



Jo Kaye
The Quadrant
Elder Gate
Milton Keynes
Buckinghamshire
MK9 1EN

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National Needs Assessment - Call for Evidence

Network Rail Infrastructure Ltd. welcomes the opportunity to contribute to the National Needs Assessment Call for Evidence. Network Rail is the owner and operator of the GB rail network, responsible for its safe operation, maintenance and enhancement.

The key points of Network Rail's response are:

- Network Rail largely agrees with the core principles of the NNA vision, but suggests minor amendments in order to capture specific requirements of the railway industry, including an emphasis on the primacy of safety and emerging technologies
- Network Rail supports the NNA's strategic options as an appropriate basis for infrastructure investment. In particular, the priority placed on generating additional capacity highlights the focus on investment as a tool for economic growth
- The response highlights the challenges faced by Network Rail in accommodating demand for use of its infrastructure
- Network Rail has a comprehensive strategy for the long-term planning of railway infrastructure, including the implementation of the Digital Railway¹ programme which can provide capacity over and above that of traditional infrastructure enhancements alone.

a. Do you agree with our proposed vision and outcomes? What amendments would you propose?

The NNA vision is copied below:

"The UK will invest efficiently, affordably and sustainably in the provision of infrastructure assets and services to drive the economic growth necessary to enhance the UK's position in the global economy, support a high quality of life and shift towards a low carbon future.

This requires a comprehensive decision making framework which considers both demand and supply-side approaches to meeting the UK's needs and which can deliver:

¹ <http://www.digitalrailway.co.uk/>

- *Resilient, flexible and efficient infrastructure, designed with consideration for future technological advances and climate change and where asset and networks' cross-sectoral interdependencies are identified and managed.*
- *National decision-making that is integrated with regional and local planning.*
- *Timely investment in new low-carbon infrastructure capacity.*
- *Technological innovation in the provision and consumption of infrastructure services.*
- *Management of demand in ways that will enhance system efficiency and service quality.*
- *Investment in resilience to ensure continuity of service when systems are under stress.*
- *The efficient provision of infrastructure services which meet the changing needs of users.*
- *Long-term, objective and consistent policy, regulatory and investment regimes.”*

Network Rail is broadly supportive of the proposed vision and outcomes of the National Needs Assessment. However, a number of minor revisions are proposed in order to ensure that these visions and outcomes are suitably comprehensive:

- Network Rail suggests a slight alteration to the primary vision statement:

“The UK will invest efficiently, affordably and sustainably in the **timely and safe** provision of infrastructure assets and services to drive the economic growth necessary to enhance the UK's position in the global economy, support a high quality of life and shift towards a low carbon future.” The difficulty in getting infrastructure authorised, planned, and built within suitable timeframes is one of the key issues facing the UK, and the NNA should stress the need streamline the process.
- With regard to the first bullet point. To ensure the commission takes proper heed of existing available technology, and that interfaces of infrastructure are given due attention, it is recommended that the first statement is amended as follows: **“Resilient, flexible, and efficient infrastructure, designed with consideration for *relevant and proven existing technology as well as future advances* and climate change and where asset and networks' cross-sectoral interdependencies are identified and managed *in a holistic way with acknowledgement of how changes to interfaces should be handled and funded.*”**
- While Network Rail welcomes the reference to *“Management of demand in ways that will enhance system efficiency and service quality”* in the fifth point of the NNA vision statement, in addition to infrastructure solutions, other options to meet demand should be considered as part of the assessment.
- It is recommended that the sixth point reads; “Investment in resilience, including resilience in adverse weather conditions, to ensure continuity of service when systems are under stress.” Weather resilience is a key part of Network Rail's future planning² because extreme meteorological events are likely to increase in frequency.
- The vision and outcomes should include supplier base considerations for infrastructure provision, e.g. availability, capacity, specialist skills, geographic requirements, and competing markets. These factors have significant potential to hamper the provision of suitable infrastructure efficiently if they are not included as part of any future planning strategy.
- Network Rail would welcome additional clarity in the vision regarding the envisaged role of the NNA in relation to the National Infrastructure Commission.

² <http://www.networkrail.co.uk/publications/weather-and-climate-change-resilience/>

- An additional point should also be added to the vision statement; “A highly skilled industry workforce with the ability to deliver the volume of work required in the decades ahead.” Major changes in how skills, training and education are structured and delivered will be required in order to meet the challenges facing the industry. Having the requisite level of skills and knowledge is fundamental to delivering the outcome for the vision. The newly launched Transport Infrastructure Skills Strategy, launched on 28th January 2016 by the Secretary of State for Transport Patrick McLoughlin³ supports this. The document outlines a strategy which seeks to close the gap created by a century of underinvestment in infrastructure skills development: “When we are investing £70 billion in transport this Parliament alone, we need a generation of engineers, designers and construction professionals, as well as highly skilled people to operate the networks once they are opened”; the Prime Minister also addressed the CBI in October 2015. “Please work with us on the skills agenda. I know it is going to be a challenge.... but we all know we need a more highly skilled economy... making sure we are one of the leaders in Europe when it comes to skills, and not one of the followers”.

b. What will be the main drivers of demand for UK national economic infrastructure over the next 35 years that we should consider in our assessment?

The National Needs Assessment call for evidence refers to many key drivers of demand, such as the level of investment in new capacity, as strategic options. Network Rail’s Market Studies⁴ set out the rail industry’s planning methodology. These four documents form a key component of the Long Term Planning Process⁵ as they calculate long-term demand forecasts. The Market Studies contain detailed information about the drivers of demand in addition to the information contained here.

As demand for transport is by nature derived from the need to travel, a key driver of demand is the demographic composition, distribution and overall size of the UK population. For both the passenger and freight sectors, the Market Studies highlight that demand for rail infrastructure is forecast to increase at an unprecedented rate over the coming decades, with an additional one billion passenger journeys per year by 2035. As such, unlocking demand will require investment to alleviate capacity, which is already saturated on some busy corridors. Specific consideration still needs to be given to the longer term challenges of safely managing ageing infrastructure. Allowing for growing maintenance costs is essential.

Demand for economic infrastructure, including transport, will also be driven by the following:

- The relative levels of regional growth, which will be influenced by devolution arrangements such as the emerging work led by Transport for the North.
- The desire of users to adapt to new and emerging technologies and technology-based communication. Productivity gains across the UK economy driven by the need for greater efficiency.
- Overall improvements in quality of life and increased leisure time.
- Competition from other sectors and the international market.
- Economic internal and external migration patterns, the impact of globalisation and changing trade patterns, for example the shift towards higher knowledge economies.

³ <https://www.gov.uk/government/publications/transport-infrastructure-skills-strategy-building-sustainable-skills>

⁴ <http://www.networkrail.co.uk/improvements/planning-policies-and-plans/long-term-planning-process/market-studies/>

⁵ <http://www.networkrail.co.uk/Long-Term-Planning-Process/>

- Climate change and weather patterns, as well as the impact of natural and humanitarian disasters or health epidemics.
- Environmental policy and reductions in fossil fuel usage.
- Protection from deliberate physical or cyber attack and the provision of system redundancy.
- The availability of critical resources including specialist suppliers and raw materials.

Additional drivers of demand can be categorised through political, economic, social, technological, legal and environmental (PESTLE) analysis.

c. What will be the main constraints on the UK's ability to provide sufficient UK national economic infrastructure assets and services over the period and what solutions or mitigations of those constraints should the UK adopt?

Specialist skills in the engineering sector are becoming increasingly scarce, and in order to deal with this a comprehensive long-term plan is necessary to ensure the economy has the right people with the right skills, including making these career opportunities attractive to potential employees. It will also be necessary for industrial partners to engage in direct skills development (such as apprenticeships and partnerships with Higher Education providers). The Enterprise Bill and a levy mechanism, expected to be introduced by 2017, will underpin the Government's intention to create 30,000 apprenticeships by 2020 for the transport sector, with the anticipation that 20% of new entrants to engineering should be women and where a 20% increase is expected in the number of BAME (black, Asian and minority ethnic) candidates undertaking apprenticeships. Network Rail's 'Everyone' policy⁶ outlines the benefits associated with a diverse engineering workforce. In adopting these ambitions and ensuring that all employers, government, professional organisations and educational institutions work together to increase the level of human resource assets, the UK will be in a stronger position to overcome the overall constraints on the UK's ability to provide sufficient national economic infrastructure. Political uncertainty (for example over immigration and the UK's potential withdrawal from the EU) could have a significant effect on the availability of skilled labour from overseas.

The interdependencies and deliverability of a complex portfolio of projects will make providing sufficient UK economic infrastructure over the period more difficult. A constantly changing backdrop of requirements will further complicate this, thus it is desirable wherever possible to have thorough plans which set out resources required in the longer term. Such a resource requirements indicator would also serve to make sure the supply chains of relevant industries are better able to foresee when expansion would be required.

The renewal and enhancement of existing railway infrastructure is generally carried out while services continue to run. This adds time, cost, and complexity to railway projects and decreases the service quality for customers. New, parallel infrastructure (e.g. HS2, Crossrail) could be a means of minimising the economic impact of the construction phase of future projects and facilitate efficient introduction of new infrastructure. In addition to this, it may be necessary to encourage a change in attitudes regarding disruption when vital works are undertaken. Education and better communication could help with this issue.

⁶ <http://www.networkrail.co.uk/asp/10365.aspx>

Funding and financing are likely to be challenging for the foreseeable future, especially if the planned level of investment in infrastructure is to be significantly higher than that of today. This could be addressed by attracting alternative funders by making the UK more attractive for inward investment, and by making a more direct link between the value added and the beneficiaries of the value (e.g. housing development funding infrastructure investment that the housing depends on).

Parts of the rail network are rapidly approaching full capacity, and crowding on peak passenger services is at least an inconvenience to the public. Many of the simplest capacity improvements have already been made on busier parts of the network, meaning future interventions are likely to be increasingly complex and costly.

Land use in the UK is already significantly constrained. This has multi-faceted effects on infrastructure planning in general and on the rail network in particular. Population growth is expected to be highest in London and the South East. Given the limited sites available for new developments, it is likely population density will increase, creating further pressure on existing transport corridors. Mitigations could include the encouragement of a more even distribution of population growth across the country, or increasing flexibility in the use of land. Network Rail is also working to mitigate land use issues by making more efficient use of existing physical infrastructure.

It is complex and time-consuming to gain permission for infrastructure projects. Improvements in planning of infrastructure would help to mitigate this and also lessen the impact of some of the above issues.

d. What nationally significant investments in capacity or changes in policy & regulation should we prioritise to deliver these outcomes and deal with these drivers of demand?

Investment should be prioritised where it directly supports economic growth, such as through transport capacity enhancements. Continued rail investment is an essential component of providing for the transport capacity needs of Great Britain. Network Rail produces a number of Route and Network Studies⁷ as part of the industry's Long Term Planning Process, which highlights rail capacity enhancement opportunities over a 30-year period in order to provide an empirical overview of rail infrastructure needs. Changes across the wider economy, for example the expansion and provision of new housing, should also be supported by transport capacity enhancements.

Delivery of committed and proposed major transport infrastructure schemes will support the economy in meeting demand, including the Digital Railway, HS2 Phases 1 and 2, Crossrail 2 and Northern Powerhouse Rail. The Digital Railway programme in particular has an important role to play in accommodating demand efficiently. Digital Railway has the potential to reduce the need for more traditional infrastructure works, although work at constrained junctions and major capacity improvements at busy stations will also be required in order facilitate the required increase in overall network capacity.

As well as passenger-focussed investment; rail freight investment offers an opportunity for reduced road congestion, increased safety and reduced carbon emissions from transporting goods.

Across the transport sector as a whole, integration of modes to better meet the requirements of users from end-to-end of a journey will facilitate economic growth. This will also encourage maximisation of the use of existing physical infrastructure; much of which will require increased maintenance investment due to age. Whilst rail capacity enhancements are of critical importance for the economic

⁷ <http://www.networkrail.co.uk/long-term-planning-process/route-studies/>

growth of the UK, in enhancements must not be to the detriment of funding the operation of the existing network.

e. In what areas can demand management or other forms of behavioural change make a significant impact? What are the blockers and enablers for realising these opportunities?

Flexible working and staggered work days would serve to smooth out peak demand, which is frequently the driver for rail infrastructure investment. If passenger demand could be spread more evenly though out the day it is likely fewer or smaller interventions would be needed in the medium term. In the longer term, the forecasted growth in demand will necessitate major interventions even if this growth is coupled with a more even spread of journeys across the day. Behavioural change can be encouraged by pricing structures, however the needs of all members of society should be considered carefully in conjunction with this. There is potential for pricing to be used to encourage change of transport mode where this is deemed appropriate, in order to make best use of overall transport capacity, rather than focussing on transport modes in isolation.

f. How can greater cross-sectoral decision-making be encouraged?

The introduction of the National Infrastructure Commission should lead to more effective cross-sectoral decision-making. The Commission's remit should cover facilitation of greater coordination between government departments and public bodies in order to improve understanding of the requirements of each industry. The Commission will be best placed to provide this, as government departments are not currently in a position to provide a holistic oversight of infrastructure needs. An effective mandate for the NIC to explore these links will be built around a clear vision, with outcomes agreed across all sectors. This will encourage commitment by all parties to delivering the vision, and promote understanding of the reasons for the strategic direction taken by government policy.

Transparency of the purpose and powers of the NIC will foster better understanding of the interdependencies and interactions across sectors, and allow government, client, finance and supply chain collaboration within sector groups and new cross-sector forums.

g. What opportunities and challenges are presented by devolution of infrastructure decision-making?

There are numerous opportunities presented by devolution of transport decision-making. More locally appropriate decisions can be taken, with the potential consequence that planning issues are more likely to be surmountable due to local support. This provides an opportunity to explore local funding options, acknowledging the local impact of the subsequent benefits. This opportunity is particularly attractive with regard to smaller scale local transport schemes where communities who benefit are also those who are affected by construction and associated disruption. There is also the potential for more innovation in solutions where decisions are made at the devolved level; this could lead to the development of better solutions to common problems in the long term if a new technique or technology proves more effective in certain circumstances.

Challenges may also arise from the devolution of infrastructure decision-making. It should be noted that the benefits of railway infrastructure can often accrue in places many miles away from the infrastructure itself, and that is a factor to be considered. The process of seeking permission for large infrastructure projects is already very complex, and devolution has the potential to increase this complexity if agencies are duplicated on the site of a project, for example on a new rail line which crosses several UK political boundaries. It is also possible that local decision-making could lead to choices which advantage that area to the detriment of the country as a whole, this is especially the case when not all of the affected parties are properly represented. Another challenge is that there could be a lack of lessons learnt from other areas. Where decisions are made at the UK level, it is

more likely that similar projects or situations have arisen before and that the relevant body will have experience in similar matters. Were decision-making devolved to a local level, there is the potential that the local body will be dealing with the same project or situation for the first time. This may cause duplication of efforts, or similar mistakes being made by different bodies when examples of suitable courses of action exist elsewhere.

If there are a limited number of suppliers, and projects are planned and approved at a devolved level without regard for work taking place elsewhere, it is possible that there will be a shortfall in resources available to complete projects. This could include equipment, materials and expertise. If a particular resource is in short supply, and it is difficult for new entrants to the market to break in, it is likely that costs will be driven up.

It is vital that decisions are made within a national framework to ensure that inconsistent courses of action are avoided. Standards must, where possible, remain uniform across devolved areas in order to keep infrastructure development and permission procedures as simple as possible. Conflicting standards would make it exceedingly difficult to implement UK-wide projects.

h. What new and emerging technologies and disruptive trends should we consider in producing this assessment?

Technology is impacting on the transport sector in numerous ways, from the implicit end-user expectation that access to communications will be available whilst using public transport to the manner in which open-data has enabled a greater public understanding of multi-modal travel.

The rail industry's Digital Railway programme, led by Network Rail, will make use of new and emerging technologies in order to accommodate rapidly increasing demand across the network.

The Digital Railway programme will unlock up to 40% more capacity from the existing urban network by delivering key technologies including:

- European Train Control System (ETCS): Digital signalling which is easier than conventional signalling to deploy and which enables more trains to run safely on the track – faster, more reliably, safer and greener.
- Traffic Management (TM): Whereas ETCS allows more trains on the track, TM maximises network performance by allowing these trains to run together as effectively as possible – maximising the throughput that existing track can support.
- Automatic Train Operation (ATO): In-cab digital decision support tools give drivers the information they need at the right time to boost performance and safeguard safety.
- In addition the data generated by the implementation of the Digital Railway will revolutionise the availability and detail of information available to passengers.

Options to deploy an enhanced package of digital technology (European Train Control System (ETCS) Level 3) are being developed. With sufficient investment, this will provide the opportunity to accelerate the release of additional rail network capacity and improve performance. Along with in-cab signaling, converting existing bespoke signalling systems to software based systems will enable a more frequent train service.

Also, although not likely to be implemented in the immediate term, the NNA should take cognisance of improved high-speed rail technologies such as magnetic levitation.

As infrastructure increasingly incorporates emerging technologies, consideration of cyber-security is essential in relation to transport infrastructure.

Advances in both energy generation and distribution will also have significant impacts on transport infrastructure, for example through increased use of electric vehicles. Shifts towards renewable energy, including biofuels, solar and hydrogen fuel cells will also have an impact and could make rail use more cost effective.

i. How can we improve public engagement in infrastructure decision-making?

One important way to improve public engagement in infrastructure decision-making is the better education of journalists, commentators, decision-makers and politicians in the key technical and economic factors (particularly constraints) involved in infrastructure development. Better-informed debate would better engage the public. In the rail sector for example it is not necessarily obvious to the public that putting more trains on the network is difficult due to capacity constraints, leading some to propose simply increasing services as the solution. If the public and media were more aware of the level of infrastructure investment this may require then the public debate would be more useful and productive. Without education, legislators and the public cannot be expected to have a feel for the trade-offs incumbent in infrastructure development. A possible way to promote this informed debate would be to have schemes budget for more education on the background issues to their scheme.

Public engagement would also be improved if decision-making processes were more transparent and if they were better understood by those beyond long term planning functions. Part of this would be to show how the outcomes of these planning and decision-making processes will affect the public. This would include making clear the likely consequences of making a certain decision or failing to make a decision.