needed to happen and the line could remain in operation with minimal closure throughout the extensive upgrade and expansion works.



www.thameslinkprogramme.co.uk

DIGITAL APPROACHES FOR MORE EFFICIENT ASSET MANAGEMENT AND PROJECT ASSURANCE

The rail industry is rightly risk averse and has an extensive focus on assurance and compliance. However, much of this is based on analogue systems with inevitable inefficiencies and at times the overly rigid application of GRIP has not helped. For example, GRIP included 20 day review periods for each GRIP stage submission, a timescale based on the time needed to exchange and scrutinise analogue design drawings. As Network Rail replaces GRIP with PACE, there is a real opportunity to digitalise the process, reduce number of key decision points and create efficiencies.

Digitisation can also enable the adoption of a fully digitised asset model – a digital twin – for UK railways. This is not simple with Victorian infrastructure and rail systems from every decade across the UK network. But that investment will reap significant dividends in better understanding our rail assets, reducing risk and enabling more efficient delivery of new projects as well as better long term asset management.



Case study: Modernising railway examinations

Leading infrastructure asset management Amey is an external supplier of civil examinations to Network Rail, inspecting and reports on the condition of the more than 100,000 assets that make up the vast majority of the UK's rail network.

The company has developed a solution to record asset data in real time, using 300 'ruggedised' tablets linked to Amey developed bespoke android apps.

This technology has the potential to virtually eliminate manual processes for typing up hand written notes and data entry, making the whole examination process vastly more efficient and effective. The company's database of asset information is continually updated in real-time from sites where the examinations are taking place.

The approach taken by Amey for asset examinations could be adopted for assurance processes for all new rail projects, with similar scope for significant efficiency gains.



CONCLUSIONS

The examples in this paper show that taking advantage of better collaboration, digital technology, and procuring for value can transform the way rail projects are delivered.

This will lead to tangible benefits to the rail user, the communities the railways serve, and the taxpayer.

The engineering consultancy sector is at the heart of these changes. Combined with Network Rail's welcome move to replace the outdated GRIP process with PACE, and the opportunity for wider strategic reform of rail sector structures that will flow from the Williams Review, we have a golden opportunity to create the rail system the UK will need to deliver its levelling up and Net Zero goals and ambitions.

