

Asset Management in Highways

Implementing our Approach to Asset

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Management in Highways

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Context

In February 2017 Kent County Council published two key, high level documents that form part of our Asset Management Framework. These documents have been approved by the KCC Environment and Transport Cabinet Committee (E&TCC) and record how asset management principles are applied to the highway maintenance service in Kent to support the County Council's strategic vision of:

“ . . .improving lives by ensuring every pound spent in Kent is delivering better outcomes for Kent's residents, communities and businesses.”

The first document, *“Our Approach to Asset Management in Highways”*, outlines how asset management principles can enable us to meet with our statutory obligations and in doing so support the County Council's strategic vision. This document will be reviewed and published at intervals of no more than five years or when there are significant changes to the County Council's vision or policies.

This second document, *“Implementing Our Approach to Asset Management in Highways”*, gives more detail on how we will embed asset management principles in the way that we deliver highway services and measure our success to ensure continuous improvement with focus on the County Council's Strategic Outcomes. This document will be reviewed and published at intervals of no more than three years or when there are significant policy or vision changes. This updated version replaces that originally published in 2017.

A third document, *“Developing Our Approach to Asset Management in Highways – 2018-2020”*, was approved by E&TCC and published on the Council's website in January 2018. It uses robust data, processes and modelling to record the current condition of highway asset groups and to forecast future condition and levels of service. It also includes recent developments we have implemented as well as areas that we want to develop in future to further enhance service delivery and ensure continuous improvement. This document will be reviewed and published annually, the next version will be published in the new year.

In October 2016 the UK Roads Liaison Group (UKRLG) published *“Well-managed Highway Infrastructure: A Code of Practice”* which highway authorities need to implement by October 2018. The Code of Practice is designed to promote the adoption of an integrated asset management approach to highway infrastructure based on the establishment of local levels of service through risk-based assessment. Although non-statutory it will be deemed to be guidance of best practice by the courts. To comply KCC must demonstrate a robust decision-making process, an understanding of the consequences of those decisions and how the associated risks are managed to ensure highway safety.

KCC's approach to applying and implementing the Code of Practice are detailed in two documents, both approved by E&TCC in July 2018. *“Well-managed Highway*

Infrastructure – Applying the Code of Practice in Kent” records how KCC has adopted the principles set out in the Code of Practice and sets out how these principles are shaping the services we deliver in a way that supports and achieves the County Council’s priorities. *“Well-managed Highway Infrastructure - Implementing the Code of Practice in Kent, 2018-2020”* outlines how we intend implementing the Code of Practice in the delivery of highway maintenance services and how we will measure our success to ensure continuous improvement with a focus on the County Council’s Strategic Outcomes. A third document of asset specific service definitions and risk assessments is due to go to E&TCC for approval in January 2019. Once approved and published, the suite of three Asset Management documents and three Code of Practice documents will, collectively, represent KCC’s approach to *“Managing Kent’s Highway Infrastructure”* and will replace all previous documents.

The three asset management framework documents are integral to and support our approach to implementing the Code of Practice and we will continue to evolve and develop them in line with this guidance. They are all published on the [County Council’s website](#).

Introduction

Our highway network is the most valuable asset we own. It enables safe and reliable journeys and in doing so supports social and economic prosperity. It is also essential for emergency services to execute their work; policing, fire, and emergency response provision all require an effective highway network. The highway network is also critical to the NHS - Emergency medical response as well as transporting patients, medical supplies, equipment and blood etc. These services are a key part of a functioning society and cannot exist without well-maintained highway assets. We are committed to good management of our highway network not only now but also for future generations.

As the Highway Authority, the County Council has legal obligations to keep adopted highway routes available and safe for the passage of the travelling public. Our statutory duties are outlined in several pieces of legislation including:

The Highways Act 1980 - outlines our duty of care to maintain the highway in a safe condition and protect the rights of the travelling public to use the highway.

The Traffic Management Act 2004 - conveys a network management duty whereby we are required to facilitate and secure the efficient movement of traffic on the highway network.

The New Roads & Street Works Act 1991 - requires us to co-ordinate road works and to make best use of the existing network.

The Road Traffic Act 1991 - describes our statutory responsibility to promote road safety and take measures to prevent collisions.

Traffic Signs Regulations and General Directions 2016 - prescribes the design and conditions of use of traffic signs on or near roads in England, Scotland and Wales.

The Construction (Design and Management) Regulations 2015 - details our duties to ensure that the work we do is designed and built competently and that risks to the work force and road users are properly considered and effectively managed. This places controls on how and when works are carried out.

The Equality Act 2010 – created the public equality duty which requires us to have due regard for advancing equality by removing or minimising disadvantage, encouraging participation and taking steps to meet the needs of all people from protected groups where these are different from the needs of other people.

Town and Country Planning Act 1990 – provides planning protection to trees in conservation areas or protected by Tree Preservation Orders (TPOs).

The Wildlife & Countryside Act 1981 – details the environmental legislation that we need to follow to ensure that we minimise our impact on local biodiversity whilst carrying out highway asset maintenance.

Public Nuisance – an action without lawful cause or excuse which causes anger, injures health or damages property.

Asset management has been widely accepted by central and local government as a way of using knowledge and forward planning to manage the highway network efficiently and effectively. We have always taken a largely asset management-based approach to maintaining our highway assets but there are still aspects that we want to develop to further enhance service delivery.

Successful implementation of Our Approach to Asset Management in Highways will deliver the following benefits to Kent:

A service that is shaped by the needs of Kent’s residents, communities, visitors, businesses and public/emergency/health services now and in the future.

The people of Kent will:

- understand our levels of service and investment decisions.
- be assured that the highway network is sustainable and able to meet the needs of future generations.

A service that makes best use of the available resources, maximising efficiency to meet with our legal obligations.

The people of Kent will:

- feel safe and be confident about their personal safety when using the highway network.
- be confident that the journeys they make will be reliable and timely.
- be satisfied that we are maximising the number of assets we repair each year.

A service that is resilient and able to respond to changes and financial challenges.

The people of Kent will:

- see that we are ready to deal with unforeseen events effectively.

Implementing Our Approach to Asset Management in Highways outlines how we will embed asset management principles in the way that we deliver highway services and measure our success to ensure continuous improvement and a focus on the County Council’s Strategic Outcomes.

Background

The County Council is responsible for the maintenance of 5,400 miles (8,700 km) of roads and associated assets. With an estimated value of around £24bnⁱ our highway network is our most valuable asset. Despite significant investment over the years, our highway assets are continuing to deteriorate. An ever-increasing number of repairs, renewals and improvements are required and the countywide maintenance backlog for our roads alone is estimated to be £650mⁱⁱ.

Funding of highway maintenance

Funding of highway maintenance comes from three sources. The majority is through capital grant funding from the Department for Transport (DfT), along with the County Council's revenue budget and capital borrowing. In recent years, significant financial pressures have been masked by the availability of one-off funding streams such as grants for severe weather recovery and pothole repair campaigns. This funding has meant the full impact of reduced revenue support from central government, DfT base budget cuts and the subsequent need for KCC-led savings initiatives has not fully resonated at a time when demands on the highways network are at an all-time high and ever growing.

As overall funding continues to be reduced it is vital that we invest the budget we have in the most effective way we can for the benefit of our customers now and in the future. In recent years, our approach to delivering highway maintenance has evolved dramatically as we have sought innovation and efficiency, undertaken intelligent commissioning and procurement exercises and built productive and positive working relationships with partner organisations. Now changes to the way in which DfT funding is awarded has brought about a requirement to demonstrate that our approach to delivering highway maintenance services is underpinned by sound asset management principles.

The Incentive Fund & Well-managed Highway Infrastructure

Changes to DfT rules for funding highway maintenance have been introduced through its Incentive Fund to encourage local authorities to embed the use of asset management principles into their management of highway maintenance and decision making around funding and priorities. The main aim of the risk-based, integrated asset management approach being encouraged by DfT is to clearly link investment decisions with an understanding of what that means in terms of outcomes and associated risks.

In 2016 a phased implementation of the Incentive Fund commenced. Local authorities are now required to complete annual self-assessment questionnaire which culminates in an overall score of 1 to 3. The completed questionnaire is submitted to DfT and the score achieved determines the level of funding received. By 2020/21, a little over

ⁱ Figure 2017/18 valuation

ⁱⁱ Value from the 2018/19 modelling

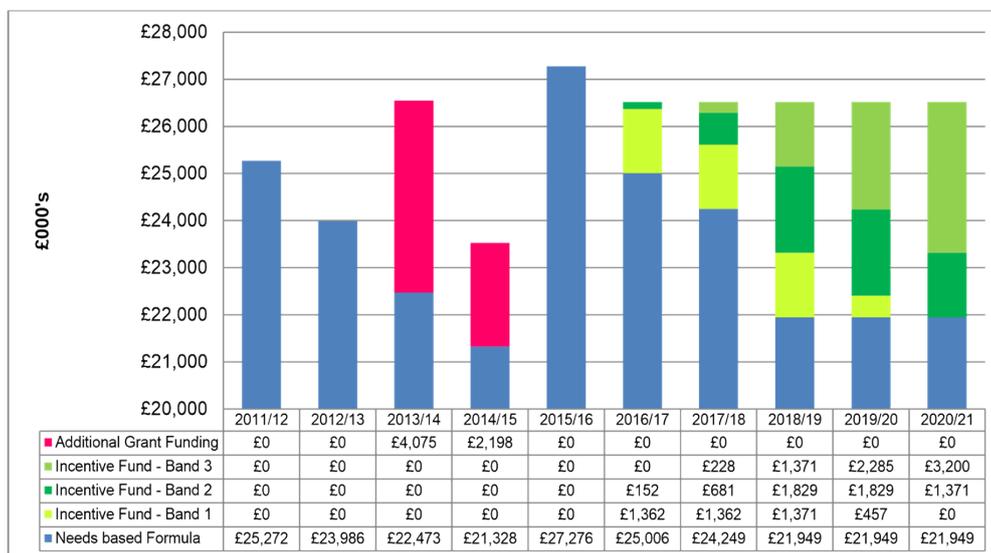
15% of the County Council’s capital maintenance grant will be dependent on the County Council being able to demonstrate that we are practicing good, risk-based asset management.

Reaching Band 3

Good asset management practice has been utilised across the County Council’s highway services to varying degrees for many years. To meet the requirements of the DfT and qualify for the Incentive Fund allocation in its entirety we need to be able to demonstrate the use of good practice is being continually monitored and developed.

During a dry run of the Incentive Fund questionnaire in July 2015, we assessed service delivery in relation to 22 questions covering asset management, resilience, customers, operational delivery, benchmarking and efficiency. Whilst we scored highly in some areas DfT guidance stated that if an Authority scores a Level 1 in any or all of the three questions relating to Asset Management Policy and Strategy, Communications or Lifecycle Planning they will automatically be placed in Band 1 overall.

In January 2016, Kent assessed itself as a Band 1 authority, principally because of the requirement to introduce lifecycle planning for roads. If Kent could not evidence that it had fully adopted the use of asset management methodology and in doing so had progressed to Band 3, it would receive £13m less in Capital funding in the years to 2020/21. This is illustrated in the graph and table below.



A breakdown of KCC's DfT Capital Funding since 2011/12

In January 2016, the County Council’s Environment & Transport Cabinet Committee resolved to support further embedding of asset management principles in our approach to delivering highway maintenance. Throughout 2016 policy, strategy, communications and lifecycle planning for roads and footways were developed to meet with the requirements of Band 2. This work was supported by a Member Task

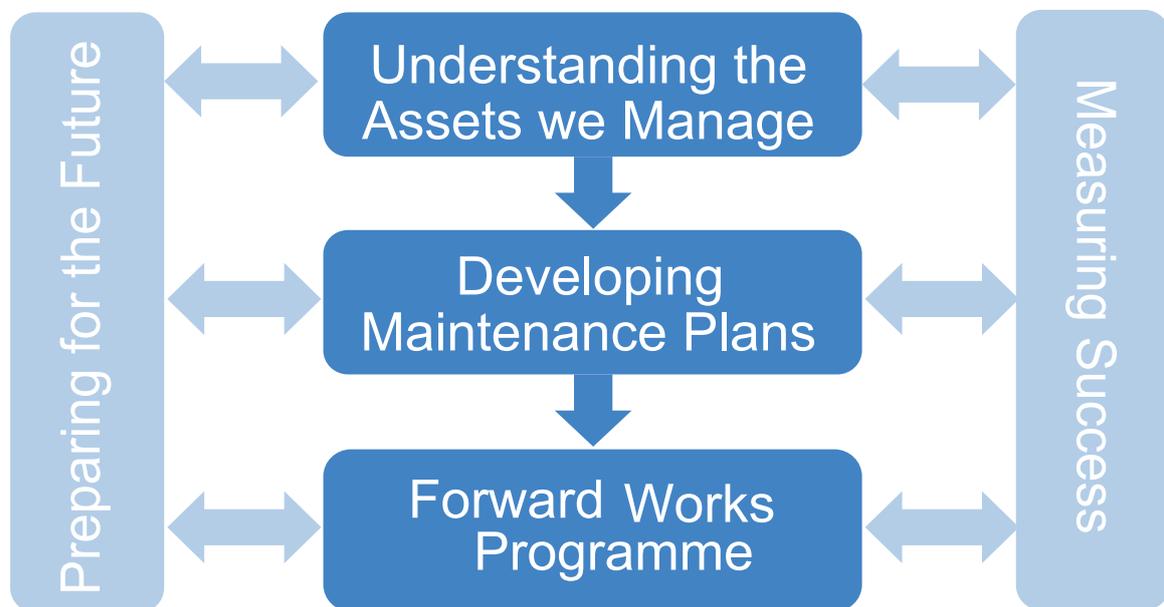
and Finish Group which convened on the 31st March and met regularly throughout the year and resulted in the production of the documents “*Our Approach to Asset Management in Highways*” and “*Implementing Our Approach to Asset Management in Highways 2017/18*”. Adopting the latter enabled the County Council to evidence Band 2 when the Incentive Fund questionnaire was completed for 2017/18.

In 2017 work continued to further develop our approach to asset management in accordance with the requirements of Band 3, prior to the completion of the 2018/19 self-assessment submission. This work particularly focused on *lifecycle planning* for other major asset groups, the development of a *performance management framework* to support the implementation of asset management, the development of an asset management *competence framework* and continued development of the approach to implementing asset management.

This work progressed sufficiently during 2017 to enable us to assess ourselves as having reached Band 3 by January 2018. An assessment later confirmed by the DfT in its allocation of 2018/19 capital funding to local authorities.

The extent to which we have so far implemented asset management principles varies across our asset groups. For some, such as roads and footways, we have comprehensive data, a detailed understanding of the asset lifecycle and the tools needed to model different maintenance strategies and investment scenarios. In these instances, we have been able to begin developing a more sophisticated approach to asset management. In other cases, such as drainage, the information we hold is more limited and although we have a good understanding of the asset lifecycle, we do not as yet have the means to complete detailed modelling of different performance or service levels. In these situations, a more simplistic but equally valid approach has been adopted. The approach taken for each asset group is described in more detail later in this document.

Part 1: Implementing Asset Management Principles in Highways



Understanding The Assets We Manage

The highway network is made up of a diverse range of assets including around 5,400 miles (8,700 km) of roads, more than 2,500 structures, 250,000 roadside drains, 500,000 trees, 120,000 streetlights as well as 4,000 miles (6,400 km) for footways and over 700 traffic lights. The replacement value of these assets is estimated to be in the region of £24 billion.

We understand different assets have different characteristics and so need to be managed differently.

Asset Information

Understanding both our assets and the effect they have on each other is central to effective asset management and informed decision making. We therefore do not consider the asset groups in isolation but as an integrated whole.

The information we need can be broken down into three categories:

Inventory and Condition Information

This data describes the full extent of an asset and can include location, age, size, construction and details of previous maintenance. Examples of how we collect this data include digitalisation of historic records and data collection exercises included as part of routine maintenance works.

Inventory and condition information helps us to plan maintenance activities and communicate with the people of Kent. It also helps us to understand the cost of replacing our assets with equivalent new assets.

Performance Information

This is the data we use to determine whether assets are doing what we need them to do to keep the highway safe, reliable and meeting the needs of Kent's residents, businesses, visitors and local communities. Examples of how we collect this data include; condition surveys, routine inspections and testing, customer enquiries, third party claims, crash records, traffic flows and energy bills.

This data helps us to understand where we need to carry out maintenance activities, where our assets are going to need replacing now or in the future and where we need to think about changing, adding or removing assets. It also helps us to understand the cost of replacing an asset with its modern equivalent, less deductions for all physical deteriorations.

Financial Information

This is the data we use to assess cost. For example, how much it will cost to maintain or replace an asset or how much it will cost to deliver a certain level of service. Our schedule of rates for different maintenance activities is one example of this kind of data.

Collection of Asset Information

We continually collect information about our new, replacement and improved assets. It is important that the data we collect is accurate, reliable and useful but data collection can be expensive. We therefore take a risk-based approach to the collection of information, prioritising high risk assets and information that will support our approach to asset management.

The quality, appropriateness and completeness of our asset data are reviewed regularly by our Asset Managers, as part of the *Asset Information Plan* (AIP), to ensure that it fully supports our approach to asset management.

Storage of Asset Information

We store all collected asset data, for each asset group, in an appropriate asset management system in a cost effective and appropriate format to ensure it is readily available to those that need it. Effective asset management relies on systems that can be used to support decision making at all levels.

Our asset inventory, condition and defect data are currently stored and interpreted in a number of ways.

Asset Group	Systems Used
Roads and Footways	Horizons, Kent Gateway and Works and Asset Management System (WAMS)
Drainage	Works and Asset Management System (WAMS), Map 16
Bridges, Tunnels & Highway Structures	Works and Asset Management System (WAMS) together with a specialist database with details of inspection records.
Street Lighting	Works and Asset Management System (WAMS)
Intelligent Traffic Systems	Information Management for Traffic Control (IMTRAC)
Soft Landscape	Works and Asset Management System (WAMS)
Safety Barriers	Works and Asset Management System (WAMS)
Signs, Unlit Lines & Road Studs	We do not record details of this asset but do undertake regular inspections and respond to customer requests to carry out ad-hoc visits to specific locations.

The systems that we use are also regularly reviewed and monitored by Asset Managers through the *Asset Information Plan*. This enables us to ensure that they are providing reliable information in a format that can be used to inform the delivery of our highway maintenance, renewals and improvements effectively.

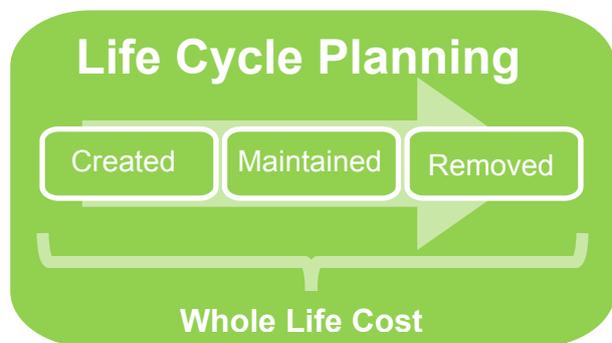
Developing Maintenance Plans

We have a three-step approach to developing maintenance plans for each asset group:

Life Cycle Planning

Firstly, we need to understand the “life cycle” of our assets.

All our assets are created, maintained and eventually replaced or removed. We need to understand what is involved at each stage, when it needs to happen and how much it will cost. If we understand the life cycle of our assets we can calculate the whole life cost i.e. how much the asset will cost to create, maintain throughout its life span and finally decommission. We can also predict the impact of different maintenance strategies and determine whether we can afford them.



Assessing Performance

Secondly, we need to understand whether we are already delivering our



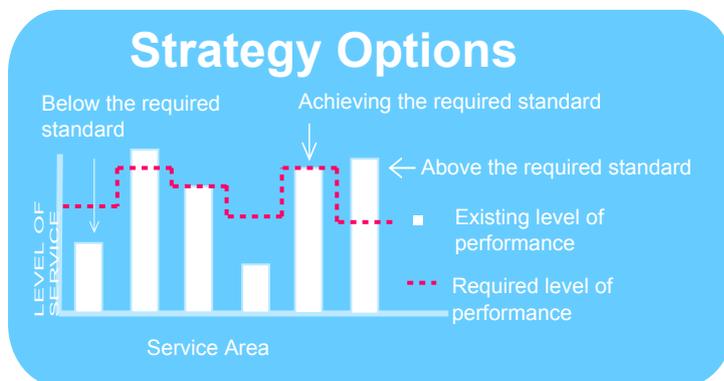
required standard of service or performance.

We can do this by measuring performance at three different levels:

Type of Performance Measure	What are we measuring?	Example
<u>Strategic Performance</u>	A snapshot of overall performance which tells us whether we are delivering the intended benefits or not to the County's residents, businesses, visitors and communities	We want to: Deliver services that are shaped by the needs of the County's residents, businesses, visitors and communities. Strategic Performance Measure: We report key measures to Cabinet and use surveys such as the NHT public satisfaction survey and CQC efficiency network surveys to do this.
<u>Asset Performance</u>	More detailed information that tells us which asset groups are succeeding or failing to deliver the intended benefits to the County's residents, businesses, visitors and communities.	We want to: Deliver services that are shaped by the needs of the County's residents, businesses, visitors and communities. Asset Performance Measure: We use condition data from a variety of asset specific surveys to understand if our assets are performing in accordance with our asset management plans.
<u>Operational Performance</u>	Operational information that tells us why a specific asset group is succeeding or failing to deliver the intended service standards/ benefits to the County's residents, businesses, visitors and communities	We want to: Deliver services that are shaped by the needs of the County's residents, businesses, visitors and communities. Operational Performance Measure: We use monthly measures to ensure we are delivering our published service standards such as "the average time taken to fix a pothole".

Defining a Maintenance Strategy

Finally, once we know where we are and where we want to be we need to decide on our maintenance strategy.



→ **Reduce the level of performance:** If the level of performance exceeds the required standard or is unaffordable it should be reduced. For example, the frequency of maintenance might be reduced or the intervention level might be increased.

- **Sustain the current level of performance:** If the level of performance meets the required standard and is affordable it should be sustained.
- **Enhance the level of performance:** If the level of performance is below the required standard, investment to enhance the performance should be found. For example, the frequency of maintenance might be increased or the intervention level might be reduced.

We must work within the constraints of our budget, particularly during the difficult financial times that this country is currently experiencing, so it is also important to identify the most efficient and affordable way of delivering services.

- **Minimising whole life cost:** When considering different maintenance strategies, it is important to think about the future and keep costs to a minimum for the whole life of the asset. For example, repairing potholes might be cheaper than surface dressing a road in the short term but not if a consequence of this strategy is that the road deteriorates faster and needs to be reconstructed and resurfaced in five years' time.

When required levels of performance are not financially viable it is important that we know the risks and prioritise accordingly:

- **Managing risk:** We need to understand and document the risks associated with different maintenance strategies and manage them effectively. For example, increasing the intervention level for a road pothole from 50mm to 100mm will save money but may increase the safety risk to an unacceptable level.
- **Enhance priority areas of the service:** Where it is not financially viable to enhance the level of performance across all assets within an asset group, key areas should be prioritised. For example, the frequency of maintenance on main roads might be increased whilst the current frequency is maintained or reduced on minor roads.

We publish information about how and when we do maintenance on the [KCC website](#). This lets members of the public see how we look after our assets, the levels of performance they can expect and when the work will be carried out.

Forward Works Programmes

Forward works programmes provide an effective and efficient way of delivering maintenance, repairs and improvements. They enable prioritisation and optimisation of schemes to meet available budgets.

Developing a works programme is a five-stage process:

Identification

Potential schemes may be identified from a range of sources including inspections, surveys, local knowledge, customer enquiries, complaints and wider transport or

corporate objectives. These schemes are collated into an initial works programme for each asset group.

Prioritisation

When prioritising schemes the following things are considered:

- The maintenance hierarchy of the road.
- The safety of road users.
- The impact on the movement of traffic if the asset fails.
- Value for money.
- The cost of bringing forward or delaying works.
- The lifecycle cost of our highway asset.
- The impact on future use of the highway.
- The environmental impact.
- The impact on the community including damage to property or impacts on local businesses.

Selection

The lists of schemes for each asset group are combined, costed and listed in priority order. The “cut off” point is then determined by totalling up the cost to the point where the budget is fully utilised.

Programming & Optimisation

Selected schemes are optimised within the works programme. This is done by coordinating or combining works to minimise both cost and disruption.

Delivery

Finally, a multi-year works programme is confirmed and delivered from the available annual budget.

We publish a lot of information about our programmes of work on the [KCC website](#), so that members of the public can see where and when we plan to do works.

Measuring Success

We are implementing our approach to asset management to deliver the following benefits to Kent:

- A service that is shaped by the needs of Kent’s residents, communities, visitors and businesses now and in the future.
- A service that makes best use of the available resources, maximising efficiency to meet with our legal obligations.
- A service that is resilient and able to respond to changes and financial challenges.

It is important that we record and demonstrate that these benefits are being delivered. We can do so at a number of levels and in a number of ways:

Monitoring Outcomes

We need to ensure that our approach is being implemented as planned and is delivering the intended outcomes. For example, if our maintenance strategy for roads is to ensure that 85% of our main roads are in good or very good condition, we need to carry out condition assessments to determine whether this is being achieved or not.

By routinely monitoring outcomes and reporting on their delivery we can ensure that we remain focused on the needs of Kent's residents, businesses, visitors and communities, meeting with our legal obligations and responding to changes and financial challenges. The delivery of outcomes is reviewed and reported on annually through a number of channels.

Performance Measures and Targets

We use a range of metrics and targets to monitor our performance against our levels of service and determine how well we are delivering the intended benefits to Kent. Examples of these measures and targets include national indicators such as the Bridge Condition Index which measure the overall condition of our assets, the percentage of residents satisfied with street lighting repairs and the number of damage and personal injury claims upheld against the County Council.

By reviewing performance we can ensure that we are continuously improving the way we work. We routinely review the performance of the service, identify areas where performance is not where we would like it to be and understand why this is the case. Having recognised opportunities for improvement, options to address any issues are identified and implemented. Performance is reported on a regular basis to key decision makers, elected representatives and members of the public.

Benchmarking

By comparing our service with the services provided by others, we can identify better ways of working at all levels. For example, we might compare the outcomes we are achieving using asset management with the outcomes other Councils are achieving. Equally we might compare two of our own services, for example residents might be more satisfied with the street lighting service than they are with the drainage service. By comparing the two, lessons can be learnt and improvements can be implemented.

For several years, until 2017, KCC commissioned an annual Highway Tracker Survey to help understand residents' perception of the highway service we deliver. This survey enabled us to compare the satisfaction levels from different parts of the service but being unique to Kent did not allow comparisons to be made with other authorities.

In 2018 KCC joined the National Highway and Transport (NHT) Network, a performance improvement organisation that enables members to measure, share and compare performance in order to identify areas for improvement. This is done through 26 key benchmark indicators (KBIs), divided between six highway and transport themes. Currently around 114 local highway authorities are members of the NHT network.

As well as allowing us to make a year on year comparison of public satisfaction with the service we provide it also enables us to compare the levels of satisfaction with our services to those achieved by other highway authorities. A summary report on the latest surveys can be found on the [KCC website](#)

The NHT Network has also developed a consistent way of measuring and comparing efficiency within and between highway authorities. This is achieved in a balanced and objective way by providing a basis for assessment of performance by combining views of customers, from the NHT Public Satisfaction Survey, with quality and cost data provided by each individual member highway authority. We can then identify and implement service improvements. A summary report on the latest survey can also be found on the [KCC website](#).

Preparing for the future

An Expanding Highway Network

The highway network increases in size year on year and so too do the number of assets we maintain.

Although we are not obliged to adopt new roads, the Highways Act 1980 gives the County Council the power to adopt highways by Agreement. In doing so, we support economic growth and can ensure that the roads and other highway assets constructed are installed to an acceptable standard that will benefit the residents, businesses, local communities and public/emergency/health services. When a new section of highway is adopted, a commuted sum is paid to the County Council for some assets to fund future maintenance.

In some instances, developers choose not to enter into an Agreement with the County Council and these streets remain under private ownership. Equally, if the developer fails to construct the adoptable highway assets to the required standard it will not be adopted.

Climate Change

The Climate Change Act 2008 places obligations on the County Council and others to reduce greenhouse gas emissions and prepare to adapt to longer term climate change. The same Act established an independent statutory body, the Committee on Climate Change to provide advice to the UK. The Committee's latest risk assessment concludes, as expected, that the trend of overall land warming leading to

warmer summers and wetter windier winters will continue, and that this will likely affect transport infrastructure including our roads, drains and structures going forward. The effects of climate change on Kent's highway assets have already been seen during several wet and windy weather events in recent years.

Our longer-term approach to highway asset management will also need to consider what effect climate change may have on investment priorities and lifecycle costs of our highway assets. For example, one of the reasons why road surfaces deteriorate is that ultra-violet light and heat damages bitumen on the surface leading to oxidisation and a loss of strength. As such, we have already started thinking about what that may mean for road surface material specification and road lifecycle cost estimates going forward.

Critical Infrastructure

Critical Infrastructure refers to routes and assets where failure would result in a significant impact to the local, and potentially the national, economy, and affect the ability of public/emergency/health services to carry out their responsibilities. Critical infrastructure assets form a crucial part of the highway network and can be divided into two types. Firstly, the critical infrastructure that we maintain, for example strategic routes such as the Thanet Way. Secondly, the critical infrastructure that others maintain but that is reliant on highway assets, for example Ramsgate Port is heavily reliant on access via the Ramsgate Tunnel. There are many potential risks and threats to the function of critical infrastructure, such as climate change, including impacts from flooding, rising temperature, changing sea levels, high winds and drought.

We need to ensure the adequate management of critical assets, including appropriate investment to ensure that they are sufficiently resilient to cope with potential threats.

We have identified our critical assets and understand both their current performance and the impact of their failure. This knowledge informs our maintenance priorities and investment decisions. The document [“Definition of Kent’s Resilient Highway Network”](#) details not only the critical network in Kent but also how it was derived and how it is treated.

Local Transport Plan 4: Delivering Growth without Gridlock 2016–2031

Highway maintenance and asset management are included in KCC's current Local Transport Plan (LTP4) [‘Delivering Growth without Gridlock 2016-2031’](#). The evidence base for which is the [‘Growth Infrastructure Framework’](#) (GIF), a document developed by KCC in conjunction with the twelve districts and Medway Council to identify infrastructure requirements up to 2031.

LTP4 includes highway maintenance and asset management as a countywide transport priority as it recognises that while it is important to deliver new infrastructure

to keep pace with and sustain the forecast housing and population growth, it is also vital to maintain existing highways assets.

In March 2017, as a sister document to LTP4, Kent adopted its '[Active Travel Strategy](#)', which has the vision to '*make active travel an attractive and realistic choice for short journeys*'. The condition, maintenance and management of existing walking and cycle routes is a central feature of this Strategy and outlines the importance of maintaining highways assets that enable alternatives to travel by motor vehicles.

Part 2: What Our Approach to Asset Management in Highways Means for Each of Our Asset Groups

Overview

Although the complexity of our approach to asset management varies across the asset groups, the same principles have been applied in all areas of the highway service. Details of the approaches taken and modelling employed for each asset group can be found in the sections below and in [“Developing Our Approach to Highway Asset Management”](#).

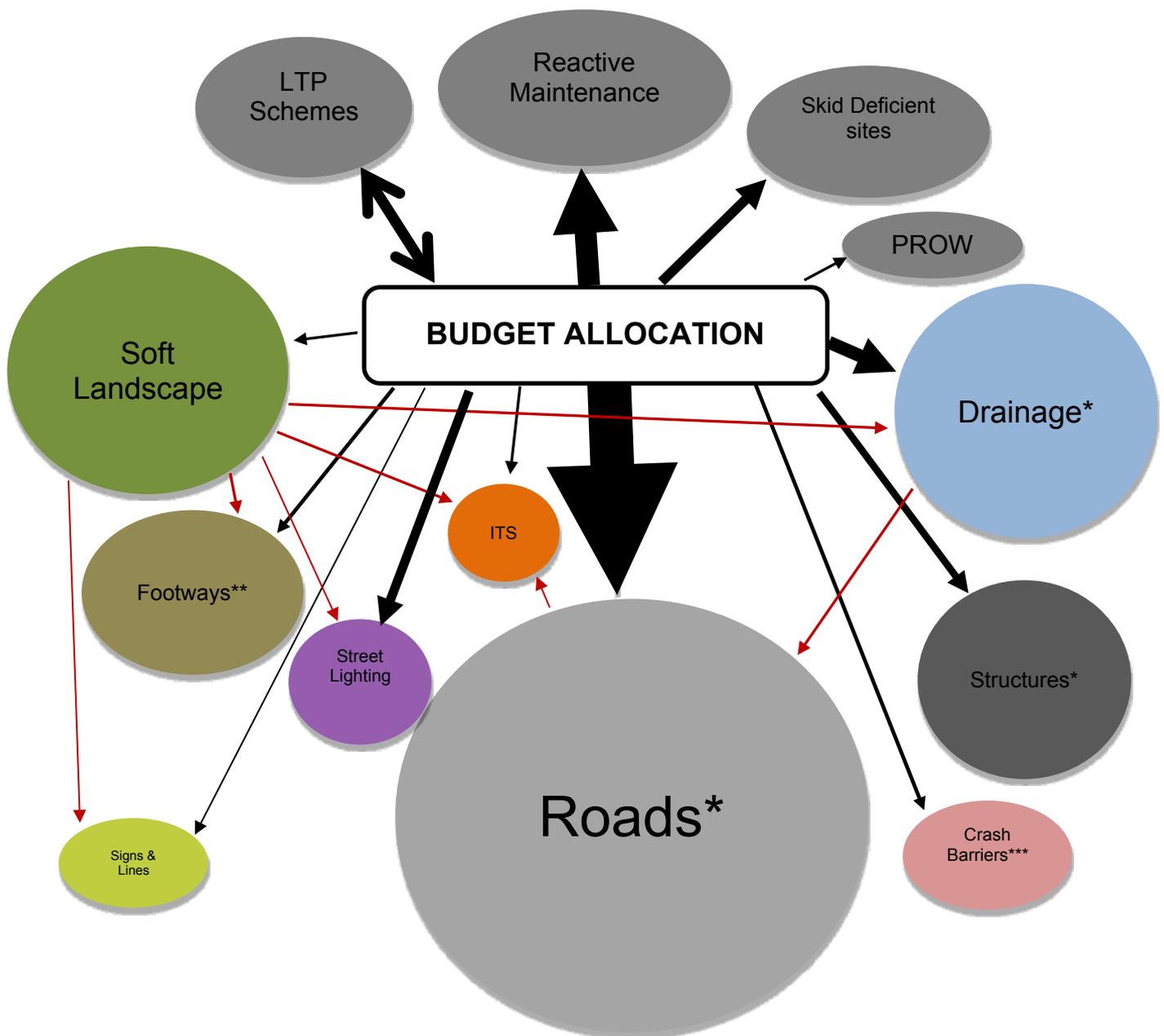
The *“Well-managed Highway Infrastructure – Service Definitions & Service Risk Assessments”* should be read in conjunction with this document which not only defines the service we provide in managing all asset or service areas but also details our statutory obligations, strategic objectives and business priorities for them. Also recorded is the scope of the services provided by each asset groups and a clear statement of what will not be provided with the current level of funding.

The document also includes assessments of the identified risks for each asset or service area along with mitigating actions and assessments of the resulting residual risk. Our maintenance decisions within our approach to asset management have been informed by these assessments.

The Asset

It is important to understand the type, quantity and value (at today’s prices) of the assets we maintain as well as their purpose and the effect their condition has on the condition and performance of other assets. For example, roads are our largest and most valuable asset and by comparison, our bridges, tunnels and highway structures make up a much smaller asset group with a much smaller financial value but they form essential links that connect our roads and footways and are therefore intrinsic to the roads asset fulfilling its purpose.

By understanding the type, quantity, value and purpose of each asset group we can identify key interdependencies and make informed decision about the extent to which we need to develop our approach to asset management in respect to that asset group.



Key Asset Interdependencies

Notes:

- The black lines represent the relative size of the allocation
- The red lines show the interdependencies between asset groups.
- * - includes critical assets on the Resilient Highway Network
- ** - asset with most impact on Equality Act duties
- *** - safety critical asset

The condition and hence maintenance need of any asset is not only influenced by the use it gets but also by its original condition and that of other assets around it.

As can be seen above we consider soft landscaping and drainage have the greatest potential to adversely affect the performance and condition of other highway assets. Both of these are predominantly revenue activities, a funding stream that is supported

by national government and that has seen the most significant budget reductions in the last five years.

Condition Assessments and Inspections

All of our asset groups are subject to condition assessments and inspections. The information collected is used to identify the maintenance and improvement works needed to meet the required service standard and to estimate maintenance backlogs and future investment needs with varying degrees of accuracy.

The frequency and complexity of condition assessments and inspections is determined by the quantity, value and most importantly the criticality of the asset. For example, our road network is our largest highway asset and consequently we invest significant resources into understanding its condition, but we do not take a “one size fits all” approach. We do mechanical condition surveys on our main roads and visual surveys on our minor roads. Similarly, higher risk areas such as high-speed roads and main roads are inspected by our team of Highway Inspectors more often than minor roads because the risk to safety should a defect occur is greater. This principle applies to all of our asset groups with priority given to understanding the condition of our highest risk assets

Prioritisation of Investment

All assets are important, and we have a statutory duty to ensure that the highway is safe. We also endeavour to make sure our road network is resilient and can support economic growth and local communities in Kent. However, we have to work within an overall budget and therefore, during a time of diminishing resources and increasing customer expectations, we need to prioritise investment effectively.

The methodology used to prioritise investment varies between the asset groups but in all cases, the approach to deciding where to spend our money is primarily risk based. Consideration is also given to the extent of the work required, whether or not the existing arrangement is meeting the needs of highway users, the impact on other highway assets and the practicalities of future maintenance.

Finally, having assessed the investment needs for each asset group, we consider this in the wider context of the whole highways service as we endeavour to undertake the right repairs at the right time in the lifecycle of all our assets.

This is how we currently allocate our Capital Maintenance Grant.

Standards of Service or Asset Performance

The accuracy with which we can assess the cost and impact of providing various levels of asset performance or standards of service varies depending on the quality of information and tools available to us. For example, in the case of roads and footways we have excellent condition data, a good understanding of deterioration and the technology to model the impact of differing levels of investment. For drainage, we do not have the same level of information or the modelling capability so a more

simplistic approach based on past experience and engineering judgement has been made.

Historically, our approach to managing the condition of our highway assets has been based on an assessment of the backlog of maintenance, for roads this means an estimate of the value of surfacing schemes that have been identified as a result of our condition surveys. The principle limitation of this approach is that it only provides a snapshot in time; it does not enable local authorities to consider the effect of funding decisions on the whole life cost of assets. For example, a reduction in funding in one year may have the effect of increasing the total cost of maintenance over the life of an asset.

As a result of changes to the way the Department for Transport allocates Capital funding for highway maintenance, an increasing share of funding is now based on local authorities' ability to evidence that they use asset management principles to manage highway maintenance. This includes making decisions based on clearly linking investment to outcomes, service level and risk. For that reason, Kent has introduced lifecycle planning for many asset groups which has improved the accuracy of modelling data and our estimate of backlog.

When determining standards of service and asset performance, we consider up to four options in the context of our statutory obligations, the County Council's Strategic Objectives, customer expectations and the available budget:

Asset Performance or Service Standard Enhancement

An approach that fulfils our statutory obligations and enables the overall condition of the asset group to be enhanced. Interventions such as maintenance, asset renewals and improvements are undertaken on a planned, prioritised basis with a view to increasing the proportion of the asset group in a very good or good condition.

Steady State

A standard of service or asset performance and investment that fulfils our statutory obligations and preserves the overall condition of the asset in its current state. Interventions such as maintenance and asset renewals are undertaken on a planned, prioritised basis with a view to keeping the same proportions of the asset group in a very good, good, poor and very poor condition. Any investment less than this would mean that a steady state condition or existing service could not be achieved.

Asset Performance or Service Standard Reduction

A standard of service or asset performance that fulfils our statutory duties and facilitates a more controlled approach. Interventions such as maintenance and asset renewals are undertaken on a planned, optimised basis.

Statutory Minimum

The minimum standard of service or asset performance that fulfils our statutory duties. Asset condition is allowed to decline with interventions such as maintenance and asset renewals undertaken on a reactive basis if and only if they are necessary to

fulfil our legal obligations. This is an extremely inefficient approach and will cost the authority more over the lifecycle of our assets and therefore cannot be recommended.

Using asset appropriate data with lifecycle and deterioration modelling, we have modelled some of these outcomes and associated required investment levels. The results of this modelling are included in the annually published document; [“Developing our Approach to Asset Management in Highways”](#).

Significant Factors Affecting Maintenance

The number of highway assets in Kent is increasing year on year and we need to be mindful of the significant factors that affect all assets, how we maintain them and how they perform to meet the needs of road users in both the short and longer term. These factors vary between the asset groups and include the materials that are used to construct them, the environment within which they are sited, the actions of third parties and the consequences of climate change.

Roads

The Kent document; *“Well-managed Highway Infrastructure – Service Definitions & Service Risk Assessments”* details the services that can and cannot be provided for the road asset with the current level of funding.

The Road Asset

We have over 5,300 miles (8,760 km) of road in Kent. Of this, around 2,100 miles (3,300 km) are classified and approximately 2,900 miles (4,600 km) are rural. For maintenance purposes the network is split into the following priorities:

- Major Strategic – routes, or parts of routes, linking major urban centres where these are not linked by trunk roads.
- Other Strategic – routes or part of routes, between other urban centres or centres of industry/commerce.
- Locally Important – routes or part of routes, of local importance in distribution of goods or people.
- Minor Roads – all other routes, including estate roads and rural lanes.

In addition to our statutory obligations, strategic objectives and business priorities set out in the *“Well-managed Highways Infrastructure - Service Definition Sheet for Roads”*, the primary objectives of our road assets are to:

- Enable Kent’s people, businesses and visitors to complete vehicular and cycle journeys safely and efficiently, thereby contributing to improving outcomes and opportunities for Kent’s people and businesses,
- Transfer vehicle weights from the road surface through to the underlying ground without deformation of the road surface to maintain road safety and minimise nuisance.

→ Maintain their structural integrity and maximise their lifespan, to provide maximum value for money from investment.

The majority of our roads are of bituminous construction of varying age and specification. However, we also have around 300 miles (480 km) of roads that are either of concrete or covered concrete construction. The majority of our concrete roads, around 275 miles (440 km), are unclassified roads in residential areas.

Condition Assessments and Inspections

We check our roads on a regular basis, using both mechanical and visual means. There are two types of checks, condition surveys and safety inspections.

Condition Surveys

Our condition surveys conform to national standards and are processed using accredited systems. The surveys establish key characteristics of the network including the quality of the journey, tyre grooves (rutting) in the road, the depth of the road's layers and skid resistance.

Safety Inspections

Our team of Highway Inspectors carry out visual checks to make sure the highway assets are in a safe condition. This includes checking for defects in the road surface that present a safety concern. We carry out this kind of check at least once every twelve months.

Reactive inspections are carried out in response to enquiries and generate ad-hoc and emergency works, for example repairing potholes and other surface failures.

Prioritisation of Investment

Investment decisions are made based on a robust understanding of what we will be getting in return in terms of future condition of the asset and lifecycle cost. Data collected from the above processes is used to assess the condition of the entire network and to model and cost suggested maintenance schemes. We also use this data to calculate the percentage of the network requiring maintenance and estimate the backlog of maintenance. Furthermore, we have good data on road deterioration and can use that to estimate future deterioration and maintenance backlogs based on different investment options.

With the funds available for highway maintenance and repair, we prioritise the works we do to ensure the most benefit to Kent's road network. To do this we consider the condition of the road, alongside factors such as the cost of the works, the amount/type of traffic it carries, its importance to Kent's economy and any safety hazards that may be present. When the defects on a road, as measured by our condition surveys, reach pre-determined trigger levels our pavement management system (PMS) allocates the most suitable treatment and ranks maintenance schemes either on a

worst-first or economic basis. This list forms the basis of our forward works programme and by summing the costs of all these treatments we can calculate a maintenance backlog. We can also calculate forecasts of maintenance backlogs for various funding scenarios. The results of this forecasting are published in; [“Developing our Approach to Asset Management in Highways”](#).

The approach that KCC takes when deciding where to invest its finite resource is to use the most appropriate surfacing treatment for the condition and class of road, within the resource available. We also seek where possible to address some local needs through liaison with its District Highway Managers. Budgets are not allocated artificially on a district or regional basis.

Other Significant Factors Affecting Highway Maintenance

The Geology of Kent

Every year in Kent, the County Council has to deal with a number of major failures in roads and footways. These are often caused by underlying geological features such as landslips, deneholes, sink holes and other subsidence and can result in unfunded pressures for the County Council. Kent’s geological make-up is highly variable and therefore failures cannot be predicted.

Road failures can also be caused or exacerbated by damaged utility apparatus. To reduce the financial impact to the County Council all major failures are now managed in a consistent manner so that utility companies are held to account.

Utility Works

Utility companies have statutory rights to lay, maintain and improve their apparatus within our highway network in order to provide water, sewerage, gas, electricity, and telecommunications services to Kent’s residents, visitors, businesses and public services. The County Council’s role as highway authority is to ensure that these works are coordinated and managed in a way that minimises inconvenience and disruption. In line with national guidance Kent also carries out a substantial programme of inspections each year to ensure that our roads are properly reinstated after works have been completed in order to minimise damage to our network. The statutory amount of inspections is 30%, though to improve and sustain the quality of street works and reinstatements in Kent, we check around half of all utility works, with around 97% passing these inspections. We also have an ongoing testing programme looking at the thickness and quality of material used in reinstatements. The pass rate for the tests in Kent has risen steadily to in excess of 80%, compared to a national pass rate of around 60%.

Notwithstanding what we are doing to minimise damage to our network caused by utility works, any works which involve cutting into an unbroken and otherwise sound road surface, even if carried out to a high standard, will affect a road’s structural integrity. This will accelerate its deterioration and shorten its life, resulting in the need for premature maintenance which increases the pressure on highway budgets. It

should also be recognised that many of the highway maintenance issues linked to utility works relate to reinstatements carried out many years ago.

Maintenance Backlog

Most commentators will accept that investment in local roads throughout the country has been insufficient for decades. The rate at which local roads are deteriorating exceeds the rate of investment and is a constant theme of published industry and Government reports. An industry report published in March 2018 estimated the cost of bringing local roads in England and Wales up to scratch at £9.6m and would take 14 years to complete.

Bridges, Tunnels & Highway Structures

The Kent document; *“Well-managed Highway Infrastructure – Service Definitions & Service Risk Assessments”* details the services that can and cannot be provided for this asset group with the current level of funding.

The Bridges, Tunnels & Highway Structures Asset

This asset group includes around 1,500 bridges, 300 retaining walls, 670 culverts, 2 tunnels and nearly 200 special structures.

Bridges and other highway structures form essential links in the highway network; their purpose is to connect roads and footways to facilitate safe and efficient travel around the County.

Condition Assessments and Inspections

There are two types of checks, planned inspections and reactive inspections.

Planned Inspections

Planned inspections are carried out as part of our cyclical maintenance regime:

- **General Inspections:** Visual inspection of the asset based on a two-year rolling programme.
- **Principal Inspections:** Very detailed inspection of the asset based on a twelve-year rolling programme.
- **Underwater Inspections:** Annual inspection of those bridges which are sensitive to scour action.
- **Trackside Inspections:** Biennial inspection of our structures that cross Network Rail lines.
- **Boat Inspections:** Biennial inspection of our structures that require access via a boat. These inspections are done alternately with Trackside Inspections.

The result of these inspections is captured in our database and this data is analysed to determine the condition of each individual asset and the overall condition of the asset stock. This information is used to identify the maintenance and repair works required for each individual structure and creates the forward programme.

Reactive Inspections

Reactive inspections are carried out in response to enquiries and generate ad hoc and emergency works, for example repairs to brickwork and parapets.

Prioritisation of Investment

We take a risk-based approach to deciding where to invest our money and the information we have about bridges, tunnels and highway structures helps us to do this. Some of the things we consider include the following:

- Where is the defect?
 - Is a “critical element” (a part of the asset that is vital to its structural integrity) affected?
- What is the risk to highway users?
 - Does the structure carry/support a high-speed road, main road, minor road or footway?
 - Does the structure span a high-speed road, main road, minor road or footway?
 - Does the structure carry high volumes of traffic?
 - Are there suitable alternative routes if the structure fails?
- What is the risk to third party assets?
 - Does the structure support or span a railway, river, watercourse or other third-party asset?
 - Is access to critical infrastructure such as powers stations or hospitals affected?

Investment is prioritised where the risk is highest.

We also consider how to invest our budget which is done by knowing what condition our assets are in. This enables us to determine how much work is needed to restore them and whether it is more cost effective to replace them completely. In many cases we can protect our bridges, tunnels and highway structures and maximise their lifespan by cleaning, painting and waterproofing them. This work requires a commitment to repeat investment but can save more significant costs in the longer term. Nevertheless, in some instances the asset has been damaged beyond repair or simply reached the end of its useful life. In these instances, renewal is the only option.

Finally, we need to consider our investment in the wider context of the highways service.

Having assessed each site, we are able to collate a prioritised list of works.

Maintenance Backlog

Although we have condition information on all our highway structures that informs the programme of maintenance works, the modelling we are currently able to undertake

for this asset group is at the strategic level only. This modelling, based on the overall condition of asset as determined by the whole government accounts process, provides us with information that informs the budget allocation process across all highway asset groups. However, it provides no information at the operational, individual bridge, level and is therefore unable to calculate or predict maintenance backlogs.

Future Management of the Structures Asset

Following a review of both the data held on this asset and the processes employed in its management, we recognised that due to the complexity of the individual elements of this asset group, the processes and software we are using are no longer fit for purpose. Having determined what is required, a new structures management system has been procured that will also provide information at an operational level.

The new structures management system called AMX (Asset Management eXpert for Bridges and Structures) is being implemented and going forward it will enable us to model the budgetary requirements or condition outcomes for a number of scenarios, as we currently do for roads and footways. The results of this modelling will be published annually in; *“Developing our Approach to Asset Management in Highways”*.

As well as enabling us to undertake deterioration modelling the new SMS will also allow us to robustly calculate the maintenance backlog.

Drainage

The Kent document; *“Well-managed Highway Infrastructure – Service Definitions & Service Risk Assessments”* details the services that can and cannot be provided by this asset group with the current level of funding.

The Drainage Asset

The drainage asset includes around 250,000 roadside drains, 250 ponds and lagoons, 25 pumping stations and 8,500 soakaways. Its primary objectives are:

- Removal of highway surface water (from our roads) to maintain road safety and minimise nuisance,
- Effective sub-surface drainage to prevent damage to the structural integrity of the highway and maximise its lifespan, and
- Minimise the impact of highway surface water on the adjacent environment, including properties.

The number of drainage assets in Kent is currently increasing each year due to new housing and business developments.

Condition Assessments and Inspections

There are two types of checks carried out on the drainage system; planned inspections and reactive inspections.

Planned Inspections

Planned inspections include highway safety inspections and condition checks carried out as part of our cyclical maintenance regime:

- Our team of Highway Inspectors carry out visual checks to make sure that highway assets are in a safe condition. This includes checking that drain covers are not broken or missing. We carry out this kind of check at least once every twelve months.
- Our drainage cleansing crews look at the condition of the drains on main roads and test each one by filling it with water and checking that it is able to flow away. We carry out these kinds of checks at least once every twelve months.
- Our pumping stations are serviced annually to check they are working properly and ensure that any faults or damage are repaired quickly.

We do not undertake planned inspections on our other drainage assets (underground pipes, culverts, soakaways, ponds, lagoon and ditches). These are all checked on a reactive basis.

Reactive Inspections

Reactive inspections are carried out in response to enquiries and generate ad hoc and emergency works. For example, cleaning blocked drains that are causing the road to flood and repairing collapsed road drains. They may also result in us serving notice under the Highways Act 1980 requesting the landowner maintain their ditch or prevent water flowing from their land onto the highway. Where this is not completed in the required time we may undertake the work and seek to recover the costs from the landowner.

Prioritisation of Investment

As with all of our assets, we take a risk-based approach to deciding where to invest our money and some of the things we consider for this asset group include:

- What is the risk to road users if the road floods?
 - Is the road a high-speed road, a main road, an estate road or a country lane?
 - Is the road used by high volumes of traffic?
 - Does the road layout affect the risk for example; is the flooding on a blind bend?
 - Does the speed of traffic affect the risk?
- How much disruption is caused if the road floods?
 - Is the road a high-speed road, a main road, an estate road or a country lane?
 - Is the road used by high volumes of traffic?
 - Are there suitable alternative routes available to road users?
 - Is access to critical infrastructure such as powers stations or hospitals affected?

- How are homes and businesses affected by the flooding?
- Are buildings internally flooded?
 - Are businesses prevented from operating?

Investment is prioritised where the risk is highest.

We then consider how to invest our budget.

It is also important to understand whether or not our assets are doing their job effectively and the practicalities of maintenance in both the short and longer term. If an asset is in the wrong place or is the wrong size there is no point simply patching it up or replacing it like for like. We also endeavour to undertake the right repairs at the right time in the lifecycle of our drainage assets

Having assessed each site, we collate a prioritised list of works which are included in the forward works programmes.

We do not undertake works to mitigate nuisance factors. We prioritise works at locations where highway surface water presents a risk to highway safety or a risk of internal flooding to inhabited areas of property.

Other Significant Factors affecting Drainage Maintenance

Damaged and Ageing Infrastructure

Much of the County's drainage infrastructure was installed when the roads were originally constructed, some of which date back to late 1800s/early 1900s. Over time settlement, ingress of tree roots and roadworks by third parties has caused widespread damage. Years of underinvestment have exacerbated this problem.

Limited Capacity

In recent years prolonged and heavy rainfall events appear to have become a more frequent occurrence. Development and changes in land use have also resulted in increased volumes of surface water being discharged into the drainage system which is designed to cope with moderate to heavy rainfall. In many places the sewers are now running at capacity.

Where capacity is insufficient the only options are to divert the highway drainage elsewhere or install an entirely new, larger system. This requires significant investment and in the past cost had tended to make this kind of scheme unaffordable. Instead, the impact of flooding has been managed by installing permanent warning signs, increasing the height of kerbs and re-profiling the road to divert water away from properties.

Reliance on Third Party Infrastructure

In many places the highway is drained into public sewers, which are owned and maintained by the Sewerage Authority, or privately-owned third-party assets such as ditches or ponds. In these instances the County Council's influence over maintenance regimes and improvements is limited.

Land Drainage

Water being discharged from adjacent land onto the road is also becoming an increasingly common cause of highway flooding. A more stringent enforcement process utilising our Highways Act powers has been developed. However, to date the vast majority of cases have been resolved via constructive discussion with the land owner.

Reductions in other services

A frequent cause of highway flooding is debris obstructing drain covers, particularly during autumn and winter. The need for financial savings has necessitated reductions in services such as street sweeping, delivered by District and Borough Councils, and soft landscaping services. These have resulted in increased debris collecting on the highway and finding its way to the roadside drains.

Maintenance Backlog

Although we have a good understanding of the lifecycle of drainage assets the data we have for this asset group is more limited than that for roads or bridges. We therefore do not currently have the means to complete detailed modelling or to determine the maintenance backlog. However, based on engineering judgement and some broad assumptions drawn from defect data and enquiry volumes we have calculated a current condition profile for this asset. This profile is included in the annually published [“Developing our Approach to Asset Management”](#).

Future Management of the Drainage Asset

We do not consider the approach taken to determine the current condition profile of the drainage asset is suitable to allow us to forecast the outcomes of various funding scenarios. However we are investigating a range of available tools and methods to allow us to do this in the future.

Crash Barriers (Vehicle Restrain Systems [VRS])

The Kent document; *“Well-managed Highway Infrastructure – Service Definitions & Service Risk Assessments”* details the services that can and cannot be provided by this asset group with the current level of funding.

The VRS Asset

This asset group includes around 230 km of barriers and is an important element in maintaining the safety of Kent’s highway network for road users.

Objects on or next to the road can present a significant hazard to the road user and there is a clear need to ensure that they are reasonably protected. Examples of such objects would be structures, large signs, lamp posts, or where there is a large difference in level near to the road edge.

Condition Assessments and Inspections

There are two types of checks, planned inspections and reactive inspections.

Planned Inspections

Planned inspections include general highway safety inspections and are carried out as part of our cyclical maintenance regime:

- Our team of Highway Inspectors carry out **visual checks** to make sure the highway assets are in a safe condition. This includes visually checking that barrier components are not broken or missing. We carry out this kind of check at least once every twelve months.
- Our Highway Structures team carry out **cyclic inspections** of highway structures and inspect crash barrier which is adjacent to the structure for the purpose of the protection of that structure.
- Our Contractor undertakes five yearly **principal inspections** of the crash barriers on A and B roads. This information is collated and barriers graded from one to five for priority repair.

Reactive Inspections

Reactive inspections are carried out in response to enquiries and generate ad hoc and emergency works orders for repair. These enquiries may be initiated by colleagues within partner organisations such the Police or District Councils and also from members of the general public.

Prioritisation of Investment

When deciding where to spend our money we think about the risks posed to the road users and residents, including:

- If the crash barrier fails, does it create a hazard to road users? and
- If the barrier is breached, is there likely to be a secondary event, i.e. a river another road or railway?

We also consider

- The type of road, for example, whether it is a high-speed road, a main road, an estate road or a country lane.
- The amount of traffic that uses the road, for example is it a main route in and out of a town or is it a minor road only used by a handful of drivers each day?
- The existing collision history of the road.
- The impact if the road is closed, for example, the road might only be used by a handful of people but it may be the only route to get to their homes.

By knowing what condition our assets are in we can then determine how much work is needed to restore them and whether it is more cost effective to replace them completely. It is also important we understand whether or not our assets are doing their job effectively as there is no point simply patching something up if it is in the wrong place or of the wrong size.

We assess each site using a risk-based approach and have a prioritised list of improvements. This is compared with the lists for other asset groups and is used to allocate budgets and compile forward works programmes.

Other Significant Factors affecting Crash Barrier Maintenance

Proportion of asset at end of life

The crash barrier asset has not been asset managed for some time and as a result a significant proportion of it is considered to be at the end of its life (twenty years). Although sections are replaced after crash damage, condition surveys carried out on the A and B road network suggests that some of the asset could be in excess of 45 years of age.

RTC damage and non-recoverable costs

Damage by third parties accounts for the majority of reactive repairs. It is becoming increasingly difficult to recover costs from third parties especially as in most cases crash barrier keeps errant vehicles on the carriageway and drivers are able to leave the site without police involvement.

Vegetation and inspection

Budget driven reductions in the level of vegetation clearance has resulted in less crash barrier defects being identified as part of driven safety inspections as the barriers are often significantly covered.

High Speed Roads

The most critical crash barriers are on the high-speed road network. This network is difficult to access without creating local congestion. It can also be costly. Kent operate an annual High-Speed Road programme as a series of planned closures to undertake works on this part of the network, however each closure offers limited time to undertake any significant repairs.

Maintenance Backlog

It is estimated that the lack of maintenance investment in this asset has resulted in over 12% of the asset needing total replacement within two years.

Future Management of the Crash Barrier Asset

We recognise that until recently there has been limited management, including condition surveying of crash barriers. We have therefore initiated a new survey regime and are exploring tools available to help us improve the management of this asset. Current and future improvements to the management of this asset are included in the document; [“Developing our Approach to Asset Management in Highways”](#).

When we have the data and tools in place we will be carrying out the same analysis as other asset groups. This will enable us to more robustly determine the maintenance backlog, the effect on asset condition of various funding scenarios and enable us to

produce an evidence based forward works programme. The results of this work will also be included in; [“Developing our Approach to Asset Management in Highways”](#).

Footways

The Kent document; *“Well-managed Highway Infrastructure – Service Definitions & Service Risk Assessments”* details the services that can and cannot be provided by this asset group with the current level of funding.

The Footway Asset

This asset groups comprises nearly 4,000 miles (6,400 km) of footway, nearly 300 miles (500 km) of which is classified as high usage. It does not include Public Rights of Way (PRoW), which are managed separately.

The primary objectives of this asset are to:

- Enable Kent’s people, businesses and visitors to travel the County on foot safely and efficiently, thereby contributing to improving outcomes and opportunities for Kent’s people and businesses,
- Withstand normal footway usage by foot or by vehicle (via appropriately constructed vehicle crossings) by transferring loads through to underlying ground without deformation of the surface, to maintain safety and minimise nuisance.
- Maintain their structural integrity and maximise their lifespan, to provide maximum value for money from investment.

The majority (86%) of our footways are of bituminous construction of varying age and specification. However, we also have footways that have slab (8%), block paving (4%) and concrete (2%) surfaces.

The footway asset group has recently been extended to include “off-road cycleways”. These pavements are those cycleways that whilst being appropriately constructed for the purpose do not adjoin a carriageway or footway section. The condition assessment and inspection criteria for these sections of our network are currently being developed.

Condition Assessments and Inspections

Condition Surveys

Our footway network is a substantial highway asset and consequently we invest significant resource into understanding its condition and likely future deterioration. We inspect our footways on a regular basis and have introduced a regime to survey their condition, along similar lines to the way we do for roads.

To confidently deliver efficient asset management, enabling timely intervention and accurate data, Kent County Council carry out annual Footway Maintenance Surveys (FMS) which have been developed over the last few years. The data collection

methodology conforms to national standards and the data is processed using accredited systems. This data is used to assess the condition of the entire network and to model and cost suggested maintenance schemes. We also use this data to calculate the percentage of the network requiring maintenance and estimate the maintenance backlog.

Safety Inspections

In addition to the condition surveys we also carry out safety inspections.

- Our team of Highway Inspectors carry out visual checks to make sure the highway assets are in a safe condition. This includes checking for defects in the footway surface that present a safety concern. We carry out this kind of check at various frequencies dependant on the nature of the section of footway concerned. These frequencies could be either monthly, quarterly or annually.
- Reactive inspections are carried out in response to enquiries from the public or other stakeholders and generate ad-hoc and emergency works, for example repairing footway potholes and other surface failures.

Prioritisation of Investment

As well as our statutory duty to ensure our footways are safe we also need to maintain the confidence and positive perceptions of the travelling public using our asset. We are currently facing an increasing need to ensure our footway network is maintained to protect against insurance claims resulting from injuries or damage caused by incidents on our network.

We prioritise high usage footways and cycleways which helps us to deliver our active travel strategy. Going forward we will be targetting resource on areas with larger populations of older and disabled people to ensure that they are not disproportionately affected by a deteriorating asset condition.

To ensure the most benefit to Kent's footway network our engineers assess and verify identified schemes to prioritise work based on usage and the type of defects that are present. We also seek, where possible, to address some local needs through liaison with its District Highway Managers.

Budgets are not allocated on a district or regional basis.

Other Significant Factors affecting Footway Maintenance

Parking

Our substantial footway network is increasingly becoming a concern in maintenance terms, principally because of parking and vehicle over-run issues. This particularly affects older residential urban areas that were not designed to accommodate the number of vehicles per household that is now typical. The narrow nature of many of these locations does lead to residents parking either wholly or partly on the footway.

It should be noted that footways generally deteriorate at a slower rate than roads, primarily because vehicles are not normally travelling on them. The consequences of poor maintenance are often less pronounced than those for roads. The principle risk on footways is from trip hazards, particularly in high footfall locations. However, where vehicles do regularly park on or traverse our footways even small defects can escalate quickly. This both increases the replacement costs and shortens the life of the asset.

Maintenance Backlog

In general terms, investment in planned footway maintenance has fallen behind that for roads. That is principally because we have not previously had sufficient condition data to inform investment decisions, but also because road maintenance has understandably been prioritised given that the safety implications of not maintaining roads is much more significant than that for footways.

However, we re-introduced footway condition surveys a few years ago and now better understand the condition of this asset group. Furthermore, we have introduced lifecycle planning for footways and this has improved the accuracy of data modelling and our estimate of backlog. Using data from our condition surveys with lifecycle and deterioration modelling, we have modelled outcomes for various investment levels. The results of this modelling are included in; [“Developing our Approach to Asset Management in Highways”](#).

Street Lighting

The Kent document; *“Well-managed Highway Infrastructure – Service Definitions & Service Risk Assessments”* details the services that can and cannot be provided by the street lighting asset group with the current level of funding.

The Street Lighting Asset

Street lighting assets form a highly visible and vital part of the streetscape. Whilst there is no legal requirement to provide street lighting, it is considered important in enabling the safe use of the highway for road users and pedestrians and also helps to promote strong and safe communities. Currently this asset group includes around 120,000 street lights, over 17,500 lit signs and more than 4,500 lit bollards as well as Belisha beacons, centre island beacons and school warning signs.

This asset base is increasing by approximately 2-3% annually through new developments and improvements to the existing road network.

To ensure we keep control of energy consumption and carbon emissions we constantly assess our asset and look to remove surplus lights where they are no longer required. We also look to apply adaptive lighting which defines the operation of lighting at different levels during periods of darkness. This may include adjusting lighting class based upon highway use at certain times of the night (dimming), trimming or part night lighting.

Our objective is to provide the most efficient lighting solution possible to promote the concept of 'right light in the right place at the right time'.

Condition Assessments and Inspections

Where street lighting is provided, the County Council must take reasonable action to ensure that lighting assets do not pose a risk to the highway user. There are two types of checks: planned inspections and reactive inspections.

Planned Inspections

Planned inspections include structural and electrical testing and night patrols:

- **Structural testing** is carried out by specialist contractors at no more than twelve yearly intervals. Testing is programmed on the basis of the previous structural test result.
- **Electrical testing** is carried out by specialist contractors every six years.
- **Night patrols** are visual checks to see that street lighting assets on main routes are operational and safe. They are carried out on a monthly basis.

The results of these inspections are captured in our asset management system and the data analysed to determine the condition of the asset stock. This information is used to identify the maintenance and repair works required for each individual asset.

Reactive Inspections

Reactive inspections are carried out in response to enquiries and emergencies and generate ad hoc works, for example lantern bollard replacements. Every time the asset is visited under these circumstances, a visual survey is carried out and information about its condition is reported back.

Prioritisation of Investment

When deciding where to spend our money, we think about the risk to road users and residents and if there is still a requirement for the asset:

- If the asset fails will it create a hazard to road users or residents?
- If the asset fails will it cause a lot of disruption?
- Is the existing asset energy efficient?
- Is the existing asset still needed?
- Does the existing lit sign or bollard still need to be lit?

We prioritise works at locations where there is a risk to safety and do not undertake works to mitigate nuisance factors.

We also consider where the risk to road users and residents is the highest by thinking about the following:

- The type of road, for example, whether it is a high-speed road, a main road, an estate road or a country lane.

- The amount of traffic that uses the road at night time. For example is it a main route in and out of a town or is it a minor road only used by a handful of drivers each night?
- The impact if the road is closed. For example, the road might only be used by a handful of people but it may be the only route to get to their homes.
- Road safety statistics
- Requirements of the Traffic Signs Regulations and General Directions (TSRGD) 2016.

We refer to the Institution of Lighting Professional's 'Technical Report 22: Managing a Vital Asset' for guidance on the timescales for the replacement of columns following structural testing and use this testing to plan replacement of those columns most at risk of failing.

Finally, we think about the ongoing and future maintenance of the asset. A bespoke style of street light will be no good if future maintenance and planned inspections are not practicable. We therefore try to standardise on materials used and encourage third parties, such as developers, to use our approved materials. Approved materials now include a suite of LED luminaires which will reduce future maintenance and energy costs.

Using data from the structural testing programme combined with lifecycle and deterioration modelling, we forecast the number of assets likely to need replacement each year for the next ten years. We also calculate the budget required to meet these forecasts. The results of this modelling are included in; ["Developing our Approach to Asset Management in Highways"](#). We assess each site using this risk-based approach and have a prioritised list of improvements which is used when allocating budgets and compiling the forward works programmes.

Other Significant Factors affecting Street Lighting Maintenance

Ageing Infrastructure

Our robust structural testing programme resulted in the provision of additional capital funding for the replacement of life expired steel street lights in the three years to 2016. This enabled Kent to make sure that this type of street light now poses a low risk of failure. However, the on-going programme of testing will identify further steel assets which will require replacing. Based on the industry average it is anticipated that every year a minimum of 1,200 steel street lights will need replacing following their programmed structural re-test. The cost of replacing these is estimated at £1.56m per year (2018 rates).

The focus on steel assets had been to the detriment of concrete street lights which received no funding in the three years to 2016. Apart from the significant danger to road users if a concrete column were to suddenly fail, the lanterns on these columns cannot be replaced which in turn meant they could not be converted to LED under the

conversion project. We are currently implementing a plan to replace all concrete columns so they can be converted to LED.

Following a recent review of our testing programmes, the scope of the structural testing was extended and now includes non-column assets (illuminated signs, Belisha beacons, refuge beacons and pole mounted lights). Previously there was no information on these assets and they were maintained on a reactive basis.

Energy and Carbon Emissions

The cost of energy is the subject of concern for all lighting authorities. Whilst increases in the cost of energy have steadied in recent years, the future is not predictable. In addition, the introduction of the CRC Energy Efficiency Scheme has added to the financial pressure surrounding street lighting.

The County Council has taken measures to reduce the impact of these by introducing LED technology. By 2019, all County owned street lights will be converted to LED thus significantly reducing energy costs and carbon emissions. The project incorporates a central management system which enables actual energy consumption to be monitored and the County Council will no longer pay energy based on unmetered supply calculations. This project covers the conversion of lanterns only, and the structural testing and replacement programme will need to continue.

Non-recoverable damage by third parties.

Damage by third parties is very common place and recovery of costs is an increasing challenge. Damage to a street light as a result of an RTC (road traffic collision) frequently results in significant damage to the vehicle involved which means there is often the opportunity to recharge the cost of replacement. However, this is not the case for lit signs and bollards. The street lighting team spends in excess of £200,000 per year on replacing these assets that have been damaged by third parties.

Adoption of assets

Whilst the County Council owns most of the street lights in Kent there are approximately 10,000 additional ones which are owned by District, Parish and Town Councils. These assets are typically in a poor condition, not having benefitted from a planned inspection regime or replacement programme. There is an increasing appetite from these Councils for the County Council to adopt these lights which, if progressed, will add to the financial pressure to ensure that the assets are in an appropriate condition.

Maintenance Backlog

The calculation of the maintenance backlog for the street lighting assets is different to some other highway assets, such as roads and footways. The latter will continue to operate safely in a deteriorated state and it is possible to apply differing levels of treatment at various stages of deterioration to restore the condition of the road and extend its life, without the need for total replacement. This isn't the case with street lighting assets. While there are a limited number of preventative treatments that we

can apply, such as painting, there are no treatments to improve their structural integrity. To ensure the safety of road users, once an asset has been deemed structurally unsound it must be removed. This could either be permanently or by being replaced with a new asset, depending on the available budget. Similarly, replacing the asset before it nears this end of life condition is undesirable as it's full value will not be realised.

Although it would be possible to have a backlog of columns in need of replacement following completion of the annual structural testing programme, we do not let this happen on safety grounds. If future budgets are insufficient to replace all of these assets each year we will need to implement a programme of permanent asset removal to fulfil our duties under the highways act of maintaining the network in a safe condition.

Intelligent Traffic Systems (ITS)

The Kent document; *“Well-managed Highway Infrastructure – Service Definitions & Service Risk Assessments”* details the services that can and cannot be provided by this asset group with the current level of funding.

The ITS Asset

The purpose of ITS assets is to monitor, manage and control vehicle movements on the highway network. This asset currently comprises around 330 signalled junctions, 370 signalled crossings, 120 CCTV cameras and over 500 other interactive warning, real time information and message signs. The number of ITS assets is currently increasing annually due to new housing and business developments as well as third party requests for safety reasons.

Condition Assessments and Inspections

There are two types of checks, planned inspections and reactive inspections.

Planned Inspections

Planned inspections include highway safety inspections and condition checks carried out as part of our cyclical maintenance regime:

- Our teams carry out **visual checks** to make sure the ITS assets are in a safe condition. This includes checking that interactive warning signs are facing the correct direction and pedestrian crossing push buttons are working. We carry out this kind of check at least once every four months.
- Our term maintenance contractor carries out an **electrical safety test** of all ITS assets once every twelve months.

Reactive Inspections

Reactive inspections are carried out in response to enquiries and generate ad hoc and emergency works, for example replacement of traffic lights damaged by third parties during a road traffic crash or modifications to signal timing plans.

Prioritisation of Investment

When deciding where to spend our money, we think about the risk that system failures pose to road users and residents, including:

- What do we need to do to make sure that the ITS equipment does not fail?
- If it fails, does it create a hazard to road users?
- If it fails, does it cause congestion/disruption?

We also consider:

- The type of road, for example, whether it is a high-speed road, a main road, an estate road or a country lane and the risk presented by the volume of conflicting traffic movements.
- The amount of traffic that uses the road, for example is it a main route in and out of a town or is it a minor road only used by a handful of drivers each day?
- The impact if the road is closed, for example, the road might only be used by a handful of people but it may also be the only route to get to their homes.
- The number of pedestrians affected, for example, if the traffic signal crossings fail is there an alternative safe route?

When deciding which assets need repair or replacement, fault rates as well as asset condition and age are taken into consideration. It is also important we understand whether or not the asset is doing its job effectively. By considering all of this information we can then determine how much work is needed to repair the asset and whether or not it will be more cost effective to replace it completely.

We regularly manage issues through our fault management system. These range from significant congestion problems affecting busy roads to faulty interactive warning signs that fail to remind drivers of excessive speed.

Whilst we know we need to react and fix dangerous situations quickly, this is not a cost-effective way of working as we have to send engineers specifically to these locations and more time is spent travelling rather than fixing. We can clearly get more done for our budget if we plan the work that needs to be done.

Other Significant Factors affecting ITS Maintenance

Ageing Infrastructure

As technology progresses, older equipment becomes obsolete and no longer supported by the manufacturer. Some components can be repaired which will prolong the effective life of the asset. As sites are refurbished any re-usable equipment is made available for use in routine maintenance.

Limited Capacity

With the increase in population there are additional demands on the network. Often changes are made to existing assets which impact on the efficiency and capacity of the junctions. Where there is a significant impact on the network there are sometimes

possibilities to mitigate them by changing the method of operation. However, with multiple developments in a small area, consideration is also given to effects on the whole transportation system with the possibility of greater contributions to increase capacity.

Reliance on Third Party Infrastructure

The ITS asset can have equipment that is installed within an asset maintained by a team other than the ITS team. For example, detector loops in the road surface. When these ITS assets fail, alternatives are considered but it is not always possible to reinstate them separate to another asset group.

External Factors

There are short notice demands made of the ITS team from external third parties which can potentially divert valuable resources and disrupt their long-term maintenance plan. When considering third party requests for equipment such as interactive warning signs, these will be assessed based on their safety benefits and likely whole lifecycle costs. This may result in some proposals being rejected and alternative physical mitigation or engineering solutions being promoted.

Specialist materials

We consider minimising the use of specialist equipment or materials which can be expensive to install and costly to maintain. During the design and approval stage the location, quantity and type of traffic signal detection equipment is scrutinised to minimise the long-term maintenance liabilities, some of which may affect other asset groups.

Maintenance Backlog

We have good data on the age of all our ITS assets and currently calculate the maintenance backlog by working out how much it will cost to replace all the assets that have reached their expected life. The results of these calculations are published annually in; [“Developing our Approach to Asset Management in Highways”](#). As fault rates are also used when determining which assets should be repaired or replaced we recognise that in future we need to refine our backlog calculations by also taking these into consideration.

Soft Landscape

The Kent document; [“Well-managed Highway Infrastructure – Service Definitions & Service Risk Assessments”](#) details the services that can and cannot be provided by this asset group with the current level of funding.

The Soft Landscape Asset

Soft landscaping assets are important for amenity and nature conservation. The asset within the Kent highway boundary includes around 55,000 individual urban trees and in the region of 450,000 trees within tree belts, groups and woodland fringes. There are also over 4.5 million m² of urban grass verges and visibility splays

and nearly 3,000 miles (5,000 km) of rural verges that need cutting. There are also extensive areas (350,000 m²) of shrubs to be maintained and also around 2,700 miles (4,500 km) of hard surfaces requiring weed spraying. KCC also owns limited lengths of hedge which also need to be maintained.

Trees play an important role in the landscape and help make Kent's roads and footways a more attractive place. In addition to their visual role, trees can remove a range of atmospheric pollutants, provide shelter and shade, reduce glare, stabilise banks, reduce perception of noise and contribute to ecological diversity. Grass verges, shrubs and hedges soften the hard look of roads and are planted in some places to discourage parking at inappropriate locations.

There are a large number of trees, hedges and shrubs located on private land adjacent to our 5,400 miles (8,700 km) of public highway. These are privately owned and we work with the local community to encourage land owners to maintain them appropriately. If necessary, we have powers under the Highways Act to notify landowners of their responsibilities. If they do not carry out necessary maintenance work we may exercise powers to carry out the works and recover costs from the landowner.

Condition Assessments and Inspections

We undertake two types of checks or inspections on our soft landscape asset, planned and reactive:

Planned Inspections

Planned inspections include general highway safety inspections and five yearly safety inspections:

- Our team of Highway Inspectors carry out driven and walked highway inspections. They have a basic understanding of arboriculture and check for trees that are clearly leaning towards the highway and may cause a hazard, identify visible loose branches and encroachment onto roads and footways, obstructions and trip hazards. They also inspect grass, shrubs and hedges for encroachment and obstruction which may affect visibility and safe use of the highway network. The frequency of inspections is dictated by road category ranging from annual for minor roads to monthly for major roads.
- Planned inspections of trees in the highway take place on a five-year cycle and are carried out by qualified arboriculturists. KCC tree assets are recorded in our Highway Database and the Inspector will update the asset details including the tree condition at each inspection. When we carry out planned tree inspections we also take note of private trees within falling distance of the highway. This is a ground level, basic visual inspection undertaken from the confines of the highway boundary only and therefore limited in its scope.

If immediate hazards are identified in private trees (within falling distance of the highway) that pose an imminent danger to the highway user, and our discretionary

enforcement powers are not considered appropriate for this purpose, we raise emergency works as soon as reasonably practicable to remove the hazard in accordance with our duty to assert and protect the rights of the public to the use and enjoyment for any highway to which KCC are the highway authority (Section 130 of the Highways Act 1980).

We do not undertake planned inspections on our other soft landscape assets (grass, hedges and shrubs) as they are subject to planned maintenance activity which is then subject to a sample quality control inspection.

Reactive Inspections

Reactive inspections of trees, grass verges, shrubs and hedges are carried out in response to customer enquiries. They may generate ad-hoc or emergency works or result in us serving notice under Section 154 of the Highways Act 1980 requesting the landowner to trim/deal with a vegetation issue. Where this is not completed in the stated time we will undertake the work and seek to recover the costs from the landowner.

Prioritisation of Investment

When we are deciding where to spend our money, we think about the risks posed to road users and residents, the impact on the surrounding environment and the age and condition of the asset:

- Is the tree or vegetation creating a hazard to road users or residents?
- Is the tree or vegetation having an adverse effect on the surrounding environment?
- Is the tree or vegetation damaged, diseased or dying?
- Is the tree or vegetation adversely affecting adjacent highway assets?

Trees are the highest risk assets within the soft landscaping group of assets. Some trees are given a higher priority because of their size, age, history or legal status.

When prioritising where we spend our money we also consider the type of road, its speed, location and use by both vehicles and pedestrians.

For example, a damaged tree near a pavement may present an immediate risk to pedestrians. Within four hours of becoming aware of the problem we will make the site safe and put barriers around the area with signs to warn people of the hazard. Within seven calendar days we clear any remaining debris and make safe.

We regularly manage issues through our fault management system. These range from safety critical problems affecting busy roads to nuisance and quality of life complaints. Whilst we know we need to react and fix dangerous situations quickly, this is not a cost-effective way of working as we have to send landscape officers specifically to these locations and more time is spent travelling rather than fixing. We can clearly get more done for our budget if we plan the work that needs to be done.

We assess each site using a risk-based approach and have a prioritised list of improvements.

Other Significant Factors affecting Soft Landscape Maintenance

Soft Landscape assets are natural living organisms in their own right. As such, they grow and are subject to disease or even death. Where this occurs on a large scale there can be unforeseen impacts on maintenance budgets. A good example of this is Ash dieback (*Chalara fraxinea*) which affects tree populations.

Another key driver moving forward will be climate change. Global warming affecting native species and their ability to grow and thrive in the local environment. Imbalance in this regard also has the potential impact on landscape safe useful life expectancy and lifecycle planning when planting new schemes. The above factors need to be balanced with available funding when planning future services.

The condition of the soft landscape infrastructure and its ability to negatively impact adjoining assets is directly associated with the level of maintenance carried out.

Maintenance Frequencies

Maintenance frequencies are reviewed periodically in accordance with available funding. We are aware that both the current and proposed frequencies fall short of what is required to prevent both medium and long-term asset deterioration. We also understand that the long-term deterioration of landscape assets can impact on surrounding assets. Established weed growth and tree roots in hard surfaces can cause hundreds of thousands of pounds worth of damage in subsequent repairs to ensure a safe highway. Moreover, unmaintained overhanging vegetation can block street lighting, visibility at junctions; obstruct the safe passage of vehicles and pedestrians and obscure the visual condition surveys of crash barriers. Some of these issues have safety implications for road users and others have the potential to become legal claims from third parties.

Pedestrian Guardrail

The Kent document; *“Well-managed Highway Infrastructure – Service Definitions & Service Risk Assessments”* details the services that can and cannot be provided by this asset group with the current level of funding.

The Pedestrian Guardrail Asset

The main purpose of pedestrian guardrail is to improve safety by trying to prevent pedestrians from crossing the road at an inappropriate place or from straying into the road inadvertently. It can also be used to keep pedestrians away from the swept path of large vehicles such as buses and heavy goods vehicles.

Its purpose is not to protect pedestrians from vehicles.

As with many other local highway authorities, KCC does not hold any Kent specific inventory or condition data for pedestrian guardrail due to the low value and limited

extent of the asset. There is currently no dedicated maintenance budget for this asset group and repairs are currently undertaken using general reactive revenue funds.

We do not have a record of the location of all pedestrian guardrail in the County but using the 'Hertfordshire' model in the Whole Government Accounts (WGA) valuation process we estimate there is in the region of 130 km of it.

Condition Assessments and Inspections

There are no asset specific assessment or inspections of this asset although they are included in the general highway safety inspections. Both planned and reactive.

Planned Inspections

Planned inspections are carried out as part of our cyclical maintenance regime. This involves visual checks by our team of Highway Inspectors to make sure all highway assets are in a safe condition. This includes visually checking that barrier components are not broken or missing. We carry out this kind of check at least once every twelve months.

Reactive Inspections

Reactive inspections are carried out in response to enquiries and generate ad hoc and emergency works orders for repair. These enquiries may be initiated by colleagues within partner organisations such the Police or District Councils and also from members of the general public.

Prioritisation of Investment

In the absence of asset specific condition data, decisions on where we need to spend money on this asset is based on our response to dealing with situations, rather than performance of the asset itself. We also think about the risks posed to the road users and pedestrians:

- If the pedestrian guardrail fails are pedestrians more likely to cross the road in an inappropriate place?
- If the pedestrian guardrail fails are pedestrians more likely to stray into the road?
- If the pedestrian guardrail fails are pedestrians likely to trip or fall within the highway?

As with all assets we also consider the type of road and the amount of vehicular and pedestrian traffic using it and whether or not the asset is doing an effective job.

Other Significant Factors affecting Pedestrian Guardrail Maintenance

Proportion of asset at end of life

Pedestrian guardrail has not been asset managed for some time and as a result a significant proportion of the asset is considered to be at the end of its life.

RTC damage and non-recoverable costs

Damage by third parties accounts for the majority of reactive repairs and it is becoming increasingly difficult to recover these costs.

Removal of pedestrian guardrail

In the 1960s and 1970s pedestrian guardrail was used extensively as urban highways were developed and expanded. There was no guidance at the time on where it should be used and this has left a legacy of over-use of this asset. The DfT recognised this in 2009 and published its document on pedestrian guardrailing LTN 2/09 which provided an assessment framework to look to reduce guardrailing on the highway network. KCC undertook a full assessment of town centre guardrailing across the county but local concerns about residual safety meant that the majority of local Joint Transportation Boards decided against implementing any removal of pedestrian guardrail.

In order to support both the amenity value of the highway network, particularly in town centres, and the desire to balance pedestrian and vehicular traffic through shared spaces and well-designed streets, LTN 2/09 should be fully implemented.

Maintenance Backlog

Because we do not currently undertake asset specific routine assessments of pedestrian guardrail we have no robust method of determining the maintenance backlog. With current budget pressures, the cost of data collection and assessment of the risks involved in not having this information it is unlikely this situation will change in the foreseeable future.

Unlit Road Signs

The Kent document; *“Well-managed Highway Infrastructure – Service Definitions & Service Risk Assessments”* details the services that can and cannot be provided by this asset group with the current level of funding.

The Unlit Road Signs Asset

Traffic Signs are categorised into four types; warning, regulatory, direction and information, and are provided to convey messages to all types of road and footway users including equestrians, cyclists and pedestrians. The message must be clear and at the right time for users travelling at the normal speed for the road, footway or cycle facility. They are therefore sited at appropriate distances for the speed of the road and the message they convey and should be reflective or lit as required.

All signs are designed and installed in accordance with Traffic Signs Regulations and General Directions (TSRGD) 2016 and amendments thereof. KCC has set up a Departmental working group to review the recent changes to TSRGD and how these changes can be implemented to improve effective and efficient management of the signs asset. In 2010 Kent County Council also produced a guidance document *“KCC Signs Technical Directive 2010”* showing any adopted variances and to assist

Engineers and Practitioners in achieving a consistent approach throughout the County.

Partner agencies are also responsible for some signing on the Public Highway network and we liaise closely with Highways England, District and Borough Councils to influence a consistent approach within the County.

We are mindful that redundant signs and street furniture work against inclusive mobility in the street environment and can cause access problems for pedestrians. There is a commitment to rationalising existing signing on the highway to reduce “clutter” where possible. Removal of unnecessary signing is carried out as part of the assessment when reviewing plans for new developments to optimise what is required.

As with many other local highway authorities, KCC does not hold any Kent specific inventory or condition data for unlit signs and there is currently no dedicated maintenance budget for this asset group with repairs undertaken using general reactive revenue funds.

We do not have a record of the location for all the unlit road signs in the County but using the ‘Hertfordshire’ model in the Whole Government Accounts (WGA) valuation process we estimate there are around 190,000 of them.

Condition Assessments and Inspections

There are two types of checks, planned inspections and reactive inspections.

Planned Inspections

Planned inspections are carried out as part of the highway safety inspections that form part of our maintenance regime. This involves visual checks by our team of Highway Inspectors to make sure all highway assets are in a safe condition. For unlit signs this includes visually checking that signs are not broken, missing or faded and that posts are in a sound, stable condition. We carry out this kind of check at least once every twelve months, with major routes being checked monthly.

Reactive Inspections

Reactive inspections are carried out in response to enquiries we receive and may generate ad-hoc or emergency works. For example, the re-positioning of a twisted sign or replacement of a damaged post could be done as a result of information received from the public.

Prioritisation of Investment

Budget pressures have historically aired towards other asset groups and signage has been proportionately funded relative to the cost of repairs. In many circumstances wholesale replacement is more cost effective than repairing the existing sign unit. Sign maintenance has now become a reactive process with little or no proactive approach in relation to preventative or cyclic maintenance.

In the absence of asset specific condition data, decisions on where we need to spend money on unlit signs are based on dealing with situations picked up by routine inspections and public enquiries, rather than performance of the asset itself.

When deciding where to spend money on our defective signs we think about the risks to safety and the benefit the sign provides, including:

- Is the sign in a safe condition?
- Is the sign sufficiently visible to drivers?
- Is the sign communicating the correct message effectively?
- If the sign was not there, would road users be unaware of a potential danger?
- If the sign was not there, would road users be unaware of a traffic restriction?
- Will a new sign improve highway safety?

We also consider the type of road, the amount and speed of traffic using it and the surrounding environment.

It is also important that we understand whether or not the sign is still doing its job effectively. If it is in the wrong place or is not providing correct, easily understood information, there is no point in simply replacing it like for like. It may also be that the sign is no longer needed and therefore it can be removed completely to reduce the amount of sign clutter.

We assess each site using a risk-based approach and prioritise repairs on the basis of safety.

Other Significant Factors affecting Unlit Sign Maintenance

Damaged and Ageing Asset

Although road signing is now designed with the environment in mind, including the need to reduce unnecessary street clutter and the use of weather resistant materials; the past has left the County with many ageing and deteriorating signs. Plastic coated signs were developed in the 1950s closely followed by posts. These have both been widely used across the County. Due to problems of internal rusting today many are now in a poor or unknown condition.

Passive Sign Assessment

The use of passive post systems can have a very high initial cost associated with it but there can be longer term cost benefits and safety improvements at specific identified locations where habitual incidents are linked to vehicles leaving the carriageway. Passive post systems are not always easily identified and therefore continuity can be problematic between initial installation and future maintenance.

Increased theft/ RTC damage and non-recoverable costs

Damage by third parties is very common place with recovering costs related to damage increasing all the time. Tagging and street graffiti also requires an immediate response for some regulatory and warning signs. This increases the burden on

existing highway budgets and restricts the potential to carry out cyclic and preventative maintenance, such as cleaning.

Ownership of Sign Strategies

There has been a number of signing strategies across the County that deal with cross District and Agency issues (lorry management etc.). There is a risk that ownership of these strategies is lost and their effectiveness diminishes over time. This in turn can then work against the County's aspiration of LTP4, growth without gridlock.

Reductions in other services

With the reduction in rural verge maintenance rural signs can become significantly overgrown and fall into disrepair. Warning signs can become obscured causing increased risk of collisions.

External/political pressure

With the focus on safety critical repairs the Council can be under greater external and political pressure to respond to damaged non-safety critical signing such as village gateways.

Maintenance Backlog

We do not currently undertake asset specific, routine assessments of the condition of unlit signs as maintenance is carried out on a reactive basis. We therefore have no robust method of determining maintenance backlog.

The Future Management of Unlit Signs

Having a detailed asset database of unlit signs would allow better planning and use of funding for this asset group. Details of sign type, size and reference number would enable efficient ordering of replacement signs and provide consistency across the County with any saving enabling cyclic maintenance to warning and regulatory signs to be carried out. Unfortunately asset collection would have a high initial cost if carried out as a stand-alone exercise, which is difficult to justify against the current reactive approach to maintenance. However we are considering ways of increasing our knowledge of our unlit signs by including them in existing surveys undertaken routinely for other asset groups.

Road Markings & Road Studs

The Kent document; *"Well-managed Highway Infrastructure – Service Definitions & Service Risk Assessments"* details the services that can and cannot be provided by these asset groups with the current level of funding.

The Road Markings & Road Studs Assets

The primary objectives of Road Markings and Road Studs are to:

- Assist with the safe movement of traffic on the highway network.
- Protect road users by guiding, warning, directing and informing them

→ Define features on the highway such as junctions, road edges and traffic lanes.

This is achieved through the use of:

- Centre line white lane markings (Extrusion)
- White edge lines (Extrusion)
- Rib edge lining (Spray for refresh sites)
- Pedestrian crossing and junction markings (Screed)
- Yellow box junction markings (Screed)
- Lettering and arrow markings (Screed)
- Road studs (milled, stick on and intelligent)

KCC does not hold any Kent specific inventory or condition data for road markings or road studs but using some broad assumptions we estimate this asset includes around 4,000 miles (6,500 km) of centre line white lane markings, 1,800 miles (3,000 km) of junction markings, 240,000 letters and arrows marked on the road and over 700,000 road studs.

Condition Assessments and Inspections

There are two types of checks, planned inspections and reactive inspections.

Planned Inspections

Planned inspections are carried out as part of the highway safety inspections that form part of our maintenance regime. This involves visual checks by our team of Highway Inspectors to make sure all highway assets are in a safe condition. This includes checking that Road Markings are sufficiently visible during the day time. We carry out this kind of check at least once every six months.

Reactive Inspections

Reactive inspections are carried out by our team of Highway Stewards in response to issues highlighted to them from our customers. When they arrive on site they survey the surrounding area so that any other Road Markings that require refreshing can be included for more efficient delivery. The Stewards also assess the condition of Road Markings while they are on route to sites. The site visits may include reports from the Police and teams investigating injury crashes.

Reactive inspections generate ad hoc and emergency works.

Prioritisation of Investment

When deciding where to spend our money on road markings and studs, we think about the risk associated with the condition of the asset to ensure they provide sufficient guidance, warning, direction and information to highway users.

We use the following questions as part of our risk assessment matrix to prioritise our response:

- What do we need to do to make sure that the Road Markings and Studs are sufficiently visible before they should be considered for refreshing?
- Review whether existing Road Markings and Studs should be replaced?
- If the Road Markings or Studs are not reflective, does it increase the hazard to drivers?

We also consider:

- The type of road, for example, whether it is a high-speed road, a main road, an estate road or a country lane.
- The amount of traffic that uses the road. For example, is it a main route in and out of a town or is it a minor road only used by a handful of drivers each day.
- High risk areas, such as Pedestrian Crossings and Stop Lines.

We assess each site using a risk-based approach and have a prioritised list of improvements. This list is used when determining budget allocations and compiling forward works programmes.

Other Significant Factors affecting Road Markings and Studs Maintenance

Life of the Asset

Thermoplastic marking in a location that is constantly over-run can last as little as 18 months before it requires refreshing. This is a particular problem in busy town centres especially on transverse lining such as junctions and zebra crossing markings. Small patching and pot hole repairs often require relining and this leads to sections of road having lining of varying condition.

Traffic Management

High Speed roads are considered most risk as they carry the highest volumes of traffic at speeds in excess of 50mph. This network is difficult to access without creating local congestion and can be costly. Kent operates an annual High-Speed Road programme which is a series of planned closures that allows work to be undertaken on this part of the network. However, each closure offers limited time to undertake any significant lining works.

Strategic Approach

The asset is currently only maintained on a risk basis and there are no strategic plans in place to cyclically refresh the network. This means that lining works are difficult to programme and deliver effectively on an ad hoc basis.

New methods and materials are available on the market and opportunities to explore these are limited without a countywide strategy.

Heavy Goods Routes

Road studs are more likely to be removed by the constant overrunning of heavy goods vehicles. Routes with a high proportion of heavy goods vehicles are likely to require frequent replacement. Alternative forms of increasing carriageway visibility should

always be considered before road studs are replaced at these locations, especially in locations likely to be over-run.

Noise

Road studs in locations which are frequently over-run, particularly by heavy and large goods vehicles, can create a significant noise nuisance to residents. Placement of road studs within 30mph urban environments is discouraged unless there is a clear safety need.

Maintenance Backlog

We do not currently undertake asset specific, routine assessments of the condition of these assets as maintenance is carried out on a reactive basis. We therefore have no robust method of determining the maintenance backlog.

Future Management of the Road Markings Asset.

Although maintenance of this asset is carried out on a reactive basis we recognise that we need a method of assessing the extent of this asset. This is something we are currently developing.