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LEADERS IN ENVIRONMENT,
PLANNING & SUSTAINABILITY.

The Digital Railway enables...

The UK's railway can harness digital technology for all elements of the railway system, from signalling to ticketing to asset management. The digital agenda enables new ways of thinking and almost endless opportunities and spin offs. This digital agenda naturally helps to unlock benefits for passengers, local communities and the environment - here are just seven examples.



A competitive railway and enhanced customer experience

- Using this window of opportunity for rail to provide a competitive travel alternative to roads and aviation for both passengers and freight
- Providing seamless integration with other transport system providers to provide efficient end-to-end travel solutions
- Exploiting digitally enabled systems to create integrated and efficient transport that provides economic, social and environmental benefits.
- Offering intelligent real-time and predictive information to facilitate a two way relationship between passengers and operators
- Enabling passengers to be a part of optimising their own end-to-end travel options
- E-Ticketing to encourage more imaginative pricing models and incentives for passengers to develop confidence in, and loyalty to rail

Sentiment mapping: The interaction of user sentiment with transport planning, customer relations, and customer experience is being explored in one of the Transport Systems Catapult's innovation projects.



Better community and stakeholder engagement

- Connecting individuals, organisations and communities with a digitally enabled railway
- Generating two way, interactive approaches to liaising with local communities about developments to the railway
- Improving data sharing across the industry and with stakeholders in a timely and relevant manner



Opportunities for realising the value from interdependent infrastructure

- Accurate identification and management of interfaces with energy, water, ICT and other transport infrastructure to optimise design costs where applicable
- Infrastructure design to minimise cost and deliver business and environmental/community benefits
- Creating resilience at a system wide level

Early engagement with the Environment Agency enabled flood protection measures to be incorporated into the bridge design on the **Norton Bridge rail junction** improvement, reducing construction costs and providing significant downstream flood protection for Stafford town centre. Further information can be found in the Environmental Statement prepared by Temple and the [Rail Engineer article](#)



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The railway's energy potential

- Taking a holistic view of the network's energy requirements to provide accuracy in seeking cost-effective supply solutions from the deregulated energy market
- Making use of stations, depots and other assets to meet some of its own electricity and heat demands through solar PV, small wind, heat pumps, Combined Heat and Power
- Utilising real-time energy management to allow Network Rail to offer grid balancing solutions and new business models



Enhanced asset information

- Using intelligent data platforms to capture asset information from multiple disparate sources providing Network Rail and its supply chain critical insight for operations, maintenance and upgrades across its estate
- Improving information for capital works with BIM to reduce unproductive time at site and over-running engineering works as well as facilitating more efficient maintenance regimes
- Harnessing smart infrastructure control loops delivering continual improvement



Improved resilience

- **Assess:** incorporating predictive tools (i.e. for temperature, rain, wind) to inform short and medium term operational strategies such as defensive driving and temporary line closures to protect infrastructure and passengers
- **Mitigate:** improving asset information through GIS and remote sensing to address the balance between operational efficiency needs and environmental sensitivity; harnessing the role of natural systems e.g. shading, water attenuation and slope stabilisation
- **Respond:** utilising the UK's expertise in climate modelling and software development to enable the rail sector to lead the world in developing management

There are 30,000 hectares of lineside vegetation along 20,000 miles of track across Network Rail-owned land. Enhancing Network Rail's management of lineside vegetation will help to greatly minimise its associated risks, including trees falling on the tracks and the hazards that autumn leaves cause to trains. Further information can be found in [The Ecology Consultancy's article in the Rail Engineer](#).



A railway designed for the circular economy

- Planning and managing future material stream requirements effectively and adopting resource efficiency principles to reduce cost and risk in the raw materials supply chain
- Identifying under-used material and manage material stock on site to add value and reduce costs e.g. using the [Resource Management Plan](#) process developed by WRAP and [Built Environment Commitment](#) (Green Construction Board)
- Using data to understand where projects and routes should focus their effort to deliver the most value

Innovation workshops to safely challenge new designs for the railway. On the London Overground Capacity Improvement Programme, innovation workshops were held across the design teams to introduce new solutions. By embedding this process through procurement the project teams were able to generate significant cost savings and enhance the reputation of the project.

... an innovative and sustainable railway

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