

Information Management and Technology Strategy





Foreword

For Highways England to deliver the Roads Investment Strategy (RIS) we will be required to act flexibly, have stronger and more accountable customer focus and demonstrate our performance by timely delivery of technology. All this will require high levels of access to and confidence in our information, whether this sits within our supply chain or within the organisation at large.

Information and technology are the critical business enablers that will improve our collaborative ways of working and unlock more efficient and effective methods of operating, maintaining and modernising the strategic road network in line with the RIS.

The Information Technology Directorate provides corporate ownership and assurance and is supporting the delivery of a number of high profile, strategic information and technology projects that will deliver benefit across the organisation by using digital technologies to unlock more efficient methods of designing, creating and maintaining our assets; of operating our network to reduce congestion to enable safe and informed travel; and improve our internal business processes to reduce bureaucracy and improve performance.

The Information Management and Technology Strategy outlines the key principles that will underpin the operation, maintenance and modernisation of our information and technology assets across the whole organisation that will allow us to put our customers at the heart of what we do; introduce solutions that support flexible, collaborative and safe working, reduce duplication and automate key business processes to allow our technology rather than our people to take the strain.

Tony Malone

Chief Information Officer

Introduction

Our Information Management and Technology Strategy is owned by the Information Technology Directorate (ITD). It provides the fundamental cornerstone upon which all other information strategies will be built to ensure appropriate protection, integrity and availability of information to provide the necessary assurance that all Highways England information can be trusted and is managed to a world class standard.

It provides a framework for delivering a corporate information and technology vision and aligns to support the achievement of our five strategic outcomes defined in our Delivery Plan:

- Supporting economic growth
- A safe and serviceable network
- A more free-flowing network
- Improved environment
- An accessible and integrated network

The ITD will provide corporate stewardship of the organisations ICT and traffic information and technology strategy, design, transition and operation. We will ensure we have the right information, in the right place at the right time, that we can trust it, that we keep it safe and we hold it legally.

We will leverage as much capability and exploit as many opportunities from our information assets as possible and we will do this across all of our

business areas as one organisation, with a single, corporate information and technology architecture.

As the organisation embraces a bold future, focussed on performance based delivery, within the ITD we will continue to build the right links between our business objectives and the way we employ information and technology to support the achievement of those objectives.

Information is critical and underpins everything we do to operate, manage and improve our network, improve safety on it and protect the environment around it. Good information improves our customers' experience and safety; it also underpins the innovation we need to ensure we continue to be progressive.

By enhancing our intelligence – provided by high quality information and information systems – we can gain efficiencies which means that projects are delivered more quickly, incidents are responded to faster and safety improvements are more effective, saving lives by reducing the number of serious accidents on our network.

Our aspiration is to deliver well designed, flexible and effectively delivered information and information services; indispensable enablers to successful delivery.

Our information landscape

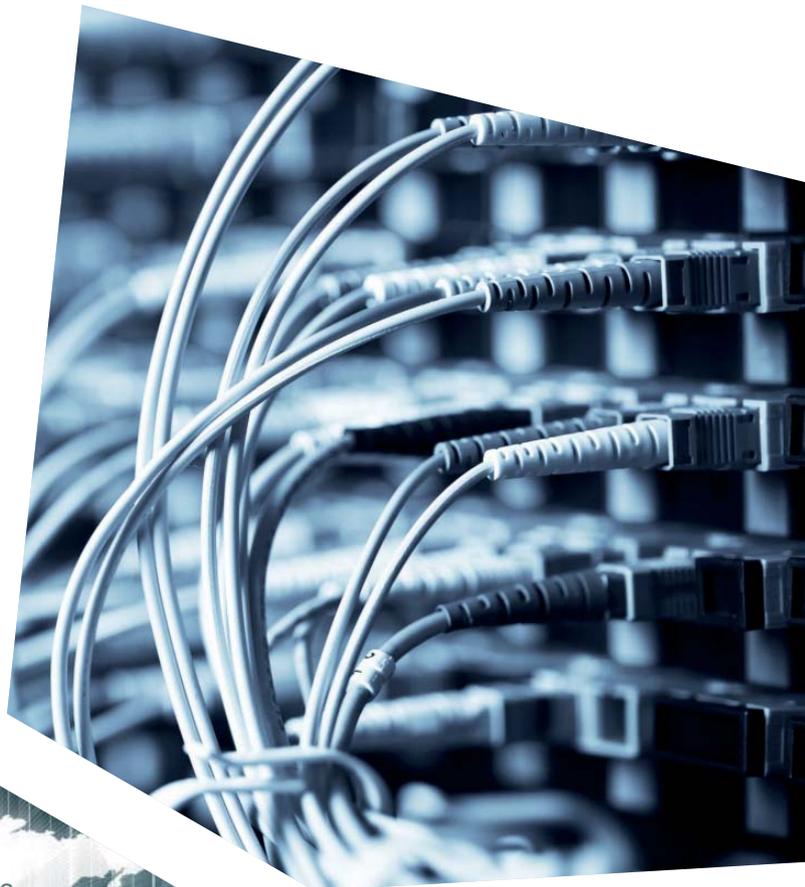
Our information users; be they internal or external, are diverse across need, geography, technology and mobility. We need to enable flexible access to our information to support our aspiration to deliver trusted information to our staff, customers and partners that can be accessed at any time and in anyplace.

Highways England collects and processes over 38 million pieces of data on a daily basis from our National Traffic Information Service; every day we send and receive over 32,000 emails to and from external email addresses.

Information management on this scale is of course only possible through the use of a range of digital technologies: devices that we use to access or collect information; networks that connect it; applications that process it; and services that structure and store it. Digital technologies continue to develop and change at pace, creating opportunities and increasing expectations in what they can enable the company to deliver.

The challenge for Highways England, supported by the ITD, is to understand this complexity of information and how we are and can use it to allow the organisation to exploit the opportunities of digital technologies.

Through digital exploitation, we can improve the delivery of our information services and improve our corporate intelligence to drive improvements in the provision of effective and efficient stewardship of the strategic road networks long term operation and effectiveness.



Our vision and ambition

As the ITD, we must enable Highways England to be a flexible and agile organisation, continually updating and improving our digital profile, adapting and keeping pace with changing business needs, priorities and developments in technology; focussed upon excellent customer services, providing solutions that promote positive working practices and enable successful delivery against our Delivery Plan.

This is a challenging agenda and we must transform our information and technology provision to meet those challenges to support successful delivery:

- High customer expectations
- Fast evolving technologies
- Challenging cost pressure
- Protecting our environment
- Legal and Policy Landscape



High customer expectations

The most significant and enduring trend affecting the delivery of digital and information services is the continuous increase in customer expectations. The default position is for improving transparency of and access to services delivered seamlessly, anytime and anyplace through a range of media with service delivery and problem resolution delivered at the first point of contact.

Customer expectation demands affordable, high quality digital and information services that can be trusted to be accurate and secure, resilient and flexible.

To deliver successfully we must:

- Appropriately understand need and manage expectation
- Ensure that processes are focussed on effective delivery, performance and efficiency
- Mitigate risk and uncertainty ensuring supporting systems are available internally and with our partners
- Affordable / appropriate levels of support for IT applications.
- Proper appreciation and investment in IT security, disaster recovery and business continuity.
- Investments in systems and services that support collaborative working
- Where possible re-use and apply COTS products, reducing cost and risk
- Technology to support flexible working, enabling staff to access systems and voice from wherever they are working.



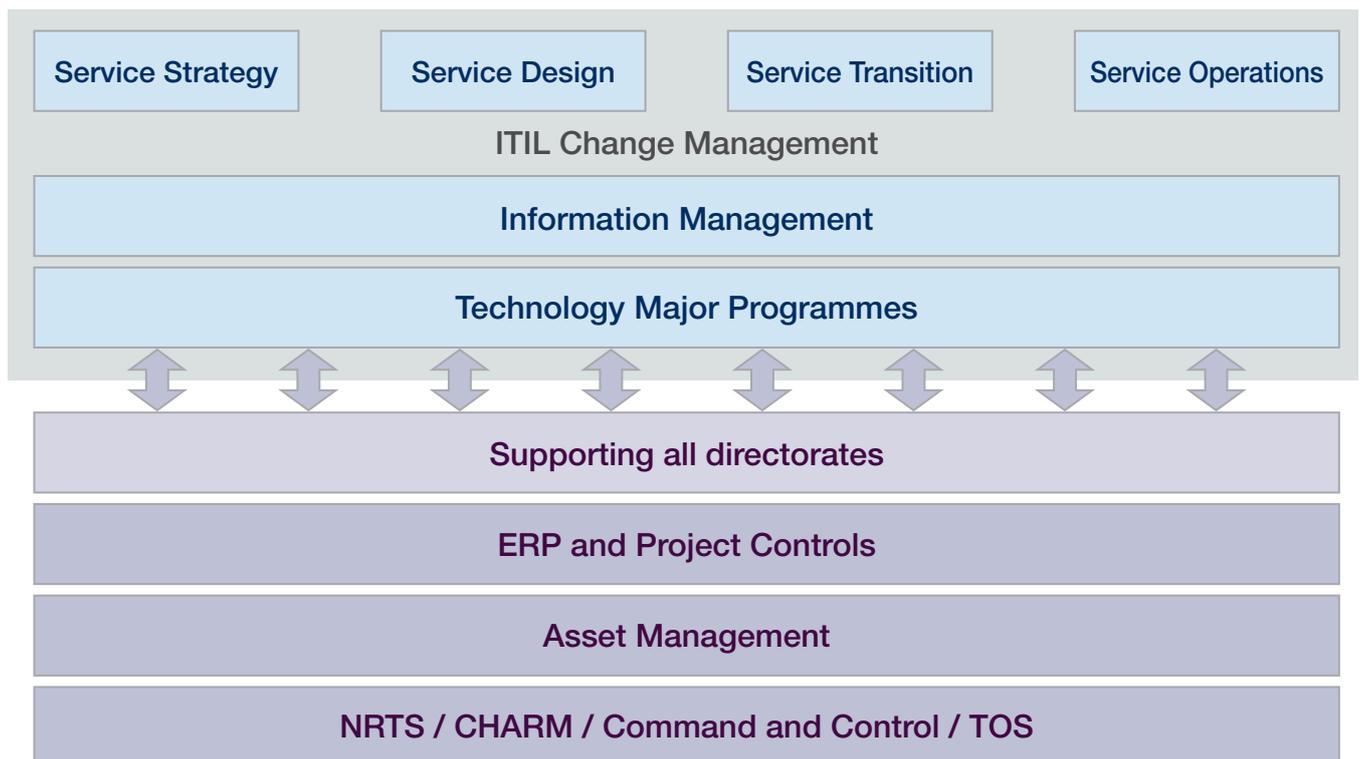
Fast evolving technology

Technology evolves almost on a daily basis and requires agile delivery mechanisms that are plugged in to an innovative and often volatile marketplace. To deliver successfully we must:

- Keep the IT skill levels of the workforce up to date, including both corporate and operational systems.
- Reduce carbon emissions against the cost of IT.
- Innovate data release and industry engagement.

- Provide effective stewardship across the operation and integrity of our technology estate.

The structure of the ITD will support the Delivery Plan by ensuring that ITIL change management processes are adhered to. We will manage our capabilities by aligning them with the Skills for the Information Age (SFIA) framework, ensuring that all staff are trained and capable of undertaking their clearly defined roles and responsibilities and meeting the objectives set out in the Delivery Plan.

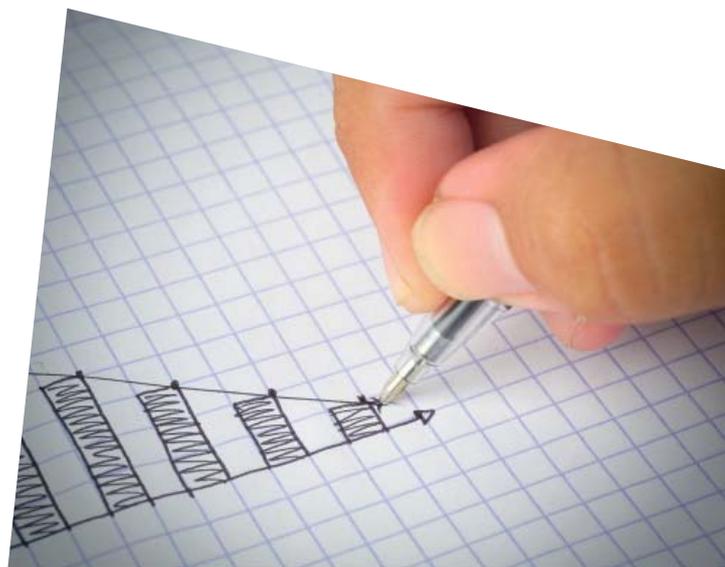


Challenging cost pressures

RIS1 commits Highways England to England's largest road investment programme for a generation. We have also committed to making capital efficiency savings of £1.212bn by 2020 (in nominal terms). Innovative technology, intelligent information services, and improved business intelligence are key enablers that will allow core business areas to leverage the savings required.

Meeting increasing business need and expectation against a backdrop of increasing downward cost pressure will require a combination of innovation both in terms of provision and procurement we have committed to:

- HMG BIM Strategy efficiency requirements of savings against baseline costs
- Collaborative IT procurement, both within the DfT and across wider government to support effective procurement and facilitation of suppliers.
- Long term budgeting and investment strategies to enable effective procurement through appropriate government channels.
- Developing strong negotiating and contracting skills
- Innovative market engagement and collaboration strategies to utilise Highways England data to leverage the development of digital solutions



Protecting our environment

Our strategic outcomes include a commitment to an improved environment across our estate and network. As a company we will utilise innovative data storage solutions; improve our information lifecycle management; improve our collaboration tools and the provision of localised access to systems to support this commitment.



Legal and policy landscape

We will comply with relevant HMG and EU policies and directives throughout the lifetime of the RIS1 and beyond.

We will comply with all relevant legislation:

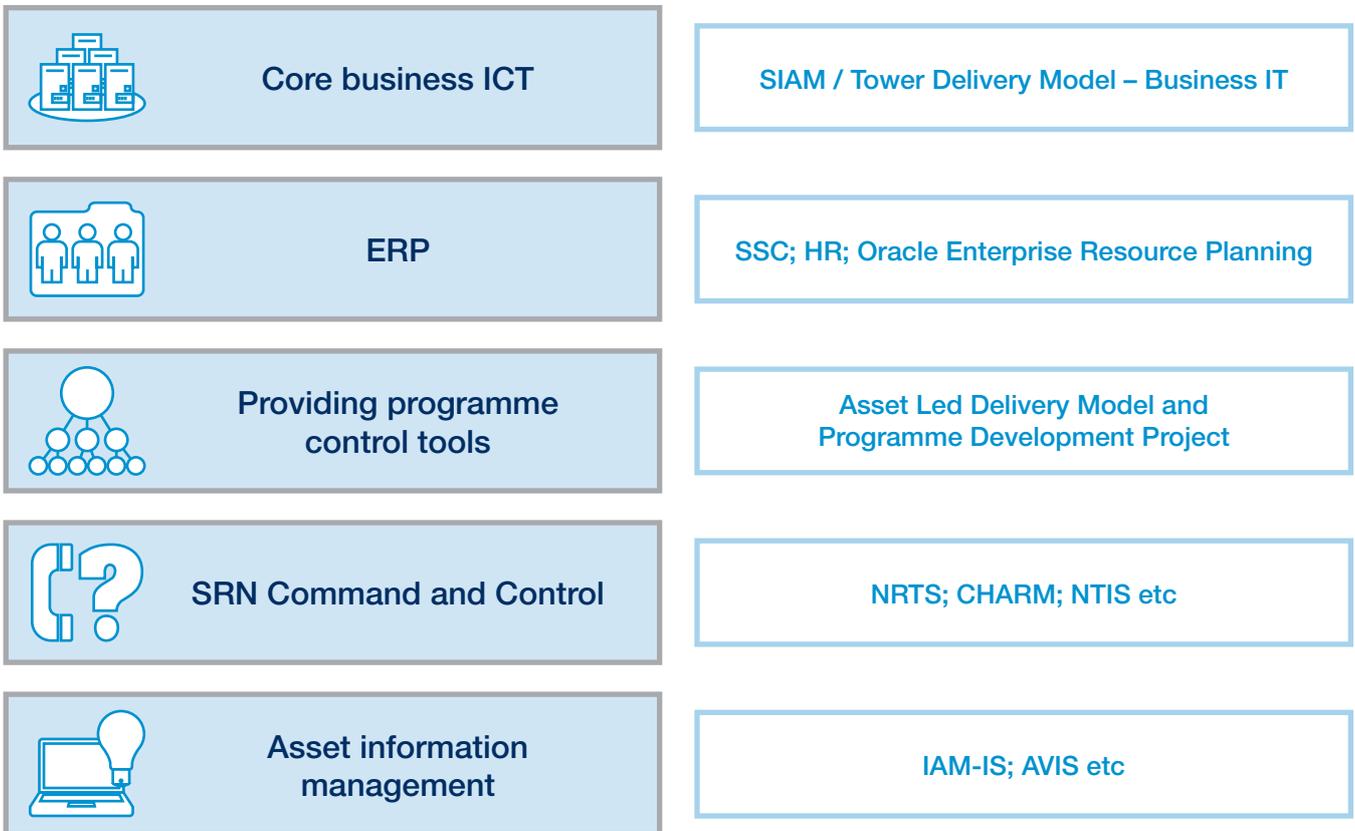
- Data Protection Act – DPA (1998)
- Freedom of Information Act – FOIA (2000)
- Regulatory Investigatory Powers Act – RIPA (2000)
- Equality Act – EA (2010)
- Asset Management - ISO55000
- Building information modelling (BIM) - PAS 1192-2:2013
- Waste Electrical & Electronic Equipment Directive – WEEE (2003)
- Health & Safety Display Screen Equipment – DSE (1992)
- Computer Misuse Act (1990)
- Copyright, Designs and Patents Act (1988)
- Electronic Commerce Act (2000)
- European Procurement Legislation (Public Contracts Regulations) (2006)
- Public Records Act (1958) and updates (for accessibility requirements) Re-use of public sector information

Currently Highways England must comply with Central Government strategies and policies and initiatives with a strong emphasis on the following:

- Industrial Strategy: government and industry working in partnership – Building Information Modelling (BIM)
- HMG ICT Strategy
- HMG Digital Strategy
- HMG Service Design Standards
- HMG Cloud First Policy
- Greening Government ICT
- Cyber Security Strategy of the United Kingdom
- National Information Assurance Strategy
- HMG Security Policy Framework

The ITD will seek to provide pragmatic advice and steer on where these strategies and policies impact negatively against the delivery plan and strongly defend Highways England’s position to the Departmental and Cabinet Office.

Our top five priorities



Our information management and technology principles

Our Strategy is supported by a number of key principles which will underpin the delivery of information and information systems across the organisation, given that information is at the core of the Highways England Delivery Plan; we must protect its confidentiality, protect its integrity and ensure its availability whenever and wherever our staff, partners and customers require it.

Principle	Statement	Rationale	Methods
Information is the basis of Knowledge and Data is the basis of Information	Knowledge must be underpinned by information. Information must be underpinned by data.	We need to ensure all knowledge is “evidence” based. This evidence will need to be based on information. This information, in turn, must be based on the underlying data	Knowledge, Information and Data will need to be managed collectively as a whole in order to achieve this principle.
Information is a Corporate Asset	Information will need to be managed, maintained and modernised	Managing information effectively and appropriately is essential to the delivery of secure, seamless and efficient operational services. It provides the basis for informed decision making and the platform upon which performance can be measured	Highways England has set-up an Information Management (IM) function that will co-ordinate facilitate and enable all IM activities with all Highways England functional areas and with relevant external suppliers. It will put in place relevant IM best practice principles as listed below.
Single Version of Truth	Data should be collected once and shared across systems.	If this does not happen then it is difficult to integrate business information across all of Highways England. This could result in inconsistent and even incorrect information being used for key business decisions. Duplication = Increased Risk	Information and data management will be looked at from a Highways England enterprise perspective. Local Business areas will be responsible for managing their data in their domain but this will need to be consistent with the overall Highways England IM standards. For data that is common across many Highways England business areas a master data management approach needs to be adopted and implemented.

Principle	Statement	Rationale	Methods
Information has authoritative sources	All data needs to have an authoritative source.	Having an authoritative source for all data makes all data traceable back to the owners of that data.	This principle typically drives a master data management solution that designates a system to be sources of truth around different types of business and operational data.
Data and Information Ownership	Any data that is just used within a single Highways England Directorate will be owned by that Directorate. Common shared Master data will need to be owned centrally in line with the Highways England master data approach Every data item has one person or role as ultimate owner.	The establishment of the correct data ownership is a necessarily prerequisite to ensure data quality.	Every item of data requires unique and ultimate ownership by a single role or person. For common data that is shared across Highways England Directorates a single owner will need to be assigned but there will need to be put in place a matrix of responsibilities to ensure that issues or conflicts always have an ultimate point of escalation.
Information Quality	Quality of information / data will be measured. These measurements will be used to focus and measure Data Quality improvements This will apply to all Highways England data regardless of where it is held.	Data quality is relative to the purpose to which it is to be applied. Decision makers need to not only have access to data. They also need to understand the timing, reconciliation, completeness, and accuracy of that data. Data quality is neither abstract nor qualitative. Rather it should be measured in absolute terms.	Quality of data should be measured in the following dimensions: <ul style="list-style-type: none"> ■ Completeness – Percentage of the logical data model that is filled with real data ■ Accuracy – The same value as the source of truth within period of update ■ Timeliness – A defined metric that commits accuracy within a given time frame (for example, updated in the last 24 hours, real-time, etc) ■ Accessibility – Ability for the user or another application to consume the data measured in qualitative metrics (for example, understandable by users, integration-capable with another system, and so on)
Information Security	Information needs to be secure throughout its lifecycle.	Open sharing of information and the release of information via relevant legislation must be balanced against the need to restrict the availability of classified, proprietary, and sensitive information. Data breach is costly for any organization. Securing sensitive shareholder and corporate data is critical to reduce compliance and regulatory risk.	Highways England will need to comply with all the principles and policies defined within the HMG Security Policy Framework document Highways England will also comply with any additional principles and policies defined by Government especially in the areas of Cyber Security and Security of Services.

Principle	Statement	Rationale	Methods
Information Retrieval and Accessibility	Information is retrievable and accessible for users to perform their functions.	Wide access to data leads to efficiency and effectiveness in decision-making, and affords timely response to information requests and service delivery. Using information must be considered from a Highways England -wide perspective to allow access by a wide variety of users.	Information needs to be classified, in accordance with the security principles of the organization, which will determine the levels of access by employees, contractors, vendors, partners, suppliers, customers, general release, etc. In addition all data should be easily retrievable by authorised users as per their business needs
Information Transparency	Relevant Information will be published to the public in accordance with the Governments Data Transparency requirements	Data Transparency is a stated government principle. Highways England will comply fully with this principle. We believe that by working with our different stakeholders in an open, honest and accessible way we can stimulate an informed and constructive debate about what we do as a company, why we do it and how we do it. We know that being more transparent will help us become a more efficient and responsive organisation, and make us more accountable to our stakeholders.	All Information will be treated as “transparent” unless classified otherwise. Any system that contains “non-Transparent” data must put in place suitable classifications and process around that data in order to exclude it from Publication
An Information Architecture will be developed	Information architecture needs to be developed. This will contain all the approaches, policies, guidelines and standards that are needed to implement the Information Management Strategy.	A comprehensive data dictionary approach for information management is the key to reducing complexity and promoting reusability. A data dictionary will make it easier for users to understand the meaning and usage of data	The Information Management Division must establish the initial common vocabulary for the business. The definitions will be used uniformly throughout Highways England. Whenever a new data definition is required, the definition effort will be coordinated and reconciled with the corporate “glossary” of data descriptions. A Highways England data administrator will provide this coordination. Functional data administration responsibilities will need to be defined and assigned.
Knowledge and information must be retained	“We are doomed to repeat the mistakes of the past because no-one ever learns”.	In the future Highways England will need to be able to answer questions as to why certain decisions and actions were taken many years previously. We need to retain this knowledge	We will put in place best practice archiving to retain knowledge and information for future usage.

Principle	Statement	Rationale	Methods
Information will be managed in the most appropriate way throughout the life of Highways England.	Information will be managed in a way that best meets the needs of the business and our corporate statutory and legislative responsibilities, throughout the life of the network.	There are many technical options for the best way to manage information (represent, capture, store, share, use etc. – digitally or otherwise) and it is recognised that the options will evolve over the life of RIS1. Highways England must be in a position to exploit the opportunity of new information technologies where there is benefit to the operation of the business, while maintaining the integrity and availability of its retained information.	We will engage across Highways England, information management and technology industry to identify and exploit such opportunities.
Digital continuity practices will be deployed to ensure information consistency and lifecycle management	Information will be appropriately managed throughout its lifecycle with due regard to digital continuity	Where technology becomes obsolete or unsupported information availability and integrity is put at risk	We will maintain a technological landscape that is up to date and supported. We will expect the same from our supply chain



Technology operations principles and methods

Principle	Statement	Rationale	Methods
A resilient technical infrastructure should be available	A resilient technical infrastructure is vital to the success of Highways England.	<p>All technical solutions must eliminate or reduce the number of single points of failure to ensure that technology services are always available when Highways England users require them.</p> <p>Highways England will follow industry Best Practice and Guidelines, including</p> <ul style="list-style-type: none"> ■ ‘Cloud First’ policy, ■ Digital Service Standards ■ Technology Code Of Practice ■ CESG Cloud Security Principles 	<p>We will ensure that all appropriate solutions utilise Cloud Services:</p> <ul style="list-style-type: none"> ■ Software-as-a-Service (SaaS) ■ Platform-as-a-Service (PaaS) ■ and Infrastructure-as-a-Service (IaaS) <p>In order to achieve the above we are continuing our migration work, and planning activities, in order to move from the existing on premise architecture to architecture of using multiple Clouds.</p>
All Highways England systems should be efficiently and effectively supported	We will continue to deliver our service management practices in support of the business in an innovative and efficient manner, with due regard to information security, key business targets and value for money.	In order to efficiently and effectively support all Highways England solutions we must provide a Single point of Contact, transparency of user requests, higher levels of service and adherence to all service level agreements.	<ul style="list-style-type: none"> ■ We will put in place a professional skilled service management function ■ We will continue to introduce best practice into service management based around ITIL, ISO27001 and HMG Security Policy Framework ■ We will complete the current strategic service initiatives including enhancing our desk side support in order to fully support our other aims
All Highways England systems and services should be available on mobile and portable devices.	We will provide all systems and services via mobile and portable devices whilst maintaining our security obligations.	Mobile-by-default. Following the business needs to work collectively and flexibly, we will put in place the technology platforms to allow Highways England staff to update Highways England information records whilst out in the field, visiting suppliers or even whilst working away from their usual place of work.	<ul style="list-style-type: none"> ■ We will continue to use the Mobile Enterprise Management solution to ensure that all Highways England approved end user devices are secured and configured correctly ■ We will continue to use the Mobile Enterprise Management to ensure all Highways England devices are correctly managed and regularly reported on to ensure compliance with all relevant governance

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