Digital Roads

Digitally Enabled – Connected – Data Driven

Safer Construction and Operations - Faster Delivery- Better Customer Experience
Introduction

“Digital roads harness data, technology and connectivity to improve the way the strategic road network is designed, built operated and used.”

This will enable a safer SRN, faster delivery, and an enhanced customer experience for all. Digital Roads aligns with our imperatives and is structured around three core themes, all of which are digitally enabled, connected and data driven.

Digital Roads themes:

- Digital Design & Construction
- Digital Operations
- Digital for Customer

Click to access next page
Purpose of this document

This document sets out the key activities and steps that are required to achieve our Digital Roads vision for 2025.

About this document

The key activities and steps required to achieve the Digital Roads vision are mapped to each of the ambition statements (see Digital Roads Brochure). The high level steps are captured in a summary roadmap and the individual steps required to achieve each ambition statement are captured in more detailed roadmaps.

This roadmap presents an indicative timeline of key activities and steps. This will be a living document that will be routinely updated to reflect progress against our 2025 Digital Roads vision.

We welcome involvement and collaboration from a wide range of stakeholders and recognise this is critical for the delivery of our 2025 Digital Roads vision.

For more information please contact: DigitalRoads@highwaysengland.co.uk

This roadmap is part of a suite of Digital Roads documents, which set out the latest National Highways thinking and approach for Digital Roads:

The Digital Roads Video
Sets out the Digital Roads vision for 2025, structured around the three themes. The video highlights the benefits of Digital Roads for our customers.

Digital Roads Brochure
Outlines the structure and additional detail which makes of the Digital Roads vision for 2025, based on: 3 themes, 9 sub themes and 35 ambition statements.

Digital Roads Interactive Roadmap
Sets out the key activities and steps required to achieve our Digital Roads vision for 2025.
Summary roadmap

Summary roadmap presents key building blocks to realising our 2025 Digital Roads vision. For visualisation, some dates and durations have been shifted or condensed.
Summary roadmap

Themes

1. Digital design and construction
   - Digitally enabled design
   - Modular and standardised approaches
   - Automated construction

2. Digital operations
   - Intelligent asset management
   - Enhanced operational capability
   - Digitally enabled workers

3. Digital for customers
   - Information provision
   - Customer engagement
   - Partnerships and alliances

Sub-themes

Digital design and construction

- **Digitally enabled design**
  - Streamlined governance process for Design Manual for Roads and Bridges (DMRB)
  - Machine led, human aided tools become the norm to deliver faster and more efficient designs

- **Modular and standardised approaches**
  - Components standardised across major project delivery and develop comprehensive product library
  - Offsite manufacturing approach established, in collaboration with the supply chain, to become default method

- **Automated construction**
  - Enhanced on-site safety through the use of data and digital tools, reducing facilities and proactively managing risk
  - Supply chain uses connected and semi-autonomous plant across construction sites to minimise risk to workers and deliver efficiency

Digital operations

- **Intelligent asset management**
  - Asset databases aligned on an accessible digital platform
  - Predictive asset management capability tested, scaled up and rolled out

- **Enhanced operational capability**
  - Advanced traffic management system (CHARM) deployment to enable automation of signaling
  - Connected and autonomous opportunities harnessed to reduce human input to on-site activities

- **Digitally enabled workers**
  - Customer feedback used to rationalise and enhance National Highways customer journey information channels and to develop freight information services
  - Enhanced data sharing with 3rd parties to provide customer journey information

Digital for customers

- **Information provision**
  - Customer feedback used to further improve customer information channels

- **Customer engagement**
  - Customer engagement strategy developed

- **Partnerships and alliances**
  - National Highways and industry collaboration enhanced on customer experience innovation (e.g. designing future connectivity trials)

Summary activities

- **Strategy and mechanism for collecting and maintaining design and construction data**
- **Emerging digital twin of SRN with integrated live data streams for asset information and network performance**
- **Digital rehearsals conducted across all major activities prior to starting construction**
- **Streamlined governance process for Design Manual for Roads and Bridges (DMRB)**
- **Machine led, human aided tools become the norm to deliver faster and more efficient designs**
- **Components standardised across major project delivery and develop comprehensive product library**
- **Offsite manufacturing approach established, in collaboration with the supply chain, to become default method**
- **Enhanced on-site safety through the use of data and digital tools, reducing facilities and proactively managing risk**
- **Supply chain uses connected and semi-autonomous plant across construction sites to minimise risk to workers and deliver efficiency**
- **Asset databases aligned on an accessible digital platform**
- **Predictive asset management capability tested, scaled up and rolled out**
- **Advanced traffic management system (CHARM) deployment to enable automation of signaling**
- **Connected and autonomous opportunities harnessed to reduce human input to on-site activities**
- **Customer feedback used to rationalise and enhance National Highways customer journey information channels and to develop freight information services**
- **Enhanced data sharing with 3rd parties to provide customer journey information**
- **Customer feedback used to further improve customer information channels**
- **Customer Contact Centre (CCC) systems and tools rationalised and streamlined**
- **National Highways and industry collaboration enhanced on customer experience innovation (e.g. designing future connectivity trials)**

Please note that for visualisation, some dates and durations have been shifted or condensed. Detailed (ambition statement level roadmaps) are presented in the following sections.
Digital design and construction

Our activities will be increasingly automated, modular and conducted off-site. This will result in safer production, reduced network disruption, increased productivity and smoother journeys for our customers.

Detailed roadmap
# Ambition Statements: Digital design and construction

Our activities will be increasingly automated, modular and conducted off-site. This will result in safer production, reduced network disruption, increased productivity and smoother journeys for our customers.

The following ambition statements set out our vision of how digital technology will enable us to achieve 2025 Digital Roads vision.

### Digitally enabled design

1. **Digitised requirements** - Our design and construction requirements will be digitised, enabling automated design and seamless integration of connected construction activities (estimation, sequencing and costing).
2. **Effective management and exploitation of data** - We will create and make greater use of available data (e.g., topographical and environmental information) to reduce the need for pre-construction site visits and investigations.
3. **Machine-led, human aided tools** – These will be used to create automated designs and improve accuracy.
4. **Digital twin** - The foundation of Digital Twin will be used on projects through the collation and federation of existing data to support network planning and decision making.

### Modular and standardised approaches

1. **Modularised and off-site fabrication** - These will become the default where practical, minimising disruption on the network and delivering a more sustainable approach.
2. **Standardised components** - We will increase the use of standardised components in our designs based on our digitised construction requirements in order to maximise efficiency.

### Automated construction

1. **Connected and semi-automated plant (CAP)** - We will reduce plant/site operative conflicts through increased use of connected and semi-automated plant for construction, which would be remotely operated (potentially off-site) and support ‘just in time delivery’.
2. **Enhanced safety on-site** - Sites will become less labour intensive using digital safety tools e.g. briefings and digital rehearsals to reduce the risk exposure of on-site workers.
3. **Digital rehearsal** - We will rehearse site activities using digital simulations to minimise disruption to construction and assembly.
Digitally enabled design

**Ambition statements**

**Digitised requirements** - Our design and construction requirements will be digitised, enabling automated design and seamless integration of connected construction activities (estimation, sequencing and costing).

**Effective management and exploitation of data** - We will create and make greater use of available data (e.g. topographical and environmental information) to reduce the need for pre-construction site visits and investigations.

**Machine-led, human aided tools** – These will be used to create automated designs and improve accuracy.

**Digital twin** - The foundation of Digital Twin will be established through the collation and federation of existing data to support network planning and decision making.

**Activities**

- Enhancements to application programming interfaces (APIs) for clause level digitisation
- Streamlined governance process for Design Manual for Roads and Bridges (DMRB)
- Authoring and publishing of Manual of Contract Documents for Highway Works (MCHW)
- Digitised standards and requirements are linked to digital design tools and digital twin
- Development of existing databases to support digital approach
- Development of data requirements for handover from construction to operations
- 3rd party data and sensors/drones data is augmented with our data
- Integrated multi-physics, multi-scale, probabilistic simulations are enabled
- Application of digital machine-led design tool to the smart motorway programme
- Collaborative development of Design for Manufacture and Assembly platform with supply chain and vendor partners to improve accuracy and efficiency
- Requirements for expansion of Rapid Engineering Model (REM) and 3D modelling across other programmes and scheme types are mapped
- Development of a data model at Level 2 maturity (Centre for Digital Built Britain Maturity Model) for 100% of the Summary Road Network (SRN)

3rd party data and sensors/drones data is augmented with our data

- 2020
- 2021
- 2022
- 2023
- 2024
- 2025
Modular and standardised approaches

Modularised and off-site fabrication will become the default where practical - Minimising disruption on the network.

Standardised components - We will increase the use of standardised components in our designs (based on our digitised construction requirements) in order to maximise efficiency.

**Ambition statements**

- **Modular construction roadmap developed**
- **Development of a complete product library for assets across SRN and integrate with machine-led, human aided design tools**

**Activities**

- **Collaboration with supply chain to encourage modular construction**
- **Application of modular construction across all new schemes (where practicable)**

- **Complete product library for assets across SRN tools developed**
- **Integration of component library with machine-led, human aided design tools**
- **Application of standardised components across all schemes (where practicable)**

2020 2021 2022 2023 2024 2025
### Ambition statements

#### Connected and semi-automated plant (CAP) - We will reduce plant/site operative conflicts through increased use of connected and semi-automated plant for construction, which would be remotely-operated (potentially off-site) and support ‘just in time delivery’.

- Existing contracts and legislation to facilitate use of CAP are reviewed
- CAP levels defined to identify expected capabilities and any necessary adaptations
- Revisions to contracts, standards and data-sharing frameworks to facilitate the introduction of CAP

#### Enhanced safety on-site - Our sites will increasingly become paperless (with fewer operatives), utilise digital safety briefings and reduce the need for on-site facilities.

- Guidance to standardise data use and IT systems on sites
- Robust data collection across all sites (project data and supply chain data)
- Widespread deployment of advanced analysis of site data to enable decision-making and risk management
- Full automation and digitisation of data entry on site (where practicable)

#### Digital rehearsal - We will rehearse site activities using digital simulations to minimise disruption to construction and assembly.

- Lessons learnt from trials of digital rehearsals captured and collated
- Framework of digital rehearsals requirements and tools established
- Capability for Digital rehearsal developed across National Highways and the supply chain
- Digital rehearsals adopted as standard across all major construction activities

### Activities

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<thead>
<tr>
<th>2020</th>
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**Click**
Digital Operations

Our operations will leverage data to drive increasingly pre-emptive interventions - resulting in improved asset resilience, increased asset life and a safer, smoother running network.

Detailed roadmap
Ambition Statements: Digital operations

Our operations will leverage data to drive increasingly pre-emptive interventions - resulting in improved asset resilience, increased asset life and a safer, smoother running network.

The following ambition statements set out our vision of how digital technology will enable us to achieve 2025 Digital Roads vision.

Intelligent asset management
1. Predictive asset management – We will apply artificial intelligence and machine learning techniques to enable predictive asset management decision making.
2. Data and Systems – We will maximise the value of the data and systems to enable effective asset management.
3. Digital surveillance – We will increase the use of aerial surveillance for inspections, particularly where access requires working from height, to improve safety.
4. Roadworks planning – We will effectively plan the interaction between multiple planned roadworks. This will enable us to better understand their impact.
5. Automated and autonomous plant - We will create the environment for increased use of automated and autonomous plant for asset maintenance activities to improve safety outcomes.

Enhanced operational capability
1. Control room technology - Our updated control room technology will provide greater oversight and control of the network.
2. On-road technology – We will fully utilise our current on-road operational technology and ‘tune’ it to improve network performance.
3. Sensor technology and data science - These will be deployed to forecast demand, weather, environmental, traffic and asset conditions enabling us to pre-emptively prepare and respond.
4. Reduced closure impact – We will exploit digital technologies to proactively restrain and divert upstream demand. We will also optimise the flow of traffic through the dynamic use of monitoring equipment and electronic signs.
5. Improved detection – We will ensure quicker response times to unplanned incidents through improved detection, automatically updating signs and signals, and through proactive, integrated resource management.
6. Emergency services - We will provide emergency services with the data they need to open the road earlier following a collision, capturing timely evidence through the use of CCTV cameras, aerial surveillance and the latest 3D laser scanning collision investigation equipment.

Digitally enabled workers
1. IT equipment - On-road workers will be provided with IT equipment that allows them to conduct their jobs as effectively as possible.
2. Reduce on-road worker and live traffic conflict - We will support our supply chain to reduce on-road worker/live traffic conflict creating an environment to exploit technologies to eliminate site incursions.
### Intelligent asset management

#### Ambition statements

**Predictive asset management** – We will apply artificial intelligence and machine learning techniques to enable predictive asset management decision making.

**Data and Systems** – We will maximise the value of the data and systems to enable effective asset management.

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<tr>
<th>Ambition statements</th>
<th>Detailed objectives developed</th>
<th>Business cases developed</th>
<th>Technology requirements for predictive analytics identified</th>
<th>Minimum viable product to test use cases is delivered</th>
<th>Predictive asset management capability is scaled up and rolled out</th>
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<td><strong>Predictive asset management</strong></td>
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<tr>
<td><strong>Data and Systems</strong></td>
<td>Asset management (inc. data requirements) strategy developed</td>
<td>RACI for systems and asset data agreed</td>
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<td><strong>Digital surveillance</strong></td>
<td>Implementation of security assessment and updated policy document</td>
<td>Governance defined</td>
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<td><strong>Roadworks planning</strong></td>
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Enhanced operational capability

**Ambition statements**

- **Control room technology** - Our updated control room technology will provide greater oversight and control of the network.

- **On-road technology** – We will fully utilise our current on-road operational technology and fine tune it to improve network performance.

- **Sensor technology and data science** - These will be deployed to forecast demand, weather, environmental, traffic and asset conditions, enabling us to pre-emptively prepare and respond.

- **Reduced closure impact** – We will exploit digital technologies to proactively restrain and divert upstream demand. We will also optimise the flow of traffic through the dynamic use of monitoring equipment and electronic signs.

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**Activities**

- Advanced traffic management system (CHARM) deployment to enable automation of signalling

- Enhanced tools to track network performance and resource deployment and inform operational decision-making

- An end-to-end control approach that provides role clarity and definition of command, control and communication responsibility is built

- Digitisation of National Highways workflows and interfaces with supply chain

- Control room technology - Our updated control room technology will provide greater oversight and control of the network.

- Advanced traffic management system (CHARM) deployment to enable automation of signalling

- Gap analysis of on-road technology and implementation of development roadmap

- Usage of current operational technology assessed

- Current on-road operational technology is fully utilised

- TOC deployment to enable remote asset monitoring and maintenance

- Enhanced National Highways capability to analyse asset performance and make risk-based decisions

- Data and technology requirements to enable proactive data maintenance approach defined

- Advanced sensor technologies rolled out

- Evidence-based predictive maintenance plans created, using data insights as standard

- Advanced traffic management system (CHARM) deployment to enable automation of signalling

- Improved core capability to exploit digital tech across National Highways and supply chain

- Delivery of National Traffic Information Service (NTIS) transformation programme

- Development of Artificial Intelligence (AI) & Machine Learning (ML) based decision tool to support automated incident response

- 3D laser mapping used to collect incident information

- Stopped Vehicle Detection goes live across the smart motorway network

- Development of AI & ML based decision tool to support automated incident response

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- Delivery of National Traffic Information Service (NTIS) transformation programme

- Improved core capability to exploit digital tech across National Highways and supply chain
Digitally enabled workers

Ambition statements

**IT equipment** - On-road workers will be provided with IT equipment that allows them to conduct their jobs as effectively as possible.

**Reduce on-road worker and live traffic conflict** - We will support our supply chain to reduce on-road worker / live traffic conflict creating an environment to exploit technologies to eliminate site incursions.

Activities

- As-is tools analysis is conducted to understand current capabilities
- Digitisation of workflows, where possible
- Current on-road worker operations and workflows are assessed
- Technology deployment for improved operation of the network
- Contracting strategy developed, with barriers to innovative solutions removed
- Specific innovations identified that will bring the greatest safety benefit to on-road workers
- More efficient approaches for National Highways and Supply chain systems integration developed and delivered

2020 2021 2022 2023 2024 2025
Digital for Customers

Our customers will be better informed and have trust in the journey information they access, ensuring that they feel safe and in control of their journeys.

Detailed roadmap
Ambition Statements: Digital for customers

Our customers will be better informed and have trust in the journey information they access, ensuring that they feel safe and in control of their journeys.

The following ambition statements set out our vision of how digital technology will enable us to achieve 2025 Digital Roads vision.

Information provision
1. Close to real-time - The information we provide to our customers will reflect journey experience and network performance in as close to real-time as possible.
2. Consistency - Customer information provision on key All-Purpose Trunk Roads will be improved making this more consistent with the level of service provided on our motorways.
3. Digital channels - Customers will be kept informed in-journey about disruption and alternative available routes through a range of digital channels.
4. Roadside technology - We will assess the impact of in-vehicle communication growth on our roadside technology, being clear on a plan for the future across the SRN.
5. Signs and signals - Better use of variable signs and signals to manage traffic flow more efficiently.

Customer engagement
1. Customer contact - Our call centre staff will have access to fit-for-purpose information that enables them to provide excellent customer service.
2. Better quality data - We will receive better quality data from our customers, which enhances our own asset and operational data to inform decision making.
3. Network trials - Large scale connectivity trials will be informed by customer insights and preferences to improve customer experience and ensure the most appropriate digital channels are utilised.
4. Working with vehicle manufacturers – We will improve customer awareness of the technology in their vehicles to improve their experience on the network.

Partnerships and alliances
1. End-to-end journey support - By working with local highways authorities and other transport operators we will provide our customers with more integrated journey information and a complete picture of network performance.
2. Better information for the freight and logistics sector - We will work closely with wayfinding services to improve the quality of information accessed by our customers with a strong focus on the benefits for the freight and logistics sector.
3. Network changes - Wayfinding service providers will be notified when new road configurations and important features (such as Emergency Areas) are operational, so that these can be reflected in the third-party applications used by our customers.
4. Innovation - We will work with the supply chain and wider private sector to identify and test new opportunities to improve customer service.
5. Future connectivity - We will work with industry partners to support larger connectivity trials and the testing of in-vehicle communication.
Information provision

**Ambition statements**

- **Close to real-time** - The information we provide to our customers will reflect journey experience and network performance in as close to real-time as possible.

- **Consistency** - Customer information provision on most-used All-Purpose Trunk Roads will be improved making this more consistent with the level of service provided on our motorways.

- **Digital channels** - Customers will be kept informed in-journey about disruption and alternative available routes through a range of digital channels.

- **Roadside technology** - We will assess the impact of in-vehicle communication growth on our roadside technology, being clear on a plan for the future across the SRN.

- **Signs and signals** - Better use of variable signs and signals to manage traffic flow more efficiently.

**Activities**

- **Delivery of NTIS transformation programme**
- **Standardised data governance and data quality measures in place**
- **Delivery of upgrades across the APTR (expressways) with optimised use of technology (inc. VMS) to enhance information provision to customers**
- **Development of Connected Services roadmap for the transition to in-vehicle communications**
- **Customer feedback used to rationalise and enhance National Highways customer journey information channels and to develop freight information services**
- **Opportunities to receive and use third party data to improve customer experience on the network identified**
- **Development of Connected Services roadmap for the transition to in-vehicle communications**
- **Use cases for how connectivity will contribute to customer information provision defined**
- **New messages on electronic signs introduced**
- **Advanced traffic management system (CHARM) deployment to enable automation of signalling**
- **Pre-programmed signal settings to automate signs with known events such as roadworks or major sporting events**

**2020** | **2021** | **2022** | **2023** | **2024** | **2025**
Customer engagement

**Ambition statements**

**Customer contact** - Our call centre staff will have access to fit-for-purpose information that enables them to provide excellent customer service.

**Better quality data** - We will receive better quality data from our customers, which enhances our own asset and operational data to inform decision making.

**Network trials** - Large scale connectivity trials will be informed by customer insights and preferences to improve customer experience and ensure the most appropriate digital channels are utilised.

**Working with vehicle manufacturers** - We will improve customer awareness of the technology in their vehicles to improve their experience on the network.

**Activities**

- Delivery of integrated Customer Relationship Management system
- Development of Customer Contact Centre future strategy
- Customer Contact Centre future strategy delivered
- Increased use of tools (e.g. ECHO) to collect additional feedback on all digital channels
- Cross stakeholder collaboration and data sharing to understand customer experience on the Network
- Enhanced customer research and segmentation analysis to maintain up-to-date understanding of customer needs
- Evaluation of additional customer use cases of connectivity through insights from connectivity trials
- Enhanced understanding of how connectivity contributes to safety, delivery and customer experience
- Customer preferences used to shape the design criteria for future connectivity trials
- Consortia with key stakeholders to shape the future roadside connectivity solutions
- Engagement with manufacturers through industry associations to identify specific customer benefits of emerging in-vehicle technology
- Evaluation of next steps and delivery of communications to educate customers on potential benefits of in-vehicle technologies

*2020 2021 2022 2023 2024 2025*
Partnerships and alliances

### Ambition statements

**End-to-end journey support** - By working with local highways authorities and other transport operators, we will provide our customers with more integrated journey information and a complete picture of network performance.

**Better information for the freight and logistics sector** - We will work collaboratively with the freight and logistics sector to improve the quality of information accessed by them.

**Network changes** - Wayfinding service providers will be notified when new road configurations and important features (such as Emergency Areas) are operational, so that these can be reflected in the third-party applications used by our customers.

**Innovation** - We will work with the supply chain and wider private sector to identify and test new opportunities to improve customer service.

**Future connectivity** - We will work with industry partners to support larger connectivity trials and the testing of in-vehicle communication.

### Activities

- **Identification and delivery of opportunities for greater collaboration with local roads authorities to enhance customer experience**
- **Collaboration with local authorities to review and improve diversion routes**
- **Definition of optimum approach for sharing data with third parties (open data vs dedicated relationships)**
- **Definition of required third-party partnership legal, technical and commercial requirements**
- **Collation and implementation of customer feedback to improve the Traffic England service**
- **Iterative improvement of Traffic England service based on customer feedback**
- **Identification of opportunities to receive and use third party data to improve customer experience on the network**
- **Development of dedicated third party engagement capability**
- **Additional data shared with third parties to keep customers informed in-journey**
- **Design of innovation competitions focused on customer experience**
- **Collaboration with industry to support innovation competitions which improve customer service**
- **Customer experience factored into supply chain innovations**
- **Evaluation of additional customer use cases of connectivity through insights from connectivity trials**
- **Enhanced understanding of how connectivity contributes to safety, delivery and customer experience**
- **Customer preferences are used to shape the design criteria for future connectivity trials**
- **Consortia with key stakeholders to shape the future roadside connectivity solutions**

**2020** | **2021** | **2022** | **2023** | **2024** | **2025**
Digital Roads 2025 outcomes

Efficient and timely delivery of our 2025 Digital Roads roadmap will enable safer construction and operations, faster delivery, and better customer experience.
Digital Roads 2025 outcomes

Efficient and timely delivery of our 2025 Digital Roads roadmap will enable safer construction and operations, faster delivery, and better customer experience.

- **Optimal network planning options are identified in a cost and time effective manner**
- **Digital designs are produced as standard to improve efficiencies**
- **Off-site, modular construction is default method, where practical, resulting in faster construct times**
- **Greater data sharing enables collaboration with construction partners to reduce duplication**
- **We pre-emptively prepare and respond to changes in operational conditions to improve safety**
- **Digitally-enabled maintenance workers can access Work Management Systems and expert advice when undertaking activities**
- **Autonomous maintenance tools carry out repetitive tasks to improve safety**
- **More automated signals, signs and lane closures are used to manage traffic flow more effectively**
- **We receive better quality data from our customers, which enhances our own asset and operational data to inform decision making**
- **We provide our customers end-to-end journey support in collaboration with local highways authorities, transport operators and 3rd party service providers**

Our contractors’ feedback is integrated into our digital designs to improve accuracy

Our digital twin is used to conduct long term planning and develop more effective asset strategies

Digitised design standards combined with databases such as topographical and environmental data are used to create integrated designs faster

Predictive analytics to manage and plan work appropriately, improving delivery speed

Use of standard components in design where possible to improve efficiencies

Asset digital twin information is accessible to those who need it to support maintenance planning

Updated control room technology provides greater oversight and control of the network

Intrusions are minimised when on-road workers are near live traffic to improve safety

On-road workers can access and update our central systems whilst on the road in real-time

Coordination of construction and maintenance activities to reduce customer disruption

Impact of roadworks is assessed and mitigated to reduce disruption

Our customers access reliable pre-journey information (consistent asset across the SRN) through collaborating with third parties (e.g. wayfinding service providers) to identify and test new opportunities to improve customer service

Our customers access end-to-end journey information (consistently across the SRN) through their preferred digital channels, personalised for their needs

Large scale connected corridor trials based on customer insights are underway throughout the country to improve customer experience

We work harmoniously with our surroundings to deliver an improved environment

Our call centre staff have access to fit-for-purpose information, that enables them to provide excellent customer service

Our customers access reliable real-time traffic information

Our customers access our central systems whilst on the road in real-time

Our customers are kept informed in-journey consistently across the SRN through collaborating with third parties (e.g. wayfinding service providers)

We work with the supply chain and wider private sector (e.g. vehicle manufacturers) to identify and test new opportunities to improve customer service

More automated signals, signs and lane closures are used to manage traffic flow more effectively

We receive better quality data from our customers, which enhances our own asset and operational data to inform decision making

We provide our customers end-to-end journey support in collaboration with local highways authorities, transport operators and 3rd party service providers

Digital designs

Greater data sharing

Digitally-enabled maintenance workers

Optimal network planning options

Our contractors’ feedback

Machine-led, human aided tools

Off-site, modular construction

Greater data sharing

We pre-emptively prepare

Digitally-enabled maintenance workers

Autonomous maintenance tools

More automated signals, signs and lane closures

We receive better quality data

We provide our customers

Our digital twin

Digitised design standards

Digitised design standards

Digitised design standards

More automated signals, signs and lane closures

We receive better quality data

We provide our customers

Optimised operational interventions

On-road workers’ patrols

On-road workers’ patrol conduct

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| **CAP** | Connected and Autonomous Plant – Please refer to [Highways England’s 2035 CAP roadmap](#) to understand opportunities, challenges and key activities required to achieve productivity improvements. |
| **CCC** | Highways England’s Customer Contact Centre |
| **CHARM** | Next generation Advanced Traffic Management system being rolled out at National Highways to replace the current system (HATMS). |
| **Data and information strategy** | Highways England’s vision for data and information management |
| **Digital twin** | System-wide, digital representation of our SRN built on a solid foundation of reliable, accurate and real time data feeds. Our long term ambition is to create a digital replica of our SRN, embedded with detailed information on design and operation of our assets, used to monitor the SRN in real-time and provide predictive analytics. This will require multiple live and historical data sources both from our assets and inputs from 3rd parties. Up-to-date data from all available smart assets will enable an understanding of live network status, thereby enabling more informed and strategic decisions around the management of assets, and aligning demand and capacity faster during varying operational contexts on the network (e.g. major events), as well as to continuously improve network operations. |
| **DMRB** | Design Manual for Roads and Bridges that contains all current standards, advice notes and other documents relating to the design, assessment and operation of trunk roads, including motorways. These will be digitised as part of the Digital Roads work. |
| **MCHW** | Manual of Contract Documents for Highway Works incorporates the requirements of EU legislation, which are mandatory for all public procurement bodies. |
| **NTIS** | National Traffic Information Services - NTIS interfaces with a number of systems from different suppliers to obtain knowledge of Highways England’s network of roads in England. It then collates and processes all of this data and intelligence to provide users of the services with the information they need, as quickly and as easily as possible, to help them make informed decisions about travel. |
| **REM** | Rapid Engineering Model is a digital workflow that is collaboratively enabled, and has the functionality to analyse digitally captured topographic and environmental data; evaluate suitability of data analysis; automate design layout following the inputted design rules and optimise the design layout according to specific project criteria. |