Norfolk's Transport Asset Management Plan

2018/19 – 2021/22

Recommended by EDT Service Committee - 16/1/18

Approved by Full Council - 16/4/18

Executive Summary

1. Background

1.1. Highway authorities exercise their duties to maintain, operate and improve their highway assets (physical things such as roads and bridges) under increasing pressures including limited budgets and resources, mature networks with significant backlogs of maintenance, accountability to funding providers and increasing public expectations.

1.2. ADEPT (Association of Directors of Environment, Economy, Planning & Transportation) have adopted the following definition for the purpose of their framework document and for application to UK highway networks.

> *"Asset management is a strategic approach that identifies the optimal allocation of resources for the management, operation, preservation and enhancement of the highway infrastructure to meet the needs of current and future customers."*

1.3. Recent drivers for continuing development have been:

- the introduction of the Prudential Code
- the progressive establishment of whole government accounts
- HMEP asset management guidance 2013 and other HMEP products and
- Incentive element of the 2016-17 DfT Highways Block Grant funding formula

1.4. The contents of the plan reflect the Highways Capital Programme for 2018/19/20 and the changing strategic corporate framework.

2. Highways Maintenance Efficiency Programme (HMEP)

2.1. HMEP is a sector-led transformation programme designed to maximise returns from highways investment and deliver efficient and effective services. It is aimed at the local highways sector and is sponsored by the Department for Transport (DfT) who funding.

2.2. The programme provides a series of 'products' to help inform highway authorities of best practice examples and recommendations that should lead to improved outcomes for all road users and better value for money for taxpayers. Any recommendations that add value to our current practices will be implemented if they are affordable.

2.3. Both the pothole review (April 2012) and asset management guidance (May 2013) issued by HMEP recommend that authorities should employ an asset management approach. They advise adoption of the principle that 'prevention is better than cure' in determining the balance between structural, preventative and reactive maintenance activities in order to improve the resilience of the highway network and minimise the occurrence of potholes in the future.

2.4. Ideally, this would require assets to be maintained to a planned regime based on the effective life of treatments. Currently this is unaffordable. We have adopted a pragmatic asset management approach whereby we are 'sweating' the asset and heavily using cheaper intermediate treatments, typically surface dressing, to maximise our network length treated. Thereby protecting past investment and postponing further capital expenditure. This has allowed us to minimise the decline in highway condition in a time of significantly falling resources

3. What we have achieved and future intentions

3.1. Norfolk's first Transport Asset Management Plan was presented in spring 2005. It superseded the Highways Maintenance Plan and sought to extend asset management principles to all aspects of transport investment with the objective of improving value for money. We are now using the new asset management guidance from HMEP to inform its development.

3.2. The 2018-19 document represents part of a continuing process of development. It will be developed annually over the next few years and incorporating any new national guidelines.

3.3. The plan pulls together all the relevant strategies, goals, objectives, plans and methods in use within the Community and Environmental Services department of the County Council for managing the highways and transportation assets.

3.4. The Norfolk TAMP is written in three parts:

Part 1 - Transport Asset Management Policy and Strategy
Provides the background to asset management, service levels, asset management data performance, risk, valuation and forward programmes.

Part 2 - Lifecycle Plans
For each individual asset

Part 3 - Technical Appendices
Provides useful technical details and guidance

3.5. We are a member of the CSS/CIPFA support network, NHT efficiency and Customer Satisfaction benchmarking clubs. The Eastern Highways Alliance has established a 'maintenance and asset management' group together with a 'benchmarking' sub-group. Theses ensure that we are aware of best practice both nationally and regionally.

3.6. In 2014 in response to our bid for additional 'pothole grant' we were assessed at 'joint rank 1' for asset management.

3.7. For the DfT incentive fund self-assessment questionnaire submission in February 2017, we considered ourselves a level 3 authority.

Part 1 - Transport Asset Management Policy and Strategy

1. Introduction

1.1. Purpose of the Transport Asset Management Plan

1.1.1. The purpose of this document is to set out an approach for Norfolk County Council for the management of its transport and highway assets.

1.1.2. The Transport Asset Management Plan (TAMP) pulls together all the relevant strategies, goals, objectives, plans and methods in use within the County Council and the Community Environment Services (CES) department for managing the transport and highway assets in the County.

1.1.3. The plan enables an asset management system to be developed for managing transport and highway assets on a long-term basis, using whole life costing within a framework of statutory requirements, customer expectations and available funding. The processes will continue to adapt to changing circumstances and advances.

1.1.4. The Norfolk TAMP is written in three parts

Part 1: Transport Asset Management Policy and Strategy – which provides the background to asset management, service levels, asset management data performance, risk, valuation and forward programmes.

Part 2: Lifecycle Plans – for each individual asset

Part 3: Technical Appendices – which provides useful technical details and guidance

1.2. What is Asset Management

1.2.1. Asset management builds on existing processes, management systems, data and tools to form a continuous improvement framework that complements and supplements existing practice.

1.2.2. Asset management means different things to different people. ADEPT (Association of Directors of Environment, Economy, Planning & Transportation) have adopted the following definition for the purpose of their framework document and for application to UK highway networks.

"Asset management is a strategic approach that identifies the optimal allocation of resources for the management, operation, preservation and enhancement of the highway infrastructure to meet the needs of current and future customers."

1.2.3. The definition brings together themes that define an asset management approach:

- Strategic Approach - A systematic process that takes a long term view
- Whole of Life - The whole-life/life-cycle of an asset is considered
- Optimisation - Maximising benefits by balancing competing demands
- Resource Allocation - Allocation of resources based on assessed needs
- Customer Focus - Explicit consideration of customer expectations

1.3. Why Asset Management?

1.3.1. It is widely accepted that transport infrastructure is vital to the economic well-being. For most local authorities their road network is the most valuable community asset under their control.

1.3.2. Highway authorities exercise their duties to maintain, operate and improve their transportation and highway assets under increasing pressures that include:

- Inadequate budgets
- Limited resources, both staff and skill shortages
- Mature networks, with a significant backlog of required maintenance
- Increased accountability, to customers and funding providers
- Increasing public expectations, the public are increasingly informed and demanding.

1.3.3. Highway authorities have been advised that the implementation of asset management principles will deliver better outcomes to customers.

1.4. Drivers for the use of Transport Asset Management

1.4.1. Funding

1.4.1.1. Both capital and revenue grants from government have seen significant restrictions since 2010-11. In Norfolk for several years there was a freeze in Council Tax meaning we have had to maintain the asset with less funding.

1.4.1.2. From 2016-17 the ‘needs’ based element of the DfT highways funding block was been reduced and supplemented with a ‘Permanent Pothole Fund’ and an ‘incentive’ element based upon a self –assessment questionnaire to be signed-off by the local Section 151 officer. A section of the questionnaire will relate to asset management and poor performance will lead to a loss of grant.

1.4.1.3. In addition the Local Enterprise Partnership (LEP) may provide additional funding for specific proposals either new build, integrated transport or structural maintenance

1.4.2. Whole of Government Accounts

1.4.2.1. The government is working towards the production of Whole of Government Accounts (WGA). WGA will be commercial-style accounts covering the whole of the public sector including local authorities. WGA will be produced on an accruals basis and will use Generally Accepted Accounting Principles (GAAP), adapted where necessary for government. This form of accounting is known as Resource Accounting and Budgeting (RAB). Under these requirements local authorities will be required to value their highway assets.

1.4.2.2. In 2010 CIPFA published Code of Practice on transport infrastructure assets Guidance to Support Asset Management, Financial Management and Reporting.

1.4.2.3. The Code has been developed in collaboration with the Highways Asset Management Financial Information Group (HAMFIG), whose work is supported by a number of government funded research projects. Implementation of the review is being overseen by a project implementation steering group (PISG) which includes representatives from national and local government and audit bodies in England, Scotland and Wales.

1.4.2.4. The purpose of this Code is to support an asset management plan (AMP) based approach to the provision of financial information about local authority transport infrastructure assets. The intention is that each authority should develop a single set of financial management information about these assets that is robust and consistent between transport authorities and supports:

- Good, evidence-based asset management, including the development of more cost-effective maintenance and replacement programmes
- Delivery of efficiency savings and service improvements
- Long-term financial planning and budgeting
- Corporate capital planning and the operation of the Prudential Code
- Performance assessment and benchmarking
- Resource allocation, locally, at regional level and nationally
- Production of transparent information for stakeholders on the authority's management of its highway assets
- Production of financial information that is compliant with International Financial Reporting Standards (IFRS) and meets the needs of Whole of Government Accounts (WGA) and National Accounts
- Any future move to current value financial reporting of the assets in local authorities' own accounts

1.4.3. The Prudential Code

1.4.3.1. The government has introduced the Prudential Code to govern the way in which local authorities manage their assets. The code requires local authorities to have explicit regard to option appraisal, asset management planning and strategic planning when making capital investment decisions and to demonstrate that their plans are affordable, prudent and sustainable.

1.4.3.2. The code enables authorities to choose between revenue and capital intensive options for service delivery, undertake 'spend to save' capital schemes and undertake additional self-funded capital investment where they can afford.

1.4.3.3. The code, therefore, enables the introduction of more sophisticated application of asset management than is possible under the previous financial regime. A robust asset management plan will be a valuable tool to any authority wishing to explore the potential benefits that the code enables.

1.4.4. The Code of Practice for Well-Managed Highway Infrastructure

1.4.4.1. A new code of practice was launched in Sept 2016. It references the 2013 Asset Management Guidance and the recommendations within it. The previous Codes will remain valid for them until the earlier of when they have implemented their approach or a period of two years from the date of publication of this Code.

1.4.5. **Norfolk County Council - Departmental and Corporate**

1.4.5.1. The development of an Asset Management Strategy was one of the actions generated by our 2002 Best Value Review of Highway Management and Network Management function. Achieving value for money from our funding remains a priority.

1.4.6. **Highways Maintenance Efficiency Programme (HMEP)**

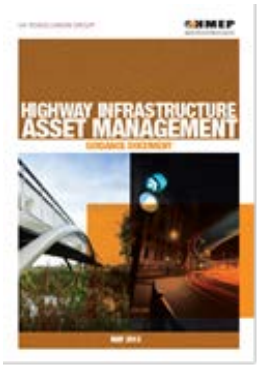
1.4.6.1. HMEP is a sector-led transformation programme designed to maximise returns from highways investment and deliver efficient and effective services. Aimed at the local highways sector, it is sponsored by the Department for Transport (DfT) who provides funding.

1.4.6.2. The programme provides a series of 'products' to help inform highway authorities of best practice examples and recommendations that should lead to improved outcomes for all road users and better value for money for taxpayers. Any recommendations that add value to our current practices will be implemented if they are affordable.

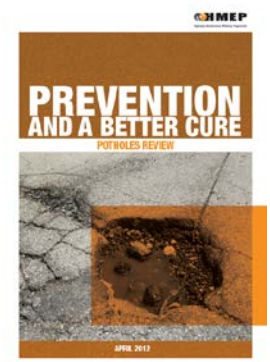
1.4.6.3. Both the pothole review and asset management guidance issued by HMEP recommend that authorities should employ an asset management approach. They advise adoption of the principle that 'prevention is better than cure' in determining the balance between structural, preventative and reactive maintenance activities in order to improve the resilience of the highway network and minimise the occurrence of potholes in the future.

1.4.6.4. It has been produced in accordance with national guidance provided by the Highway Maintenance Efficiency Programme (HMEP) –

- 'Highway Infrastructure Asset Management' May 2013'



- 'Prevention and a Better Cure' April 2012.



1.4.6.5. Ideally, this would require assets to be maintained to a planned regime based on the effective life of treatments. Currently this is unaffordable. We have adopted a pragmatic asset management approach whereby we are sweating the asset and heavily using cheaper intermediate treatments, typically surface dressing, to maximise our network length treated. This protects past investment and postpones further capital expenditure, as opposed to using more robust treatments using a 'worst first' approach but over a lesser network length. This has allowed us to minimise the decline in highway condition in a time of significantly falling resources

1.4.7. **Local Transport Plan, Asset Maintenance Policy and Strategy**

1.4.7.1. Our third Local Transport Plan, Connecting Norfolk, was adopted in April 2011. It includes a number of performance indicators and targets in line with the coalition government's reduced performance framework. The improvement plan 2015-21 states "Maintaining the transport network will remain our priority and we will continue to divert money towards it from the LTP Integrated Transport Grant. The Asset Management Strategy and Policy is designed to minimise deterioration of the network. The focus for capital spend will continue to be on maintaining and managing the higher status roads to ensure that the most important routes are kept in the best possible condition given funding constraints.

1.5. Benefits of Transport Asset Management Plans

1.5.1. Asset management facilitates better decision-making by supplementing instinctive engineering judgement and supposition with analysis (financial, economic and engineering). It thereby enables an authority to better understand and manage the relationship between cost and performance.

1.5.2. This will deliver an improved level of service for the resources available, i.e.,

- The same or better level of service at a reduced cost
- A better level of service at the same or marginally increased cost
- Or; where, owing to budgetary constraints, it is not possible to maintain the level of service, the effects of the reduced level of service is mitigated through the efficient use of resources.

1.5.3. Specific benefits of an assessment management approach are:

- Reduced life-cycle costs
- Defined levels of service
- The ability to track performance
- Improved transparency in decision making
- The ability to predict the consequences of funding decisions
- Decreased financial, operational and legal risk
- Ability to discharge statutory valuation and financial reporting responsibilities

1.6. Scope of the Transport Asset Management Plan

1.6.1. This document represents an evaluation of asset management practices in the County and sets out a way forward.

1.6.2. The Highway Infrastructure Asset Management document was published May 2013 and contains a framework which comprises the activities and processes that are necessary to develop, document, implement and continually improve asset management. These activities and the approach to their delivery should be clearly documented and accessible to relevant stakeholders.

It states 'Authorities should build on the work they have already done and use this Guidance and its recommendations to further augment the implementation of asset management.

1.6.3. The Framework is presented in three parts:

• Context – Describes the context for highway infrastructure asset management, the organisation and the environment within which the local highway service is delivered, an is covered in Part A;
• Asset Management Planning – Describes the key activities and processes for asset management planning and gives advice on how these should be applied to highway infrastructure assets, as covered in Part B; and
• Asset Management Enablers – Describes the enablers that support the implementation of the Asset Management Framework and is covered in Part C.

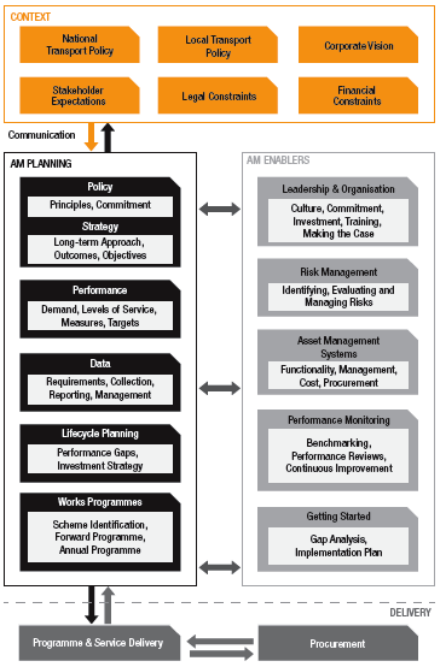


Table 1.1 (Fig 2 from Highway Infrastructure Asset Management document)

1.6.4. As our TAMP is reviewed it will evolve to include elements of more advanced systems and developments.

1.6.5. A lifecycle approach to asset management and our developing TAMP is based on:

- Best available, current information
- Condition sample
- Existing service levels
- Calculating cash flow predictions for asset maintenance, rehabilitation and renewal based on local knowledge
- Providing service performance measures against which improvement could be monitored
- Contrast existing approaches with opportunities for improvement
- Seek the views of asset group users on appropriate service level

1.7. Aim of Norfolk's Transport Asset Management Plan

1.7.1. We are seeking to enhance our current approach to transport asset management, thereby becoming more effective and improving our ability to meet national and local objectives and customer needs. We have developed a 5-year programme, the first two years of which will be in some detail and the later three being indicative.

1.7.2. As the plan is developed it will:

- Be regularly reviewed and updated
- Include all highway and transportation assets
- Adopt best practice where affordable
- Monitor the condition and performance of assets
- Provide value for money by optimising the long-term lifecycle costs of assets and through improved system and practices
- Continue to identify improvements in the information and systems necessary to refine this process
- Use optimisation tools to develop options for current and future service delivery, forward financial planning and investment and asset renewal programmes
- Achieve corporate objectives
- Enable the County Council to meet the government's requirements for financial planning and accounting for transport
- Demonstrate effective management of assets on behalf of customers and stakeholders
- Planning for future asset requirements based on projected demand and service levels
- Seek the views of asset group users on appropriate service levels
- Increase the horizon and confidence in future planning and programmes

2. Strategic Corporate Framework

2.1. The County Council Plan

2.1.1. Our Council has a clear set of priorities based around 'Caring for our County'.

These are:

- Caring for your money
- Caring for your family
- Caring for your community
- Caring for your health and well being
- Caring for your roads and environment
- Caring for your economy

These pledges inform the Council's planning and budget-making process. They are reflected in the County Council Plan for the next four years, which was published autumn 2017.
‘

2.1.2. A transformation programme called ‘Norfolk Futures’ is delivering new models of service delivery, new relationships with citizens and partners, to deliver our priorities. It consists of a number of corporate priorities have been identified to make better use of resources, inform service strategies and departmental plans.

2.2. Local Transport Plan

2.2.1. Local Transport Plans (LTP's) are the overarching documents setting out the plans, policies and programmes for transport across an area. They are statutory documents required by legislation (the Transport Act 2000, as amended by the Local Transport Act 2008).

2.2.2. Norfolk County Council has adopted *Connecting Norfolk;* its 3rd LTP. *Connecting Norfolk* sets the longer term strategy for transport delivery up to 2026. It provides the policy framework for transport as well as providing a guide for other agencies, like local planning authorities, when considering future development or delivery. The Transport Asset Management Plan is guided by *Connecting Norfolk*.

2.2.3. The overall vision of LTP3 is “A transport system that allows residents and visitors a range of options to meet their transport needs and attracts and retains business investment in the county.” *Connecting Norfolk* contains short term priorities that recognise the financial constraints we currently face. There will be less money to deliver improvements and works will need to refocus on maintaining the existing asset.

2.2.4. Transport activity will be delivered in six themes. These were identified through stakeholder consultation during January and February 2010 as priority areas of transport. The strategic aims are:

- Manage and maintain the transport network to an appropriate standard
- Deliver sustainable growth
- Enhance strategic connections
- Reduce emissions
- Improve road safety
- Improve accessibility

2.2.5. Each of these aims has a clear strategy. We deliver these strategies through programmes of schemes and initiatives, including local safety schemes, Park and Ride, pedestrian crossings and road maintenance schemes. The measurable outcomes from the schemes contribute to the LTP's performance framework so that we can see how well the strategy is working. A systematic asset management process will help identify the optimal timing and level of intervention of schemes. This will ensure that best use is made of the funding available, and this in turn will ensure that the outcome benefits are maximised, thereby further improving the performance of the LTP.

2.2.6. Connecting Norfolk contains a shorter-term implementation plan as well as the longer-term strategy. The implementation plan has recently been rolled forward to cover the period from April 2015 up to 2021. This is the period over which government has announced indicative LTP funding allocations.

2.2.7. One of the main drivers for updating the LTP Implementation Plan was the emergence of Local Enterprise Partnerships' Growth Deals. Growth Deals provide LEPs with capital funding (and other powers negotiated with government) in return for ambitious levels of economic growth, as set out in LEPs' Strategic Economic Plans. Since some of the funding for Growth Deals has come from the national Local Transport Plan budget, there is reduced funding through this stream for local authorities. On the other hand however, Growth Deal funding does provide a potential opportunity for maintenance funding provided that maintenance can be shown to bring forward housing and jobs growth. Decisions on this funding stream are taken by New Anglia LEP.

2.3. Community and Environmental Services - Service Plans

2.3.1. Community and Environmental Services Department's suite of operational Service Plans focus on the key things its individual services aim to achieve over a period in support of the County Council objectives. They do not attempt to identify everything each service does. These set out more detailed objectives, targets and performance measures.

2.4. Transport Asset Management Plan

2.4.1. Our Transport Asset Management Plan supports these plans:

- It prioritises **improvements** to the network as described in section 8 to support the implementation of the:
    - **Local Transport Plan – Connecting Norfolk** in particular prioritises improving accessibility and road safety,

- **Strategic Economic Plan** developed for the 'New Anglia' Local Enterprise Partnership and in conjunction with the
- **Operational Network Management Plan** covering the co-ordination and the management of the competing demands of users of the existing highway network and planning for the future.

- It allocates available funding for **planned maintenance** based on condition data and priorities agreed annually by Members, to maintain assets based on whole life costing principles to ensure available funds are invested to minimise future costs.
- It sets out the standards for **routine maintenance** that meet the Council's legal responsibilities to keep routes available and safe for the passage for the travelling public.

2.4.2. The following Figure 2.1 shows the link between the strategic and operational plans within the County Council and the Community and Environmental Services Department.

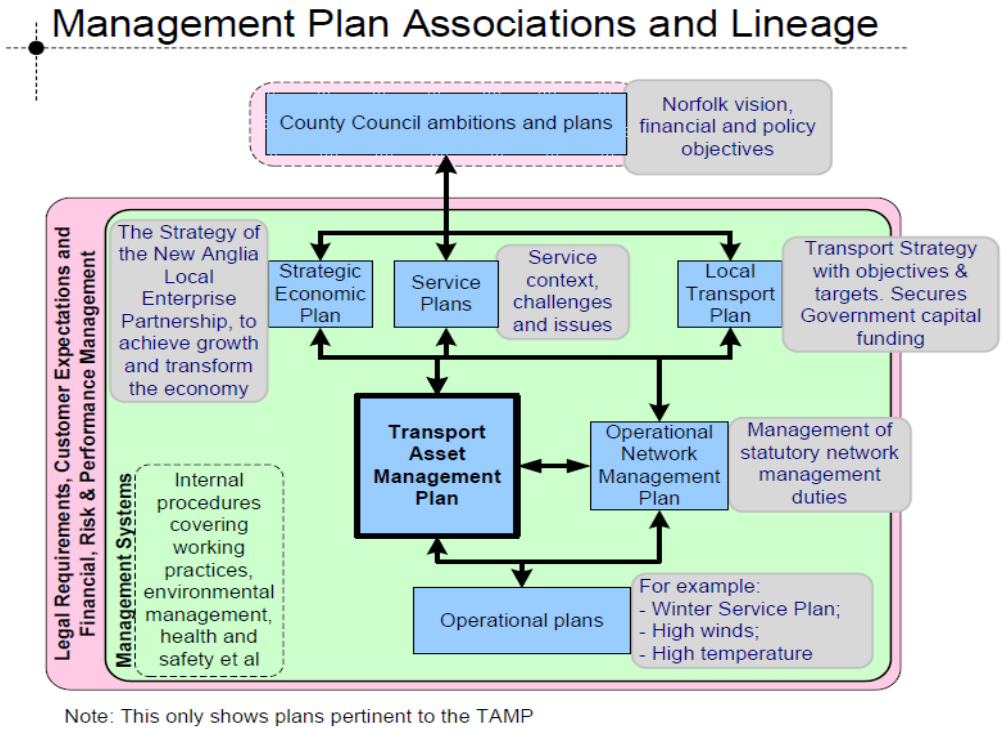


Figure 2.1

2.4.3. It is delivered by Norfolk County Council staff, working in collaboration with Lafarge Tarmac, Mouchel, and Imtech, who were all successful in securing long term contracts with the County Council from April 2014.

3. Norfolk County Council's Transport Asset Management Policy

3.1. Norfolk County Council recognises that the need for the highway service is universal amongst all of its residents, providing access for business, services and promoting well-being. An effective network is essential for a successful economy and society.

3.2. Achieving the priorities in the County Council Plan requires a focus on the availability, capacity, condition and quality of the highway network and associated assets.

3.3. The key to this will be the ability to make good, informed decisions. This is core to the asset management approach, optimising the contribution to the service provided by the infrastructure. The principles of which are;

- To deliver the statutory obligations of the authority
- To be responsive to the needs of users' and the community
- To utilise the available funding to minimise whole life costs
- To support effective delivery of the statutory network management duty
- To support and add value to local transport objectives
- To support and add value to wider corporate policy objectives

3.4. This policy was adopted by the Environment Development and Transport Committee on 8th July 2014 in response to the paper on Highway Asset Performance. The Transport Asset Management Strategy was approved at this time and refreshed on 14 Oct 2017. This can be seen in Section 4.

4. Transport Asset Management Strategy

4.1. Main Components

4.1.1. The Transport Asset Management Strategy is built around three main components.

- A defined hierarchy for all elements of the network
- The legal framework and robust policies and objectives for the service
- A detailed Inventory of all relevant components of the asset

4.1.2. To be effective, these key components are supplemented by the following:

- A comprehensive management system for inspecting, recording, analysing, prioritising and programming maintenance works to optimise their asset management contribution
- Arrangements to finance, procure and deliver maintenance works, in accordance with the principles of sustainability and best value
- Arrangements to monitor, review and update as necessary, each component of the strategy and the performance of the strategy
- A risk management strategy clearly identifying and evaluating the risks and consequences of investment decisions and measures to mitigate
- A proactive approach to the implementation of innovations and best practice in collaboration with our contractors and other councils
- Maintain a knowledgeable and robust client to engage with others councils and contractors

4.2. Detailed Strategy for Transport Asset Management

4.2.1. The Transport Asset management Policy can be seen in Section 3.

4.2.2. The detailed elements of the strategy are to:

4.2.3.

- Utilise asset management practices to ensure protection of the highway infrastructure through the implementation of the Transport Asset Management Plan.
- Based on whole-life costing, to ensure value for money. We utilise a preventative approach investing a greater proportion of the available budget to treat roads in the early stages of deterioration. This targets assets that are not currently in need of full structural renewal and proposes to extend the assets whole life by arresting/delaying deterioration. This minimises the risk of the highway and transportation asset deteriorating
- Carry out repairs to the most appropriate standards and methods
- Identify needs against the National Codes of Practice and survey data.
- Allocate resources based upon assessed needs basis, to
- Continue to identify improvements in the information and systems necessary to refine this process
- Seek the required funding by demonstrating the maintenance needs for maximum Government support, through the Local Transport Plan.
- Seek additional funding through the County Council's strategic planning and budget cycle.

- Seek to optimise the benefits of maintenance works by incorporating any appropriate safety, availability or accessibility improvement works at the same time.
- Co-ordinate works to reduce disruption.
- Treat as a priority those hazards that could lead to personal injury or damage to vehicles.

4.3. Strategy for Main Asset Groups

4.3.1. It is recognised that the current level of funding makes the maintenance of current condition challenging and that in most circumstances the strategy will be to manage deterioration.

4.3.2. Pressures can be demonstrated with Members supporting part of the Integrated Transport grant being used to support structural maintenance which in turn is supporting some work previously undertaken using revenue funding such as patching.

4.3.3. **Carriageways**

4.3.3.1.
- Extensive utilisation of intermediate treatments such as surface dressing, joint sealing, re-texturing and machine patching.
- Use of poly-modified binders and Dense Stone Mastic Asphalt (SMA) to increase the robustness of resurfacing.
- Consider the use of recycling to add strength to rural roads and in fenland reduce weight of the pavement
- Innovation to examine the use of new techniques
- Scheme selection and Programme development informed by an intelligent client
- Specification informed by our Norfolk Laboratory.
- Full condition survey of the network

4.3.3.2. Desired outcome

4.3.3.3. Performance targets have been established in the Local Transport Plan (LTP) for the ‘A’ road network and in the performance framework for all road classifications. These show a slight decline over the next 3-year period to 2020-21.

4.3.4. **Footways**

4.3.4.1.
- Utilisation of intermediate treatments such as slurry seal and machine patching.
- Full condition survey of the network
- Use of Hot Rolled Asphalt (HRA) to increase the robustness of resurfacing.
- Innovation to examine the use of new techniques
- Scheme selection and Programme development informed by an intelligent client
- Specification informed by our Norfolk Laboratory.
- Full condition survey of the network

4.3.4.2. Desired outcome

4.3.4.3. Performance targets have been established and these show a slight decline over the next 3-year period to 2020-21.

4.3.5. **Highway Structures (bridges)**

4.3.5.1. There is a small strengthening programme which should complete by 2019-20.

4.3.5.2. Performance targets have been established and these show a slight decline in Bridge Stock Condition Index (BSCI) score over the next 3-year period to 2020-21. The bridge strengthening programme is expected to complete in 2019-20.

4.3.6. **Traffic Signals**

4.3.6.1. This is a rolling programme with the intent to manage the level of controllers older than 20 years.

4.3.6.2. Desired outcome

4.3.6.3. Performance targets have been established and these show manging the asset at similar levels as now but from 2019 demand will grow as millennial assets reach there 20 year term.

4.3.7. **Street Lighting**

4.3.7.1. Our street lighting is managed using a Private Finance Initiative (PFI)

4.3.8. **Drainage schemes**

4.3.8.1. We were successful in our bid for the DfT challenge fund bid for major surface water drainage works of £10.3m. These were undertaken 2015-16/17/18.

4.3.8.2. Some of the structural maintenance allocation that was to be given to drainage was used as match funding in the DfT bid. As a result limited funding is available for local maintenance drainage schemes in the remainder of the county and this will be allocated on a priority basis. From 2018-19 this will revert to the former level.

4.3.8.3. A small allocation of the structural maintenance allocation has been ring fenced for match funding of bids by our Flood & Water team to the Environment Agency.

4.3.9. **Capital Improvement and Road Safety Scheme**

4.3.9.1. We maintain a £1.3m - £2.1m integrated transport programme with the remainder of the DfT grant being allocated to structural maintenance.

4.3.10. **Sudden Asset Failures**

4.3.10.1. Whilst the Strategy advocates a planned and risk based approach to Asset Management, there may be exceptional circumstances in which a particular asset fails rapidly - beyond prediction.

4.3.10.2. No separate reserve is held for these and the any occurrence will be dealt with on a case by case basis. Members may sanction the use of reserves, alternatively our structural maintenance programme across all asset types could be adjusted to meet new priorities.

4.3.10.3. The condition of Fen roads is particularly difficult to predict as they can be significantly affected by weather conditions. Fenland areas have soils which are "susceptible to cyclic shrinkage and swelling". This is exacerbated in periods of unusually high or low rainfall and this movement can aggravate cracking and subsistence along roads in affected areas. Our life-cycle plans reflect differing treatments and return periods in these susceptible ground conditions.

4.3.11. **Planning Considerations**

4.3.11.1. Our Council understand the importance that growth and re- development has on the future of the local area and economy. There is a need to ensure that any new development / change of use promoted through the planning process fully consider the impact on the existing highway network and its future maintenance.

4.3.12. Data Management and Information Systems

4.3.12.1. In 2016 we implemented new core Highway Management System. We will continue to seek opportunities to use technology to support the service and make efficiencies.

4.4. Performance Framework

4.4.1.1. A performance framework linked to the asset management strategy and the themes of :

- Condition / or age as proxy for Main Asset groups
- Customer Satisfaction
- Serviceability
- Sustainability (Economic & Environmental)

4.4.1.2. This can be seen in Appendix H

4.5. Approval

4.5.1. The Transport Asset Management Strategy was approved by members on 14 October 2016 together with the Performance Framework, allied to the strategy for the main asset groups.

4.6. Review Process Monitoring and Reporting

4.6.1. Highway Asset Performance is reviewed annually and a report shared with members. It covers planned capital structural maintenance of the assets only.

4.6.2. This report highlights:

- Performance against current service level
- Current service priorities
- Customer Satisfaction
- Funding levels and needs

Options on policies strategies and reviews

4.6.3. This allows informed decisions by members.

4.7. Associated Elements

4.7.1. The Hierarchy

4.7.1.1. As well as the national classification (A/B/C/U) the highway network in Norfolk is classified according to a route hierarchy, which distinguishes roads, and footways on the basis of their function and level of use.

4.7.1.2. All trunk roads are the responsibility of the Highways Agency and are not included within the County's network. They are therefore not included in our TAMP.

4.7.1.3. The hierarchy used by Norfolk are shown in App C (i), (ii) and (v) alongside the national classifications from the 2005 Code of Practice and App C (iii), (iv) in map form. Network and item quantities can be seen in the relevant life-cycle plan.

4.7.2. County Council's Legal Network, Policies and Processes

4.7.2.1. Norfolk County Council is the Highway Authority for all non-trunk roads which are maintainable at public expense within Norfolk. As such, the County Council has to fulfil a number of statutory duties imposed by the legal framework.

4.7.2.2. It is the duty of all Highway Authorities to reasonably maintain and repair the highway, and to keep the surface of the road free from that, which might otherwise obstruct it.

4.7.2.3. Appendix A details the legal framework from the authority in respect of highways and transport matters.

4.7.2.4. Many policies are implemented through the Procedures manuals for the Department. These, together with Policies linked to resolutions made by committees are on the Department's procedure pages on the intranet.

4.7.3. A Detailed Inventory of all Relevant Components of the Asset

4.7.3.1. Robust and reliable data are essential to support the County Council's Transport Asset Management Strategy and Plans.

4.7.3.2. The following systems are currently in operation to hold our Highway Data:

- Yotta (Mayrise) Highway Management System for Highways, street works and street lighting
- Yotta (MARCH) Pavement Management System
- Key Accidents
- Asset Management Expert
- Scheme Management Information System
- Geospatial and Access Databases

4.7.3.3. Further information on these can be seen in Section 6 and Appendix G.

4.7.4. **Arrangements for Service Delivery**

4.7.4.1. The Highways Agency are responsible for trunk roads in the County, namely the A11 and A47.

4.7.4.2. Norwich City Council acts as the County Council's agent for the road network in the City. The County determines Policies and Standards and the Agency adheres to them. The annual Business Plan is designed to ensure that the general terms of the agreement are being met.

4.7.4.3. Norfolk County Council is responsible for the remainder of the County road network. All parties liaise regularly to ensure a co-ordinated approach.

4.7.4.4. It is our practice that much of the highway service is delivered locally, and to that end the County has been divided into 4 areas (North, South, East and West) for service delivery.

4.7.4.5. These offices provide public liaison, routine maintenance works (pothole repairs grass cutting, drainage cleansing, road markings, road studs and signs), minor structural maintenance (resurfacing, footway and kerbs, drainage, surface dressing), winter maintenance (gritting and snow clearing), emergency response, and street work co-ordination. The other functions are based at County Hall. See Appendix B for contact details.

4.7.4.6. Some District and Parish Councils have delegated powers under Agency Agreements to carry out specific services within their boundaries. The services concerned consist of grass cutting and some associated highway verge/tree maintenance. Details can be found under the relevant lifecycle plan within this document.

4.7.5. **Good Practice**

4.7.5.1. Norfolk County Council is committed to developing and implementing best practice as it continues to be developed.

4.7.5.2. In October 2016 a Code of Practice for Highway Infrastructure entitled "Well-managed highway Infrastructure: A Code of Practice" was issued by the UK Roads Liaison Group (UKLRG). We have adopted this subject to an improvement plan which will complete in 2018.

4.7.5.3. In the meantime the former code may apply. This is the 2005 a Code of Practice for Maintenance Management entitled “Well-Maintained Highways” was issued by the DETR.

4.7.5.4. Any standards in the TAMP will be cross referenced to the relevant code.

4.7.5.5. We will make the best use of the following where appropriate:

- Highway Maintenance Efficiency Programme (HMEP)
  - Is producing a suite of guidance documents concerning highway asset management. We review these and adopting best practice where resources allow.
- Connect and Share Network
- HNT
  - Benchmarking
  - Customer, Quality, Cost Frontier Benchmarking project and its successor NHT Efficiency Network
- The Chartered Institute of Public Finance and Accountancy (CIPFA)
  - Highways Asset Management Planning Network
- UK Roads Board
- Eastern Highway Alliance (EHA)
- ADEPT Asset Management Working Group
- National and regional conferences
- Professional Institution engagement
- Peer to Peer learning with other authorities
- Competency training

5. Service Levels, Performance Indicators and Improvement Framework

5.1. Service Levels

5.1.1. These describe the quality of services provided by the asset for the benefit of customers.

5.1.2. They are a way in which a highway authority can determine whether or not it is meeting its expectations and statutory obligations in the delivery of the highway service. They enable the Highway Authority to:

- Document and measure the service provided
- Rationally evaluate service versus cost trade-offs
- Determine if adequate consideration is given to what's important to the customer
- Establish if operational activities support the achievement of strategic goals

5.1.3. In simple terms the requirements of the plan guide the development of the levels of service for assets and reflection of demands placed on the service.

5.1.4. The department establishes levels of service where appropriate often using performance indicators and occasionally service groupings.

5.1.5. We are currently managing the service around the PIs stated with the department's Local Transport Plan, Business and Service plan, the lifecycle plans in this document and the annual report to members on Highway Asset Performance. In addition team level indicators may exist which are managed at that level. These are subject to annual review.

5.1.6. **Legislative Requirements**

5.1.6.1. There is a statutory duty to carry out most service work areas. In particular, the Highways Act requires us to maintain public highways. Common law also imposes a general duty of care on the County Council in the way it carries out its statutory functions.

5.1.6.2. Often when a statutory duty applies it is not an absolute duty but to set against statutory defence. For example:

- **Highway Inspections – Section 58 Defence**
- **Precautionary Gritting and Snow Clearing - 'Reasonableness'**
- **Snow clearing - 'Importance of route and Resources'**

5.1.6.3. There is no statutory duty to carry out public liaison but the consequences of not doing so are unacceptable to the public.

5.1.6.4. There is no statutory duty to insure against liability, but the potential consequences of not doing so are increased costs.

5.1.6.5. App A contains further information on legislative requirements.

5.2. Performance Management

5.2.1. With the changes in the national performance arena implemented by the coalition government,

5.2.2. There are some limited requirements for formal performance data reporting to central government in the single data set. Beyond this local government is left with the opportunity to implement its own, locally focused, performance framework.

5.2.3. We agreed with our members at ETD committee 14 Oct 2016 performance measures to monitor our Asset Management Strategy (Section 3). These and current progress on the performance measures can be seen in App H. These are shared and updated with our Members at the Highway Asset Performance Report to EDT committee.

5.2.4. Monthly departmental performance reports are issued to Heads of Groups and are discussed at Departmental Executive Management Team meetings. Additionally a range of key measures are reported monthly to Chief Officers and regularly to member overview and scrutiny panels and Cabinet.

5.2.5. As part of this process we reappraise our lifecycle plans annually and the budget and programme for each service area established.

5.3. Benchmarking

5.3.1.

Customer Satisfaction

5.3.1.1. We participate in the National Highways & Transport Network Public Satisfaction Survey

5.3.1.2. Altogether 121 local authorities signed up for the 2017 survey. Out of the 31 county councils and larger unitary authorities in the peer group, Norfolk ranked in the top 10 in for:
Condition of highways – 10th
Local bus services – 9th
Road safety education – 6th
Ease of access for people with disabilities – 8th
Community transport – 8th

Traffic levels and congestion – 8th

Overall – 7th

5.3.2. Biggest gap between importance and satisfaction both nationally and in Norfolk, across all highway functions continues to be highway condition.

5.3.3. At Key Benchmark Indicator level, 1 improved and 24 declined. At a Benchmark Indicator Level, 14 improved and 63 declined.

5.3.3.1. Our show overall performance is good compared to other County Councils the importance that residents place on the condition of the highway network

5.3.3.2. The County Council has adopted its third Local Transport Plan, which has been termed Connecting Norfolk.

5.3.3.2.1. Development of LTP3 was guided by a comprehensive community engagement plan and used the County Council's web page to engage and gauge the views of elected Members and other key stakeholders, as well as more traditional methods of meetings, seminars, leaflets and questionnaires.

5.3.3.3. The authority has a customer contact recording system and customer contacts are directed via our website the Council's Customer Service Centre. The recording and handling of contacts and are a source of management information.

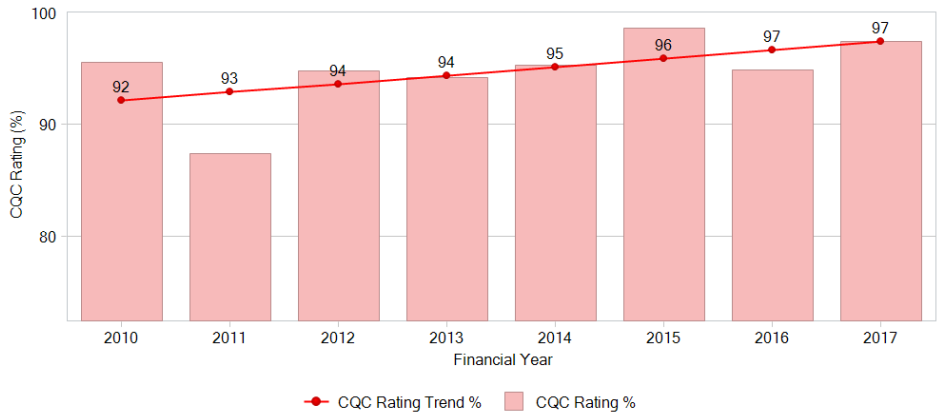
5.3.3.4. This includes a Highways Enquiry Tracker, which allows the public to track the progress of their enquiry through to completion via e-mail by following the services updates in status.

5.3.3.5. Customer views are also actively sought as part of policy development for specific issues, for example the extensive consultation around the Norwich Northern Distributor Road, currently under construction.

5.3.4. Efficiency

5.3.4.1. We are members of the NHT Efficiency Network looking at Customer, Quality and Cost to identify efficiency. We had previously participated in the Cost Quality Customer Frontier benchmarking project which has informed the development of the network.

5.3.4.2. In 2017-18 some 91 LHA's submitted data for the period 2009/10 to 2016/17 Achieving a theoretical 97% efficiency in 2016-17 and an improvement of 5% over the period. See following table.



5.3.5. Local Benchmarking

5.3.5.1. Liaison with the other local authorities in the region is an important component of performance management. The County Council participates in a number of groups:

- Eastern Highways Alliance (EHA) framework
- Maintenance and Asset Management
- Benchmarking (reporting sub-group)
- HMEP/HNT Connect and Share

5.3.5.2. This enables rapid comparison of performance data with nearby authorities and may suggest areas of strength or weakness allowing corrective action. They also allow open discussion of working practices and understanding of requirements.

5.4. Improvement Framework

5.4.1. Asset management builds upon existing processes and tools to form a continuous improvement framework that complements and supplements existing practice.

5.4.2. In accordance with these principles there is a need to monitor progress, setting out improvements to demonstrate that the County has established performance measures, reviews results and sets goals.

5.4.3. This will be ensured by the following processes:

- Keeping abreast of developments.
- Legislation, governmental and corporate guidance, codes of practice and standards and innovative approaches. Reviewing and implementing what is appropriate.
- Transport Asset Management Plan annual review.

5.4.4. Dependent on the scope of the performance indicator and the improvement actions being implemented, there can be a significant delay before any outcomes are significantly improved. In these instances the annual trend in improvement needs to be documented through the review cycle in relation to the aim. If the format of performance indicators is modified too often the trend data becomes more difficult to assess and confidence in the ability to demonstrate improvement reduced.

5.4.5. Actions to address performance gaps can be summarised as follows:

- Perception
- Delivery
- More Funding
- Review service level

5.4.6. Our focus is currently on our BS11000 communication plan, the incentive funding self-assessment questionnaire, and reviewing and implementing the new 2016 Code of Practice.

6. Management of Highway Infrastructure Asset Data

6.1. Objective

6.1.1. Asset data describes what highway infrastructure assets an authority has, where they are and how they perform.

6.1.2. It includes:

- Number
- Location
- Performance
- Financial values
- Public opinion

6.1.3. The overall objective of the asset data set is to:

"Provide the data required to support the approach to asset management."

6.1.4. Typically data is used to support the overall requirements for asset management including:

- Defining network inventory and asset performance
- Supporting statutory requirements (if any)
- Making effective and informed decisions
- Understanding the impact of decisions on the asset and the subsequent level of service and performance
- Assessing and managing risk
- Determining investment requirements
- Assessing and reporting financial value
- Reporting performance.

6.1.5. Effective asset management planning and decision-making relies on this data being available, appropriate, reliable and accurate

6.1.6. The management of all data has to comply with Norfolk County Council's Policy on Data Protection and the requirements of the Data Protection Act 1998.

6.2. Data Management Strategy

6.2.1. Our Data Management Strategy approved EDT committee 14 Oct 2016 documents the approach to the management of highway infrastructure data.

- Data need
    - A Business Case detailing
        - An assessment of the data requirements
        - Demonstrating how they meet the asset management strategy and necessary performance reporting
        - Risks associated with the data
        - Value for money
- Data owner
    - An “owner” is responsible for management of the data. This is typically the team manager.
- Data custodian
    - For managing the data day to day and reporting
- Data collection
    - Requirements for the accuracy, reliability, repeatability of data and value for money.
    - Collaboration in procurement between authorities were beneficial.
    - Frequency of collection and updating
    - A risk based approach has been adopted, particularly where assets are low value and pose low risk to the performance and reporting
- Data management
    - Data storage and date stamping,
    - Management and access rights to the data
    - Processing requirements
    - Reporting requirements and Performance Framework
- Data disposal
    - Informed by our corporate data retention policy with reference to Statute and regulation and Operational need.
- Data reviews
    - Regular reviews should be undertaken to ensure that data continues to support asset management should be considered to ensure that these are / still fit for purpose.
- Data Management Plan
    - Details elements of the DMS for each of our asset management data sets, owner, host and secondary systems, custodian, uses, extent, reliability, confidence, tolerance, publish, cleanse, comments, renewal of data

6.3. Data Management Plan

6.3.1. This is live document for internal use and subject to regular review. For each data set the elements or the Data Management Strategy is detailed.

6.4. Network Referencing

6.4.1. Norfolk commonly uses three methods for network referencing

- National Street Gazetteer (NSG) for Streetworks Register.
- UK Pavement Management System (UKPMS), link and section
- Geo-spatial co-ordinates for GIS

6.4.2. The joining of data using common features allows an integrated solution to reporting, were all attributes are not held in a common database.

6.5. Asset Registers

6.5.1. Asset registers are the repositories for all data associated with the asset. They are typically databases and in developed form are used to support maintenance management and the management of defects, for an asset or group of assets. In their advanced form, they are integrated databases with geospatial referencing.

6.5.2. The following table shows some of the systems and the functions on which they are, and will be, held.

6.5.3.

Register	**Function**	**Tasks**
Highways Management System (HMS) Yotta (from Feb 16)	Inventory	• Creation and maintenance of highway Assets
	Routine Maintenance Management	• Safety Inspections • Defects • Routine rates • Works • Historic record • DLO works management • Reporting
	National Street Gazetteer	• Creation and maintenance of the NSG network
	Other Highway centre line addition attributes	• Hierarchy • Reporting • R199B
	Street works	• Street works Register
	Street Lighting	• Residual highway assets • PFI • Reporting
	Schemes ordering and invoicing	• Orders • Compensation events • Finals

Pavement Management System (PMS) Yotta MARCH		UKPMS	• Condition surveys • Reporting • Stats 130/1/2 • Valuation
Auxiliary	Capital Programme Management	Schemes Management Information System	• Extent • Milestones • Documents • Budgets
	Works Programme Database	Forward St Mt Programme	• Extent • Planned • Specification • Benefits
	Surfacing Scheme Database	Surfacing records	• Extent • When • Specification
	Geo-spatial database	Surface Dressing records	• Extent • When • Specification
	Asset Management Expert (AMX)	Bridges	• Asset Management
	Geo-Spatial CAD	Urban Traffic Control	• Layouts
	'Trails' - Exegesis Countryside Access Management System – MS SQL & Map info	PROW (part)	
	Key Accidents	Accident data	
	Financial Information Management System (FIMS)	Payment records	• Record of financial transactions
	In-house developed database	Traffic counts	• Manual classified • Ped Counts (O&D) • Ped counts (crossing) • Ped count (school crossing) • Ped count (footway) • Radar Gun speed survey • Laser gun speed survey • Vehicle occupancy • Bus passenger counts
	Area office, Legal Dept.	TRO's	• Records
	Area Office system	Permits and Licenses	• Location • Permit agreement

	NHT website	Customer Satisfaction	• Question sets • Benchmarking • Spatial distribution
		Efficiency	• Question sets • Benchmarking

6.5.4. **Highway Management System (HMS)**

6.5.4.1. Our core register is the Highway Management System (HMS). It is used to manage our networks, (National Street Gazetteer, other highway attributes), street works, highway inventory, routine maintenance, street lighting orders, compensation events and payments.

6.5.4.2. We migrated to the Yotta 'Mayrise' system in Feb 2016. It contains a comprehensive set of data (see 6.5.3) for 2016-17 and some limited historic data.

6.5.4.3. A NCC archive exists for data exported from the previous system. This can be accessed via reports.

6.5.4.4. The Department along with our PFI contractor have used the Yotta 'Mayrise' street lighting system since the start of the contract in 2006 to store the street lighting asset inventory as well as associated inspections, defects and works history.

6.5.5. **United Kingdom Pavement Management System (UKPMS)**

6.5.5.1. This register holds the UKPMS network which is the national standard to run accredited condition surveys for roads and footways.

6.5.6. ## Auxiliary Registers

6.5.7. **Schemes Databases**

6.5.7.1. Scheme financial and programme information is held our Schemes Management Information System (SMIS).

6.5.7.2. Various Microsoft Access databases and Geo-databases hold construction history and proposals on the network.

6.5.7.3. Our structural maintenance forward programme is held in our Works Programme Database (WPDB), this is an Access database.

6.5.7.4. A record of road treatments is held in Geo-databases. Our Maintenance Surfacing Schemes Database (MSSD) holds resurfacing and the surface dressing is held on a similar system.

6.5.8. **Structures**

6.5.8.1. The structure data set was moved to Asset Management Expert (AMX) in July 2013.

6.5.8.2. Currently the HMS Inventory records the location and, where possible, the reference number of all bridges and other structures.

6.5.9. **Urban Traffic Control**

6.5.9.1. UTC system is a specialist stand-alone system that has within it, its own traffic signal inventory. The system is maintained internally by UTC.

6.5.9.2. It is held on an Access database and is exported to SDE for geospatial display.

6.5.10. **Public Rights of Way (PROW)**

6.5.10.1. We utilise two systems to manage the PROW records:

- 'Trails' - Exegesis Countryside Access Management System. This is a commercially available system that uses a Microsoft SQL server as the data repository and MapInfo to provide the GIS capability.
- 'Other PROW' – Yotta HMS integrated PROW/road maintenance team.

6.6. Asset Data Sets

6.6.1. **Inventory**

6.6.1.1. The highway inventory was collected by the letting of a number of contracts between 1996 and 2001, and covers the whole county, including the area within the City of Norwich, which is managed by Norwich City Council under an Agency arrangement.

6.6.1.2. As well as providing a location based listing of the component elements of the network, the highway inventory is needed in order to record the current value for each of its highway assets. Since the valuation requires knowledge of its replacement value, current condition and rate of deterioration, we need to be aware of the state of the inventory and condition data in order to complete the valuation.

6.6.1.3. Data collection, storage, retrieval, integration and analysis are fundamental requirements of asset management. A user guide and data management plan has been established to support these activities.

6.6.1.4. The Inventory is held in asset groupings and is used in different ways by a wide variety of users. Requirements from the Inventory and the level of detail needed can be quite different. Users can be divided into two principal types:

6.6.1.5. Operational users – requiring access to data of varying accuracy, on an almost daily basis and for whom the inventory is an essential tool. e.g. UTC, street lighting etc.

6.6.1.6. Strategic users – needing summary information on a less frequent basis, such as providing answers to occasional technical queries, analysis, or preparing annual budgets and maintenance programmes. This use also includes the preparation of the annual valuation report, and carrying out the necessary annual adjustments relative to the changing condition of the asset.

6.6.1.7. The level of detail required for different users will dictate the level of detail that an inventory needs to hold, and thus the level of maintenance it will need to sustain its accuracy and quality. On the basis of risk assessment frequently used data or that of high value needs to be more accurate and well maintained.

6.6.1.8. Some items are difficult to identify upon initial site collection such as filter drains which may have been overgrown and hence are only a partial data set. Since its completion, the inventory within Norfolk has been maintained using as-built drawings from schemes or routine works. Relying solely on this system has caused some deficiencies to occur in the past due to non-supply of records and available resources. Whilst some routine activities such as gully emptying are linked to inventory items and regular feedback from the contractor helps verify records.

6.6.1.9. The current valuation guidelines recognises these circumstances and allows assumptions to be made, for example surface water drainage pipelines.

6.6.1.10. The inventory is subject to ongoing review as part of the Data Management Plan to ensure that all the necessary data is being collected and maintained to enable the plan to function efficiently, subject to risk assessment based upon value for money.

6.6.1.11. The extent, reliability and confidence levels of the inventory data have been assessed and are shown in tables within Appendix E.

6.6.1.12. The current inventory can be described as still fit for current purposes. It is not as complete as possible but still functions for users and no wholesale recollection is currently planned. There are, however, several opportunities for ad hoc inventory collection or validation whilst a site is being visited for other purposes.

6.6.1.13. If the need for some wholescale re-collection of some attributes may need to be considered where confidence levels are unacceptably low. The DMS will be followed including value for money. A detailed cost/benefit analysis for various options will be necessary before any action taken. GPS technology would have to be considered if further widespread collection was to take place. Careful consideration will be given to ensure that the collection of any new data is cost effective, i.e. that it is worth collecting. Since the original data attributes were established, demand for different information has brought the need for some additional attributes, whilst some other attributes are not being heavily used.

6.6.2. Road & Footway Condition

6.6.2.1. Road surface condition data has been collected through programmed machine based surveys SCRIM (based upon Norfolk policy) & SCANNER (classified roads) and Coarse Visual Inspections (unclassified roads)**.** It is regularly refreshed by a fully funded survey regime.

6.6.2.2. The frequency of Highway Inspection schedules for both safety and condition can be seen in Appendix D (i) and (ii). This gives Norfolk sufficient data to enable it to meet the requirements for asset management, reporting for the single data return and WGA see section 7 and Appendices E & F.

6.6.3. Auxiliary data-sets

6.6.3.1. Many items are held that provide additional useful information and condition data on specialist assets and function. These support the basic inventory and condition data, although are primarily used for other purposes. These can also be linked to the network data, and therefore be easily accessible, enabling a comprehensive picture of the asset obtained through mapping and analysis.

6.7. Extent of Asset Data

6.7.1. The tables contained in Appendix E show the groupings, extent and completeness of the Inventory and condition data in relation to:

6.7.2.

- Asset Inventory and Condition Data Held
- Asset Statistics Confidence Levels
- Asset Inventory Confidence
- Asset Inventory Data Collection
- Asset Condition Confidence
- Asset Condition Data Confidence

7. Valuation of the Asset

7.1. Background

7.1.1. In July 2005, the CSS and the TAG Asset Management Working Group published a '*Guidance Document for Highways Infrastructure Asset Valuation'* as a companion document to the '*CSS Framework for Highways Asset Management*'.

7.1.2. Asset valuation is the calculation of the current monetary value of an authority's asset. The current monetary value is defined as the depreciated replacement cost (DRC), which is the gross replacement cost (GRC), less the accumulated consumption.

- The GRC is the cost of replacing the asset with a Modern Equivalent Asset, using standardised Unit Rates.
- Accumulated consumption is the depreciation in value due to ageing, usage, deterioration, damage, reduced service levels and obsolescence.

7.1.3. The need for Asset Valuation is described as:

- Emphasising the need to preserve the highway infrastructure by placing a monetary value on it.
- Demonstrating good stewardship by monitoring the asset over time.
- Supporting WGA and promoting greater accountability, transparency and improved stewardship of public finances.
- Supporting highway asset management.

7.1.4. When published, these documents were supported by HM Treasury, ODPM, DfT, CSS, TAG and SCOTS, but further work was deemed necessary in association with CIPFA and the HM Treasury.

7.1.5. On the 19th March 2010 the resulting Code of Practice on Transport infrastructure assets Guidance to Support Asset Management, Financial Management and Reporting was published. This was superseded in 2013 by the latest version.

7.1.6. The purpose of this Code is to support an Asset Management Plan (AMP) based approach to the provision of financial information about local authority transport infrastructure assets. The intention is that each authority should develop a single set of financial management information about these assets that is robust and consistent between transport authorities and supports:

- Good, evidence-based asset management, including the development of more cost-effective maintenance and replacement programmes
- Delivery of efficiency savings and service improvements
- Long-term financial planning and budgeting
- Corporate capital planning and the operation of the Prudential Code
- Performance assessment and benchmarking
- Resource allocation, locally, at regional level and nationally

- Production of transparent information for stakeholders on the authority's management of its highway assets
- Production of financial information that is compliant with International Financial Reporting Standards (IFRS) and meets the needs of Whole of Government Accounts (WGA) and National Accounts

7.2. Whole Government Accounts Timeframe

7.2.1. Progress

7.2.1.1. We have been working to the timescale set-out by HM Treasury and CIPFA which have been altered several times. The process began in 2010 and thresholds for information have gradually been increased for the Highway sector year on year.

7.2.1.2. For 2016-17 year - In July 2017 we submitted a GRC OF £14,639,989,000 for the 2016-17 and an accumulated depreciation closing balance of £776,746,000 year end using the methodology and supporting information provided at that time. This gave us a DRC of £13,863,243,000.

7.2.1.3. We have been working with our Finance, both the Capital and WGA teams, to better understand the requirements from both departments and a small working group was instigated in 2015 to ease the full introduction of this code which was planned for July 2017.

7.2.1.4. An internal audit was started in 2016 which was due to proceed an external audit by Ernst Young (EY) in the same year. Due to complications, as mentioned below, this was not followed through to completion. Although ultimately not finished the initial process had been useful in confirming the process adopted was fit for purpose.

7.2.1.5. However it has been decided by the CIPFA/LASAAC code Board (8th March 2017) not to progress with the financial reporting requirements for local authorities. The Board decided that, currently and in particular in the absence of central support for key elements of the valuation, the benefits are outweighed by the costs of implementation for local authorities. The Board determined that it will give further consideration to the issue only if provided with clear evidence that benefits outweigh costs for local authorities.

7.2.1.6. It had been further complicated by a possible accounting anomaly which could make it difficult to conform to IFRS.

7.2.1.7. The Board recognises the work undertaken by accounts prepares, auditors and highways engineers in preparing for the planned changes and would encourage continued improvement of the management of the highways network asset through better inventory and cost information.

7.3. Future Guidance

7.3.1. CIPFA in association with other bodies will monitor the success of the WGA which will continue to be gathered as before but they have no agenda at present to populate the General Ledger with these figures.

7.3.2. Further guidance, from CIPFA and their associated bodies, confirming this and the development of methodologies and processes will follow in due course.

8. Budgets

8.1. Funding types

8.1.1. Funding for Highway Maintenance covers two elements:

- Capital, used for renewal of assets
- Revenue, primarily used for day-to-day, routine maintenance (cleaning and servicing activities), together within promotional activities such as road casualty campaigns and walking and cycling.

8.1.2. The Government provides funding to local authorities for both. Additional funding can be undertaken by Highway Authorities and contributions from others for example developers.

8.2. Sources of Finance

8.2.1. Capital funding for transport schemes is largely provided by government

- The Highways Maintenance block grant
- Integrated Transport block grant, both determined through government formula.
- National Productivity Investment Fund from 2017-18

8.2.2. The block grant capital allocations are not ring-fenced for transport and may be used to fund other County Council services. Allocations have now been published up to 2020/21.

8.2.3. The Highways Maintenance Block formula 2015/16 – 2020/21, was sub-divided consists of:

- Needs based element
- Challenge Fund (bidding opportunities) (Ring-fenced)
- Incentive element (from 2016-17)
- Permanent Pothole Fund (from 2016-17) (Ring-fenced)

8.2.4. The National Productivity Investment Fund was established in 2017-18 and was directly allocated for that year for broad transport use. For 2018/19/20 the fund was accessed by a bidding round for improvements based around economic growth, development and congestion. Norfolk was successful in a securing funding to install a roundabout at Hempnall on the A140.

8.2.5. Revenue funding based on a formula is provided by the Government as part of the Formula Grant from the DCLG

8.2.6. Private sector funding is also available from developer contributions under Section 106 agreements, and in the future, possibly through the Community Infrastructure Levy (CIL) and Strategic Economic Plan (SEP)

8.2.7. Other sources of funding such as the Local Growth Fund via the Local Enterprise Partnership (LEP) can be approached principally for improvement, but also for structural maintenance.

8.2.8. The County Council may also choose to allocate funds for Capital Transport schemes both Maintenance and improvements from funds it raises through the Council Tax, other revenue grants and sources together with the sale of assets. It can also choose to fund Capital investment in transport schemes from borrowing.

8.2.9. The allocation of resources to the Community and Environmental Services Department and hence the highways budgets is decided annually by Members in the light of the Council Plan, Annual Performance Plan and Departmental Service Plans. The Department has delegated powers to allocate the overall highways budget to achieve best value and optimise the condition of the asset.

8.3. Recent and Future Funding

8.3.1. The 2013 Spending Review announced a funding commitment by Government for the Highway Maintenance Block of £976 million per year over six years from 2015. As part of the new government formula a Challenge Fund bidding process was established. During 2014-15 additional one-off grants were made for flood/water damage and potholes. Government no longer provides specific revenue support for de-trunked roads (A10, A134, A140, and A17). This is now included in the Highways Maintenance block allocation. In additional from 2016-17 DfT pothole fund, and DfT incentive fund were established

8.3.2. In 2018-19 our Council announced a £20m investment in Highways over a 4-year period. The investment was to be directed to integrated transport schemes.

8.3.3. Whilst Government requires Councils to set budgets for at least 3 years, to reduce fluctuations in Council Tax levels, the actual allocation to Highway services may vary annually to enable response to changing priorities or budget pressures elsewhere in the Council or Government

8.3.4. Capital funding for highways is approved by our members annually as part of a report on the Highways Capital Programme, a summary of planned spend can be seen in App G(iii).

8.4. Allocation of Budgets

8.4.1. Routine Maintenance

8.4.1.1. The allocation is assessed to meet the standards contained within the lifecycle plans, contractual charges for energy, specialist maintenance such as traffic signals, gully emptying, street lighting, grass cutting, weed control and services such as weather forecasting, salt supply and road condition surveys.

8.4.1.2. Those budget elements where maintenance can be related to a frequency such as cleansing or have little public interaction, such as road studs, have been based upon our inventory, schedule of rates and maintenance frequency and also assumptions.

8.4.1.3. The budgets for the remainder is based on historical data with variations from year to year to take account of variable weather, inflation, inventory increases and pressures in any particular area of work identified through customer demands, surveys and inspections.

8.4.1.4. The budgets for routine maintenance in each area are allocated on the basis of population demography. The budgets are kept under review through the year and changes in the allocations made to accommodate any specific pressures should they arise. Appendix G (i) shows the budget distribution for 2018/19.

8.4.1.5. The allocation for Public Rights of Way is based on historical information on expenditure and assessed need.

8.4.2. **Structural Maintenance**

8.4.2.1. The headline budget is informed by:

- Lifecycle plans for each asset type
- Member priority
- Available budgets
- Pragmatic asset management approach

8.4.2.2. Annual reports are produced for members on:

- Capital Programme and TAMP on structural (capital spend) and standards - Jan/Feb
- Highway Asset Performance and TAMP report for comment on priorities, funding and spending - July

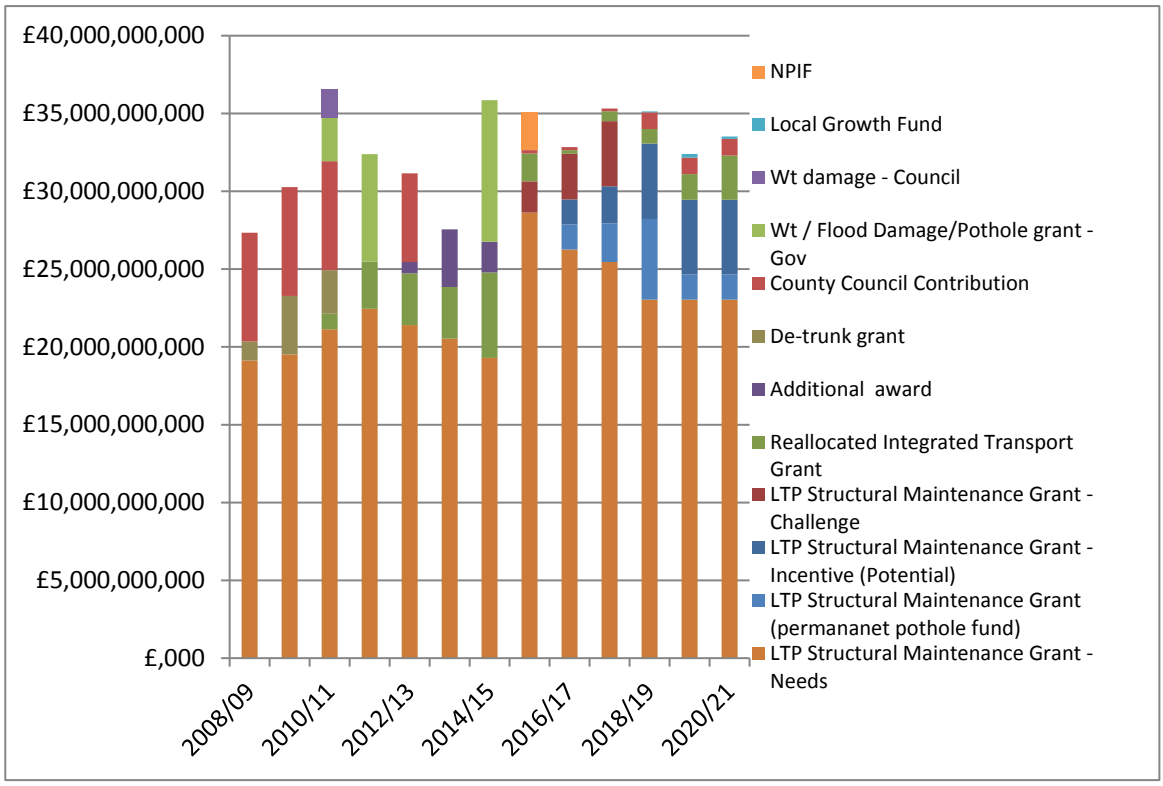
8.4.2.3. These form part of a ‘Plan, Act, Do, Check’ cycle.

8.4.2.4. The draft allocations and programmes are approved by our Cabinet member in September to enable schemes to be placed in early development for the following year. The allocation of the budget are subsequently formally approved by EDT committee as part of the Highway Capital Programme. The allocations agreed by committee for 2018/19 as shown in Appendix G (ii).

8.4.2.5. Occasionally government may give later additional funding due to unusual circumstances. For 2018-19 Government made announcements in February and March of additional funding for 2018-19 which will be reported to later EDT committees

8.4.2.6. Recent Structural maintenance allocations and projected to 2020/21 are displayed in the following graph:

8.4.2.7.



8.4.3. **Integrated Transport**

8.4.3.1. The LTP describes the County Council's transport strategy with the associated programme of schemes. The programme is developed to support local LTP objectives. The detailed improvement programme at scheme level is, where possible, linked to the Maintenance Programme to achieve better use of funds and minimise the impacts on the network.

8.4.3.2. Following central government funding reductions and local prioritisation towards structural maintenance, our members have the Integrated Transport spending from the DfT grant of £3.2m in 2018/19. However significant investment is now available from other sources.

8.4.3.3. It is approved by our members as part of a report on the Highways Capital Programme, a summary of planned spend can be seen in App G(iii).

9. Forward Programme and Optimisation

9.1. Development of detailed programmes

9.1.1. Maintenance

9.1.1.1. Asset management principles are used to assess budgetary options, distribute budgets between assets types and sub-types and multi-criteria analysis used to prioritise schemes within these budgets.

9.1.1.1.1. A and B roads together with C roads in Norwich City

9.1.1.1.1.1. The programme is developed directly by the Asset team on the basis of annual route inspections together with the UKPMS Condition Index analysis, and SCRIM testing. The method of allocating the available funds to surface dressing, resurfacing and reconstruction is described below:

- Condition surveys organised
- Condition survey treatment recommendations displayed on Norfolk Mapping Browser
- Annual Route inspections to verify data, forward programme prioritisation and identify any new schemes
- Review condition data within scheme limits and recommend within treatments
    - Roads,
        - Intermediate - surface dressing, reclamite
        - Long-life resurfacing, recycling or reconstruction
- Core priority sites to confirm preferred pavement design.
- Consult Area, Laboratory and delivery staff at Gateway 1 meeting.
- Confirm programme.
- On A roads only identify schemes with SCRIM values at or below investigatory level, investigate casualty record and add to the appropriate treatment programme, unless already identified in confirmed programme (within agreed time frame).

9.1.1.1.2. Remaining Roads and Footways

9.1.1.1.2.1. The programme is developed by the Area teams on the basis of the locations identified by the engineering staff and their suggested remedial treatments, with review centrally to minimise variations in assessment of defects and appropriate remedial treatments. The process is described below:

- Condition surveys organised by Asset Team
- Condition survey treatment recommendations displayed on Norfolk Mapping Browser by Asset Team
- inspections to verify forward programme prioritisation and identify any new schemes

- Review condition data within scheme limits and make recommendations for treatment
    - Roads,
        - Intermediate - Surface dressing, reclamite
        - Long-life - Resurfacing, recycling or reconstruction
    - Footway
        - Intermediate – Slurry Seal, Fine Cold Asphalt, Surface Dressing
        - Long Life - Resurface, Reconstruction
- Prepare draft programme to anticipated budget levels
- Consult Area, Laboratory and delivery staff at Gateway 1 meeting
- Confirm programme

9.1.1.1.3. Drainage

9.1.1.1.3.1. The drainage programme is based on a priority assessment method which calculates a “score” taking into account:

- The extent and depth of flooding and where it occurs
- Category of road
- Traffic flows
- The type and number of properties flooded
- Whether the flooding results in splashing of property, cyclists and pedestrians
- Alternative Routes

9.1.1.1.4. Area Managers Schemes

9.1.1.1.4.1. This small allocation is included to enable the four Area Managers and Norwich City acting as our agent to bring forward schemes on the basis of the following criteria:

- Schemes that are a bit too big for routine works
- Applies to all Marshall heads
- Likely to cost less than £10,000
- Should be easy to design and construct
- To cover some emergency works not contained in Routine
- Can be proposed by Member, Parish, customer or Area staff
- Supported by local member and Area Manager

9.1.1.1.5. Street Lighting and illuminated Traffic Signs

9.1.1.1.5.1. This forms part of our PFI agreement.

9.1.1.1.6. Traffic Signals

9.1.1.1.6.1. The priority for replacement of older signal installations is based on a risk register which includes:

- Age of equipment
- Production status
- Scarcity of controller type
- Spares availability
- Whether installation is fully ducted with chambers
- Known replacement proposals
- Known maintenance problems

9.1.1.1.6.2. In addition a User Risk Rating covering safety issues is applied where site maintenance ratings are identical. Schemes are ranked in priority order for bringing forward into the replacement programme.

9.1.1.1.7. Public Rights of Way

9.1.1.1.7.1. Work programmes are based on a risk assessment of the severity of the problem and the likelihood of its affecting others. Issue logged for attention as follows:

- Immediate – if it has health and safety implications
- High – if it affects a nationally, or regionally, promoted route
- Medium – if it affects a well-connected or well used path
- Low – if it affects only an isolated generally unused path or one that runs alongside another path

9.1.2. **Improvements**

9.1.2.1. A process is in place to identify and prioritise various improvement schemes, taking account of:

- service criteria
- budgetary constraints
- practical constraints

9.1.2.2. This provides a framework to assign proposals to either a longlist of schemes awaiting funding, or to the capital programme for delivery. The capital programme proposals are reported annually to members for approval.

9.1.2.3. In recent years, in addition to our annual LTP funding, a greater range of funding options has emerged (Local Growth Fund, National Productivity Investment Fund etc). The County Council keeps all available funding streams under review and submit bids where funding criteria are considered likely to be satisfied.

9.1.2.4. Footways

9.1.2.4.1. An assessment process is in place to suggest the relative priority for inclusion in the programme. The assessment includes the physical characteristics of the route, the availability and accessibility of safe areas off the carriageway, volume of pedestrian and vehicular traffic, age profile of pedestrians and accident data. In addition to the assessment score other factors such as proximity to schools, links to local services and public transport, condition survey and cost are considered in determining the programme.

9.1.2.5. Pedestrian Crossings

9.1.2.5.1. The initial assessment process identifies the need for a site to be assessed in more detail. The priority for these assessments is based on the level of expected use, the casualty history and the proximity to schools, homes for the elderly, local services, public transport, etc.

9.1.2.5.2. The inclusion of a scheme in the programme for construction is reliant on the outcome of the detailed assessment in terms of the form of the crossing, cost and timescale for its construction.

9.1.2.6. Local road schemes

9.1.2.6.1. This covers delivery of:

9.1.2.6.2.
- New and improved access roads
- New and improved junctions
- Road dualling and widening

9.1.2.6.3. Priority is given to the improvement of the agreed Route Hierarchy. The priority of potential schemes is based on casualty data and maintenance costs with the intention that any improvements reduce the number of casualties and ongoing maintenance costs.

9.1.2.6.4. In rural areas priority is given to junctions between routes within the Route Hierarchy in order to encourage the use of the most appropriate roads. The main factors determining the priority of a junction for improvement are casualties and congestion. In some cases improvements can be funded from the Local Safety Schemes Budget, but in most cases this is not possible because the cost of the works results in a low cost/benefit rate of return. Other factors including the potential benefits for pedestrians and cyclist are considered.

9.1.2.7. Public Transport Improvements

9.1.2.7.1. Schemes are brought forward to achieve the priorities and targets within the Bus Strategy, Interchange Strategy, Rail Strategy and Demand Responsive Transport.

9.1.2.8. Cycling

9.1.2.8.1. The county Council has developed a cycling and walking strategy which provides a developing framework to promote this part of the network, and with a view to accessing suitable funding streams. Priority is generally given to those schemes that will generate increased cycle use and/or enable complete routes to be established. In addition, a series of Market Town Walking and Cycling Studies have identified measures to develop networks within the towns, these will be brought forward in a similar way as funding permits.

9.1.2.9. Local Safety Schemes

9.1.2.9.1. Proposed improvement at cluster site locations that achieves a first year rate of return of 200% or more are considered for inclusion in this programme. Priority is generally given to those achieving the higher rates of return but other factors such as the contribution to other LTP objectives, and timescales for implementation are considered when developing the programme.

9.1.2.10. Traffic Management

9.1.2.10.1. The programme generally contains relatively small-scale schemes to introduce or modify speed limits, waiting restrictions and weight restrictions to deal with local concerns. Larger scale improvements are included within the “other improvements” category.

9.1.2.11. Other Improvements

9.1.2.11.1. This category includes larger traffic management schemes and pedestrian priority schemes. These schemes implement elements of area strategies, or can be linked to regeneration aspirations of Town and District Councils. When linked to regeneration their timing is dictated by the availability of external funding.

9.1.2.12. Traffic Calming

9.1.2.12.1. A detailed assessment method looks at accident rates and vehicle speeds. Only schemes likely to reduce casualties are brought forward, and those are prioritised on the basis of casualty reduction potential.

9.1.2.13. Bridges

9.1.2.13.1. The purpose of the Bridge Strengthening programme is to enable the network to be accessible to all vehicles. Priority is given to those weak bridges on the Route Hierarchy network, although the actual programme has to reflect the priorities of the owners of rail or other private bridges.

9.1.2.14. Parish Partnerships

9.1.2.14.1. This programme was introduced 2012 and has proved very successful. Parishes can bid for match funding to deliver small highway improvements which are a priority for local communities. Popular bids in recent years include ‘trods’ (unbound footways) and SAM” (flashing speed signs)

9.2. Scheme Development

9.2.1. Schemes are developed through the feasibility, preliminary and detailed design stages. Through these stages the optimum scheme is developed by consideration of the items listed below. The extent to which these items are considered varies from scheme to scheme depending on their complexity, cost, timescales, extent of public consultation etc.

- Definition of the problem.
  Identification of the opportunity or problem through LTP Area Strategies, surveys, Departmental Service Plan, correspondence or accident information. Details of any surveys that have been carried out, or required, together with standard assessment methods. Details of any inter-group discussions and liaison with the Laboratory.

- Define the stakeholders.
  Define who is affected by the problem and who the likely beneficiaries are. List those persons who either need to input in the process or who should be advised of the outcomes.

- What are the constraints?
  Define any constraints imposed by existing features e.g. SSSI's or listed buildings. List other constraints such as budgetary measures, programme requirements NRSWA requirements, any constraints imposed by other schemes in the area.

- What are the solutions available?
  Look at all possible solutions to address the problem/issue having regard to any constraints.

- Are the solutions deliverable?
  Carry out checks to ascertain delivery given any constraints imposed by outside factors. Can the constraints be overcome or alleviated by other measures?

- What are the costs associated with each solution?
  Prepare detailed estimates of each solution outlining the certainty of cost and any items which may be subject to change?

- What are the perceived benefits from each solution?
  List all benefit both in qualitative and financial terms. Financial benefits will include savings e.g. from predicted reductions in accidents following completion of an improvement scheme.

- Define and assess the risks associated with a scheme?
    - Assess the risk, particularly related to potential insurance claims based on advice from Insurance Section, of using different types of materials.
    - Assess the risks of completing and not carrying out the scheme.
    - Assess the risk of any stage completions and how these can be minimised.
- Define the solution from which the greater benefits can be derived.
  Compare perceived benefits with the cost of each solution to arrive at optimum solution also having regard to any financial and programming constraints.

9.3. Programme Development

9.3.1. Organisational Opportunities and Restraints

9.3.1.1. Resources

9.3.1.1.1. The ability to maintain and improve the assets depends to a great extent on the level of funding available, the proportion of these allocated to the asset groups and the effectiveness of the targeting of the resources based on condition or any other policies or priorities. The funding will vary from year to year therefore the Asset Management Plan must be flexible to respond to these changes. Also, it must be able to inform the Members of their decisions by illustrating the effects of possible budget options.

9.3.1.1.2. Every effort is taken to coordinate the combination of improvement and maintenance works to optimise value for money and minimise disruption.

9.3.1.2. Traffic Management Act

9.3.1.2.1. The Traffic Management Act (TMA) requires us to change from our traditional role of asset providers and maintainers to one of network operator. As network operator we are required to minimise disruption for network users through better planning and coordination of all works, whether by utility companies or our own. Though this restriction could have implications on the cost of works, if contractors are unable to start works earlier than notified if resources are available, it ensures that those who live close to the works site or use the network are informed of our intentions and we consider their needs alongside our asset management needs. We are responding to the TMA by doing more detailed advanced planning to give earlier certainty of programming and will also make it easier for us to consider, understand and explain the consequences of programme changes to our network users and stakeholders.

9.3.2. Current Programmes

9.3.2.1. Currently the County Council has the following programmes:

- Maintenance
    - Indicative 5-year programme for A and B road maintenance works based on survey data. the Cabinet Member for Planning and Transportation, and then Members are consulted through annual Area Office surgeries. See Appendix G (v - vi).
    - Indicative 5-year programme of maintenance schemes for non-principal roads based on inspection data. The annual programme is agreed with the Cabinet Member for Planning and Transportation,

and then Members are consulted through annual Area Office surgeries. See Appendix G (v - vi).

- The annual draft programme is agreed with Committee chair and vice-chair of the Environment Development and Transport committee.

- Budget distribution is confirmed with the Environment Development and Transport committee and the Full Council.

- Improvements

  - A detailed 2 year programme is approved by Members through discussion the EDT committee, and approved at Full Cabinet. See Appendix G (iii). Beyond this an indicative programme for the years 3 to 5 is also updated annually.

  - Parish Partnerships. The annual programme is approved by Members through discussions with the EDT committee

- A Street lighting replacement programme is delivered within the street lighting PFI contract.

- Annual programme of smaller scale area manager schemes is agreed through consultation with local members and the Area Office.

10. Adaptation to climate change and the TAMP

10.1. Introduction

10.1.1. Norfolk County Council has a key role in addressing the impacts of climate change on its services, in addition to any statutory obligations it has. Fundamental aspects to this responsibility are:

- Embedding climate impacts and risks across council decision making and delivery of functions.
- Implementing appropriate adaptive responses in all priority areas.
- Working with Partnerships to take a risk-based approach to managing major weather and climate vulnerabilities/opportunities across the wider local authority area.

10.2. Climate change – some background

10.2.1. Adaptation vs mitigation

10.2.1.1. Within the terminology used around climate change two are key terms – ‘Adaptation’ and ‘mitigation’.

- ‘Adaptation’ is the response the impacts that are already happening, such as the impacts derived from the increased incidence of extreme weather events – across all seasons.
- ‘Mitigation’ is a term that addresses actions that are applied to reduce the causes of climate change.

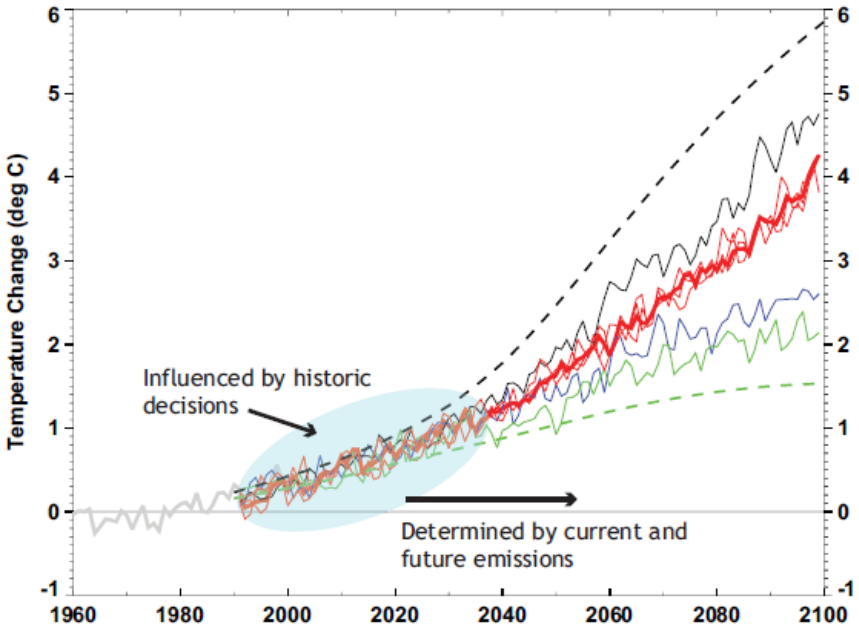
10.2.2. Climate vs Weather

10.2.2.1. Weather is often confused with climate. The difference between weather and climate can be remembered as ‘*climate is what you expect, weather is what you get*.’

10.2.2.2. Climate change is the concerned with long term trends in weather - often over an average of 30 years or more of weather data. That way trends can be identified.

10.2.3. Inevitable climate change

10.2.3.1. Due to historic emissions of greenhouse gases and their lengthy atmospheric lifetimes, we are committed to an inevitable degree of climate change, irrespective of the mitigation measures we may put in place now. This is illustrated in the following diagram:



10.2.3.2. Figure 1 – Inevitable climate change. The shaded blue area denotes the amount of climate change to which we are already committed due to historic emissions and the atmospheric lifetimes of greenhouse gases (source: UKCIP, 2010). Note: for information on modelling future climate change and emissions scenarios, see **the UKCIP website.**

10.2.3.3. Given the changes happening now, we will need to consider how we ensure this understanding is embedded in all key decision making processes, not least the impacts on transport networks.

10.3. What can we expect in Norfolk?

10.3.1. In essence, the effects of future climate change can be divided into three distinct changes:

- Hotter, drier summers
- Warmer, wetter winters
- Coastal change

10.3.2. Inevitably due to these polarised seasonal changes. For example, more severe weather events such as storms or increased levels of rainfall are increasingly being seen. This will lead to on the ground impacts. As such this has required the Council to consider the risks to service delivery of any changes in the climate.

10.4. Top five risks for Highways and Transportation

10.4.1. Risk assessment work done to date has identified the following concerns impacting upon the highway:

1. Increase in frequency and intensity of fluvial and surface water flooding of highways Increases in the frequency and intensity of fluvial and surface water flooding events may result in flooding of the highways due to exceeding drainage capacity.
2. Increased heat-induced damage to highways surfaces (e.g. bleeding, rutting and tracking) Increases in the frequency and intensity of heat waves are expected to increase heat-induced damage to highways surfaces (e.g. bleeding, rutting and tracking).
3. Increased flood related damage to bridges and culverts Increases in the frequency and intensity of fluvial and surface water flooding may result in increased flood related damage to bridges and culverts.
4. Increased storm surge flooding of the highways network Increases in frequency and intensity of storm surges may result in increased flooding of the highways network.
5. Increased maintenance of soft estate Warmer, drier summers and warmer, damper winters are expected to enhance rates of vegetation growth, resulting in a longer growing season.

For the latest information with regarding climate change as it affects the East of England, check the UK Climate Impacts Programme: UKCIP Website

10.5. What are the TAMP's adaptive options?

10.5.1. There can be any number of different adaptation options available for any given risk. As a guide there are five areas or types of adaptation that the TAMP could consider:

- Increase understanding about vulnerability (and opportunity) posed by climate changes e.g. conduct a risk assessment / keep abreast of changes in climate change science
- Adapt plans to ensure correct procedures are in place to cope with climate change risks e.g. business contingency plans
- Protect risk receptors financially by sharing the risk with insurance
- Enhance risk receptor in situ or move it away from vulnerability or towards opportunity
- Work with other organisations, especially where risk synergies exist, to share the costs and benefits of adaptation

10.5.2. For more information about adaptation options see the UKCIP website.

10.5.3. These provide additional tools that can enable you to understand the issues involved and assist a strategic and operational approach.

10.6. Managing climate change risks

10.6.1. Business Continuity

10.6.1.1. We have completed some work to look at adaptation to climate change and business continuity links and we have encouraged departments to consider these links particularly when looking at risks to their service in the longer term.

10.6.2. Service Planning

10.6.2.1. It is important as part of any risk assessment process that managers are encouraged to consider how they can 'future proof' their services against climate change.

10.6.3. Strategic Planning

10.6.3.1. As an additional statutory requirement that can impact upon responses that factor in climate change, NCC has obligations under the Flood and Water Management Act 2010. Therefore a Flood and Water Manager and SuDS engineer are available for advice on infrastructure issues pertaining to the highway.

10.6.3.2. NCC as a Lead Local Flood Authority (LLFA) is now statutory consultee in the planning process. Currently restricted to standing advice unless thresholds met.

10.6.4. Corporate Risk Management

10.6.4.1. Our corporate risk register does not currently hold long term risks. Therefore, our current position on dealing with long term risk, such as climate change, is to encourage departments to liaise with Business Continuity and Climate Change teams where appropriate, if they are uncertain as to what impacts are associated with their service area. Alternatively, they can explore impacts via UKCIP's 'Adaptation Wizard' than can be seen accessed via their website: UKCIP Adaptation Wizard

10.7. Transport Network Resilience

10.7.1. The severe winter weather of 2013/14 had a major impact on national transport systems, including many local roads which were subject to localised funding flooded for prolonged periods e.g. Somerset Levels

10.7.2. As a consequence of this disruption, the Secretary of State for Transport commissioned a Transport Resilience Review, which was published in July 2014. The Department for Transport supported all 63 Recommendations.

10.7.3. A key recommendation of the 2014 Transport Resilience Review for Local Roads is “that Local Highway Authorities identify a ‘resilient network’ to which they will give priority, in order to maintain economic activity and access to key services during extreme weather.”

10.7.4. In November 2015 the members of our ETD committee approve the ‘Resilient’ network see Appendix C(ix)

10.7.5. The resilient network will be used as a basis for decision-making and included in the prioritisation criteria for relevant assets.

10.7.6. All risks associated with the resilient network will be documented together with mitigation and be subject to review.

10.8. Flood & Water Management

10.8.1. The Flood and Water Management team has completed the Preliminary Flood Risk Assessment (PFRA) for Norfolk. The PFRA is a high level assessment of significant flood risk describing both the probability and harmful consequences of past and future flooding. It concentrates on the potential impact of flooding on people, business and critical services (e.g. hospitals, energy/water supply.) Areas of concentrated risk are prioritised for detailed studies such as through Surface Water Management Plans.

10.8.2. Surface Water Management Plans

10.8.2.1. A Surface Water Management Plan (SWMP) is a framework to help understand the causes of surface water flooding and agree the most cost effective ways of managing surface water flood risk. Surface water includes flooding from surface run-off, ordinary watercourses and ground water.

10.8.2.2. The main outputs are a co-ordinated Action Plan to prioritise projects to reduce surface water flood risk and detailed mapping of areas prone to surface water flooding.

10.8.2.3. SWMPs have been undertaken in the Norwich Urban Area, sixteen settlements in the Borough Council of King’s Lynn and West Norfolk, the Borough of Great Yarmouth and are progressing in the Districts of North Norfolk and South Norfolk.

10.8.3. Further Flood Risk Studies

10.8.3.1. The PFRA highlighted areas of risk that needed further county-wide studies that stand outside the remit of SWMPs. These studies will look at the flood risk to the transport network, agricultural land, heritage sites, important habitats and critical infrastructure. Further assessment of the flood risk from groundwater and ordinary watercourses will feed into these studies.

11. Risk Management

11.1. What is Risk Management?

11.1.1. Risk management is the planned and systematic approach to the identification, analysis, evaluation, treatment and monitoring of risk. The main objective of risk management is to ensure that threats to achieving the organisation's objectives are appropriately managed. . Risk management is an integral part of corporate management for Norfolk County Council.

More detailed information about the approach to risk management within Norfolk County Council can be found at Norfolk's Risk Management webpage.

In addition, an eLearning risk management training course can be found on the Learning Hub, by selecting the How to Manage Risk course from the Business Essentials/Managing Risk category.

11.1.2. Risk management should be effectively used to minimise the negative effect of threats and maximise the benefits of potential opportunities. Therefore risk management is about asking:

- What can go wrong?
- What are the consequences of something going wrong?
- What are we already doing about it?
- What more can we do about it?
- What level of risk can we tolerate?
- What opportunities can we capitalise on?

11.2. Benefits

11.2.1. Some of the potential benefits from risk management are:

- Increased likelihood of achieving our objectives
- Improved identification of opportunities and threats
- Raised level of awareness of the need to identify and treat risks
- Earlier identification of risk events
- Better compliance with relevant legal and regulatory requirements
- Improved levels of governance
- Enhanced public reputation
- Improved stakeholder confidence and trust
- More established and reliable basis for improved decision making and planning
- Improved levels of compliance and professional standards
- More effective allocation and use of resources dedicated to risk treatment
- Enhanced performance in areas such as health and safety, environmental protection and data protection
- Reduced claim costs, fines and penalties
- Improved loss prevention and incident management
- Improved organisational resilience

11.3. Types of Risk

11.3.1. The categories of risk that can be found within the Communities and Environmental Services department are:

- **Professional/Operational**: those associated with the particular nature of each profession.
- **Economic/Commercial**: those associated with financial planning and control and the adequacy of risk financing policy. Those affecting the ability of the council to meet its financial commitments.
- **Health, Safety and Welfare/Human Resources**: those related to possible breaches of Health and Safety legislation and to the well-being of all stakeholders.
- **Information/Project Management**: those associated with managing information including issues of data protection and freedom to information. Those related to IT/communications systems. Those related to management of projects.
- **Technological**: those associated with our capacity to deal with the pace/scale of technological change, or our ability to use technology to address changing demands.
- **Contractual/Partnership**: those associated with the failure of contractors/partners to deliver services or products to the agreed cost and specification. Those related to services provided by the council to external organisations.
- **Physical**: those related to fire, security and accident protection (for example hazards/risks associated with buildings, vehicles, plant, and equipment).
- **Environmental**: those relating to the environmental consequences of realising our objectives (e.g. in terms of energy, efficiency, pollution, recycling, climate change and sustainability).
- **Business Continuity**: those associated with the inability to continue delivering the services to the public to an acceptable level following the occurrence of an incident.
- **Reputational**: those associated with the public confidence and the image of the council that the public has of the services it delivers.
- **Political**: those associated with failure to deliver either local or central government policy, or to meet the local administration's targets.
- **Legal/Statutory:** those associated with the current or potential changes to legislation at national and international level.
- **Procurement/Commissioning**: those associated with letting large contracts and commissioning new services.
- **Fraud and Corruption:** those associated with theft, embezzlement, fraud, bribery, corruption and money laundering.

11.4. Risks and the Transport Asset Management Plan (TAMP)

11.4.1. Risk management has been included in the TAMP. It is possible to apply our corporate risk matrix to any planned activities, including:

- Highway defect response arrangements using these principles, see Appendix D (vii) and D (viii)
- Performance indicators and associated targets (see individual lifecycle plans)
- Frequency based operations
- Tasks
- Finance

11.4.2. Risks will commonly be described as being categorised as either Financial/Commercial or Professional/Operational within the corporate guidance.

11.5. Risk Score

11.5.1. The risk score (demonstrating its significance) is calculated using a matrix described in the corporate document “Well Managed Risk - Management of Risk Framework”. The matrix can be viewed in the following illustration and is used for scaling the severity of risk, by taking into account various factors, such as service delivery, and potential financial loss).

The following matrix shows how the corporate risk template has been used for the highway defect risk register.

		IMPACT				
		Insignificant 1	Minor 2	Moderate 3	Major 4	Extreme 5
LIKELIHOOD	Almost Certain 5	5	10	15	20	25
	Likely 4	4	8	12	16	20
	Possible 3	3	6	9	12	15
	Unlikely 2	2	4	6	8	10
	Rare 1	1	2	3	4	5

KEY TO MATRIX	RISK CATEGORY	HOW THE RISK SHOULD BE MANAGED	
	High Risk (25)	Response 'A'	2 Hours
	Higher Medium Risk (12-20)	Response 'B'	Up to 4 days
	Lower Medium Risk (5-10)	Response 'C'	Up to 35 days
	Low Risk (1-4)	Response 'D'	More than 35 days (repair during next available programme, schedule a more detailed inspection or review condition at next inspection)

11.5.2. **Likelihood Score**

1 – Rare - The defect will mean an incident may occur only in exceptional circumstances
2 – Unlikely – The defect will mean an incident is not expected to occur
3 – Possible - The defect will mean an incident might occur at some time
4 – Likely - The defect will mean an incident will probably occur in most circumstances
5 – Very Likely - The defect will mean an incident is expected to occur in most circumstances

11.5.3. **Impact Score**

11.5.3.1.

Level / Descriptor	1 Insignificant	2 Minor	3 Moderate	4 Major	5 Extreme
Personal injury	Insignificant injury, a third party might stumble but not fall.	Minor injury, a third party might stumble and fall.	Personal injury that may result in a short term recovery (less than a week no requirement for hospital treatment).	Personal injury that may take longer to recover (more than a week). Hospital treatment and possible medical treatment at location.	Serious injuries that may result in fatality or life changing injuries requiring long term hospitalisation . Medical attention at incident location.
Vehicles damage	Insignificant damage to a vehicle of any type.	Minor damage to a vehicle. Nothing that would require specialist mechanical intervention.	Significant damage to vehicle, requiring garage intervention	Extensive damage to a vehicle requiring long term garage repairs and extended hire costs.	Total loss of vehicle.
Property damage	Insignificant damage to property	Visible damage	Clear and attributable damage	More than one property suffering from damage	Temporary loss of use of property

11.6. Risk Registers

11.6.1. The department holds all of its recorded risks in four levels of register. These are:

- Corporate – those of corporate significance that require monitoring at a County Leadership Team (CLT) level and reported to the Audit Committee quarterly.
- Departmental – Significant risks to the Department that need to be managed at a Departmental Management Team (DMT) level and reported to Committees quarterly.
- Service – risks affecting the service that need to be managed within the service.
- Project – held within individual project risk registers (note risks can be escalated on to the Departmental risk register)

(Monitored by Project Owners, Project Managers or Project Boards)

11.6.2. The Service Plan includes actions with reference to risk, as do Section/Team Plans.

11.6.3. The Communities and Environmental Services Departmental Risk Register contains these risks (where relevant) and they are updated monthly. They focus on the real risks we face that will prevent us delivering a service or achieving an objective, along with what the outcome would be if the risk is realised.

11.6.4. Where areas of risk are common to more than one service, such as elements of financial/budgetary risk against service delivery it may be sufficient to hold a central risk on the register owned by Finance or a similar support service. DMT will decide whether this approach should be taken.

11.6.5. Monitoring includes assessing whether the risk score is still accurate, updating progress and reflecting any new developments. Strategic corporate risks are reviewed centrally (by the Risk Management Function within Norfolk Audit Services) to help ensure that there is consistency across the Departments.

11.6.6. Risks can also be escalated or de-escalated to other registers (or removed from Registers) as the Risk Score, progress against mitigation measures and overall importance are monitored.

11.7. Business Continuity and the Transport Asset Management Plan

11.7.1. Business Continuity Management involves identifying critical services provided by Norfolk County Council and planning ahead to minimise the likelihood of any disruption to these services. Where an incident does occur, pre-defined strategies aim to limit the time services are disrupted.

11.7.2. The TAMP covers assets without which we would struggle to provide many of our critical services – everything from emergency response, caring for the vulnerable and providing registrar services rely on a transport network capable of allowing movement of people, resources and waste. Highway services such as winter maintenance, emergency fault notification and repairs to the highway are themselves ‘critical activities’.

11.7.3. A key recommendation of the 2014 Transport Resilience Review for Local Roads is "that Local Highway Authorities identify a 'resilient network' to which they will give priority, in order to maintain economic activity and access to key services during extreme weather." Norfolk established its resilience network in Nov 2015 and can use it to help manage risk and prioritisation of proposals.

11.7.4. Although our critical activities are focussed around those services which must be up and running 24 hours every day, the principles of forward planning and resilience are ones which have a much wider application.

11.7.5. In terms of the TAMP, Business Continuity Management (BCM) principles encourage thinking about the lifetime of any capital investment, considering future changes including potential impacts of climate change, economic and political shifts, energy security and sustainability.

11.7.6. More information about the BCM process can be found at Norfolk's Business Continuity webpage.

Part 2 – Lifecycle Management Plans

1. Lifecycle Planning

1.1. Introduction

1.1.1. Every asset goes through a series of phases during its serviceable life. They are defined as:

- Creation/Acquisition
- Planned Maintenance
- Renewal/replacement
- Upgrading
- Disposal

1.1.2. The asset stock in Norfolk has been assessed into the following asset groupings:

- Roads (2.0)
- Footways and Cycleways (3.0)
- Drainage (4.0)
- Signs (5.0)
- Road Markings and Road Studs (6.0)
- Barriers, Fences and Guardrails (7.0)
- Winter Maintenance (8.0)
- Structures (9.0)
- Street Lighting (10.0)
- Vehicular activated signs (11.0)
- Traffic Signals (12.0)
- UTC (13.0)
- Telematics - CCTV (14.0)
- Telematics - Automatic Access Control (15.0)
- Telematics - Car Park Guidance and Information Systems (16.0)
- Telematics - Common Data Management Facility (CDMF) (17.0)
- Bus Station (18.0)
- Park and Ride (19.0)
- Verges & Soft Estate (20.0)
- Public Rights of Way (21.0)
- Access Development (Norfolk Trails) (22.0)
- Level Crossings (23.0)
- Traffic Counters (24.0)
- Safety Cameras (25.0)
- On Street Pay and display machines (26.0)
- Electronic Information Kiosks (27.0)
- Real Time Information Assets (28.0)
- Bus Stops (29.0)
- Cromer (30.0)
- Thetford Bus Stations (31.0)

1.1.3. This section incorporates the lifecycle management plans for each asset grouping.

1.1.4. They document the lifecycle planning process that has been undertaken for each asset grouping in order to manage each phase of an asset's life (i.e. from creation to disposal) and in doing so recognises the interdependency of the phases.

1.1.5. A lifecycle plan starts with the identification of options, clearly documenting them. It only however becomes of significant value if the evaluation of those options is undertaken in a rigorous and repeatable manner; i.e. if there is a process of optimisation.

1.2. Layout

1.2.1. Each lifecycle plan includes those elements recommended the CSS in their framework document together with physical parameters of each asset type. They have been laid out on the basis of a common template to aid users of the document as follows:

- Physical Parameters - Describes physical attributes of the asset type and their distribution.
- Lifecycle Asset Options
    - Creation or Acquisition
    - Renewal or Replacement
    - Upgrading Disposal
    - Disposal
- Non Asset Options
    - Managing Demand
    - Amending Standards
- Lifecycle Treatment Options
    - Do Minimum Treatment
    - Medium Life treatment
    - Long Life Treatment
- Routine Maintenance - Activities
- Maintenance - Objectives and Response
- Structural Maintenance

- Service Levels
- Risk

1.3. Lifecycle Cost Analysis

1.3.1. Lifecycle Cost Analysis is a process of comparing different cost streams over the same extended period of time, to determine the most appropriate strategy. With different strategies for managing (elements of) the asset, will come different levels of service, different cost streams and different residual risk options.

1.3.2. We are seeking to develop this process across are range of assets. Some are more progressed than others.

1.3.3. It is considered that sufficient funds exist to carry out the inspection regimes, any emergency and high priority works identified across our asset types.

1.3.4. Certain types of demand can be related weather. The severity of winter and the extent of rainfall can vary considerably year to year. If necessary additional funding from other routine heads can be drawn upon depending upon need. The Met office provides weather warning related to rainfall, the Environment Agency regarding flood risk and PA provide winter weather forecasting.

1.4. Service Levels

1.4.1. Some formal ‘service levels’ have been established following discussion with members, we have made reference to those recommended standards and performance indicators used to monitor the condition of various assets within the individual lifecycle plans.

1.5. Other Response Issues

1.5.1. The following issues are dealt in appendices and describe ordering timescales and responses to situations affecting the asset rather than their condition.

1.5.2. Routine Maintenance – Defect Categories, response and ordering timescales, highway defect risk matrix and register can be seen in Part 3 Appendices D (vi), D (vii) and D (viii).

1.5.3. Regulatory Management – Objectives, Standards and Response, can be seen in Appendix D (x).

2. Carriageway Lifecycle Management Plan

2.1. This asset grouping comprises the surface and substructure of the carriageway used mainly by vehicles and all of the associated maintenance arrangements.

2.1.1. Physical Parameters

2.1.1.1. The description of road network lengths used here is taken from the Highway Management System (Apr 18).

Length by Classification (Km)	
A Roads	778
B Roads	645
C Roads	3,425
U Roads	4,993
Back Lanes (V)	25
Total	**9,866**

Length by Hierarchy (Km)	
2b	452
2c	243
3a(i)	24
3a(ii)	655
3b(i)	153
3b(ii)	724
3b(iii)	66
3b(iv)	85
4a(i)	192
4a(ii)	6,117
4b	628
4c	26
4d	500
Total	**9,866**

2.1.1.2. Length by Hierarchy, Maintenance Area and District can be seen in Appendix C (v) and C (vi).

2.1.2. Lifecycle Options

2.1.2.1. Creation/Acquisition

2.1.2.1.1. County Council schemes to create new roads are funded from the LTP and consist of bypasses and relief roads. Other improvement schemes such as traffic engineering schemes are mainly related to safety and enhance existing assets.

2.1.2.1.2. Developer funded schemes can and do provide new carriageway particularly in the form of new housing and industrial estate roads through Section 38,106 or 278 agreements.

2.1.2.1.3. Regeneration schemes are another source which can increase the size of this asset. These schemes tend to be funded from a variety of sources, including LTP and LEP funding.

2.1.2.2. **Upgrading**

2.1.2.2.1. Specific proposals may arise from time to time which will effectively upgrade a section of highway. The number of such schemes is small.

2.1.2.3. **Renewal/Replacement**

2.1.2.3.1. There are a large number of Structural Maintenance schemes carried out every year in order to maintain the carriageway in good order by prolonging the life of the surface and structure of the highway. These are discussed further in treatment options.

2.1.2.4. **Disposal**

2.1.2.4.1. A small element of highway is usually disposed of each year through stopping up or closure orders. These events are related to schemes promoted by the others or ourselves but are generally small in area and have no material impact on the size and extent of the asset.

2.1.3. Non Asset Options

2.1.3.1. **Managing Demand**

2.1.3.1.1. The demand for road space is increasing as private car use on the increase. This has had an impact on congestion and the frequency of maintenance on our road assets. Demand has been managed by the County Council using the following methods:

- Continued strong support of and encouragement of the use of public transport. It is a major subsidiser of transport in rural areas including many school bus services.

- Providing a Park and ride system in Norwich. Currently consisting of 6 permanent park and ride sites all served by high quality, high frequency buses.

- Encouraging the use of both walking and cycling through programmes of footway, cycleway and road crossing facilities.

- Traffic engineering schemes to control traffic and allocate road-space to other modes including pedestrians, cyclists and public transport, particularly in town centres.

- A route hierarchy has been introduced to define the access routes to settlements and businesses so that environmental and physical damage to the road surface and surrounds by HGVs can be limited to defined signed routes. These are maintained and inspected accordingly.

2.1.3.2. **Amending Standards**

2.1.3.2.1. The application of standards is linked with the objectives of safety, accessibility and conservation.

2.1.3.2.2. Within rural areas two area-wide quiet lanes schemes have been introduced. Different standards of maintenance and development have been applied in order to protect their character.

2.1.3.2.3. Within towns and significant village centres, schemes are promoted which may restrict use of motor vehicles.

2.1.4. Lifecycle Treatment Options

Do Minimum The do minimum activities are the inspection and routine maintenance carried out by the Council in order to make the highway safe for users by removing dangerous defects.

- Pothole repair
- Odd kerb / iron work replacement
- Patching

Medium Life These are carried out to a programme based on the results of condition surveys and inspections. The expected life of one of these treatments would be 10 - 15 years.

- Surface dressing
- Wearing course resurfacing
- Haunching
- Kerbing (over-run)

Long Life These are carried out to a programme based on the results of condition surveys and inspections. They are aimed at providing a long life for the asset.

The expected life of one of these treatments would be 10-25 years.

- Resurfacing
- Reconstruction

2.1.5. Structural Maintenance

2.1.5.1. **Identification from Road Condition surveys**

2.1.5.1.1. Schemes are developed using data from Road condition surveys and site visits to verify condition, site limits and priorities.

2.1.5.1.2. We utilise the following condition surveys according to road class:

- ‘A’ roads – SCANNER and SCRIM (Skidding resistance surveys)
- ‘B’ & ‘C’ roads – SCANNER
- ‘U’ roads – CVI

2.1.5.1.3. These are all network level surveys and when processed through the rules and parameters of an UKPMS system provide both the condition indices used for high level reporting and recommendations for treatments to inform scheme development. These need to be assessed alongside the functional use of the road and funding to produce appropriate maintenance solutions.

2.1.5.1.4. Local treatments for differing road classes and environments have been developed to match recommendations made by the UKPMS system.

2.1.5.1.5. Road condition indices, treatment recommendations, past treatments and our forward programme are displayed on a corporate Geographical Information System (GIS) map.

2.1.5.1.6. These surveys may be supplemented at a local or project level by further investigation. The nature of this investigation will depend on the circumstances of the case. It will include a visual inspection by a highway engineer and likely project level surveys, determined by our Laboratory.

2.1.5.1.7. Our aim is to undertake a coring or sample window of all surfacing proposals prior to ‘gateway 1’ prior to confirmation of the surfacing programme for the coming year. This will inform the proposed treatment, scheme budget and aid management of the delivery programme. We issue a coring programme a year in advance to achieve this. The late supply of additional funds or rapid deterioration will cause programme change and will disrupt this process.

2.1.5.1.8. Additional project level surveys could be:

- Falling Weight Deflectometer (FWD)
- Ground Penetrating Radar (GPR)

2.1.5.2. **Identification of Schemes – General**

2.1.5.2.1. The tables in this section relate to the 1989 Code of Good Practice, and in the absence of such summary tables from UKPMS represent a good visual guide to practitioners, but should not be considered an intervention level. Road condition data treatment data is contained on the Norfolk Mapping Browser and give a visual indication of the relative need. Any proposal will be prioritised against others see Section 3.1.5.2 and 8.

2.1.5.2.2. Surfacing

2.1.5.2.2.1. Covers all forms of works intended to resolve fine crazing, permeable surfaces, fretting, loss of chippings, texture loss, ride quality and strengthening.

2.1.5.2.3. Whole Carriageway deterioration

Road Category	Severity	% of Area/Length	Patch and surface treatment
2 to 4	Cracking, coarse crazing, loss of aggregate or serious permeability problems	5	Patch and surface dress
2		10	Patch and surface dress
		25	Major Strengthening
3		15	Patch/Surface dress
		40	Major Strengthening
4		15	Patch and surface dress
		50	Major Strengthening

2.1.5.2.4. Loss of Skid Resistance – General Deterioration

2.1.5.2.4.1. The maintenance objective when assessing this is to provide skid resistance levels appropriate to the occurrence of events at each site. The presence of events such as approaches to roundabouts and pedestrian crossings will require higher levels of skid resistance than non-event sections, straight roads with no junctions for instance.

2.1.5.2.4.2. The Sideways-force Coefficient Routine Investigation Machine (SCRIM) is used to measure the resistance to skidding on roads, which assists in predicting potential skidding accident problems.

2.1.5.2.4.3. The general deterioration of road surfaces and in particular loss of skid resistance, can normally be arrested and restored to an appropriate level by surface treatment, in the absence of more deep seated problems.

2.1.5.2.4.4. Some guidance on appropriate investigatory levels is provided in the Highway Agency's Design Manual for Roads and Bridges Vol. 7. However, this advice is for trunk roads. The approach to investigatory levels used in Norfolk are based on this with some local variations (Appendix D (iv)).

2.1.5.2.5. Edge Deterioration

2.1.5.2.5.1. Edge strengthening should be considered when it is necessary to repair:

- Edge deterioration, which causes cracking, fretting, potholing and deformation of the carriageway.
- Over-running which causes potholing on the edge of the verge.

Severity	% of area or length	Treatment

1. Cracking, fretting or potholing of the edge carriageway is present, with a need for patching but with no over-riding of the verge	17	Patch
	50	Haunch and/or kerb
2. Severe over-riding with or without rutting or potholing of the edge of the verge is present, either alone or with deterioration of the carriageway, as for above.	10	Patch
	30	Haunch and/or kerb
3. Serious deformation or cracking of the carriageway in the vicinity of the edge is present, with or without over-riding of the verge	7	Patch
	20	Haunch and/or kerb

3.1.1.1.1. Wheel Track Rutting

3.1.1.1.1.1. Wheel track rutting can be either plastic deformation of the surface, or an indication of structural failure. Further engineering investigation is normally required.

Severity	% of area or length	Treatment
Depth 20mm or more	5	Localised overlay or resurfacing the affected length of rut
	80	Overlay or resurface affected lane

3.1.1.1.2. Adverse camber

3.1.1.1.2.1. In cases where road safety is being compromised, it may be necessary to shape and resurface the offending area. Bad condition relates to either:

- Where camber or adverse camber on bends is so excessive that it is potentially dangerous
- Cross-fall is insufficient to provide run-off for surface water, causing water to remain on carriageway to a potentially dangerous extent.

3.1.2. Carriageway – Routine Maintenance – Activities

3.1.2.1. Routine maintenance is the regular on-going day to day work that is necessary to keep assets operating, including instances where portions of assets fail and need immediate repair to make operational again.

3.1.2.2. Maintenance undertaken on the carriageway has been sub-divided into activities, the standards of which have been displayed in tabular form with objectives and response arrangements.

3.1.2.3. Reactive activities are by their nature unplanned and occur in response to sudden changes, whilst the other activities are carried in a planned manner.

3.1.2.4. **Condition Monitoring**

3.1.2.4.1. See Appendices:

- D (i) for Highway Safety Inspections
- D (ii) for Condition Inspections

3.1.2.5. **Reactive activities**

3.1.2.5.1. See Appendices*:*

- D (vi) Ordering timescales and priority response
- App D (viii).Highway Defect Risk Register

Reactive Activity	Service Standard
Street works inspections	See Regulatory Management Appendix D (x)
Pre-cautionary and post salting treatment	See Winter Service lifecycle plan - 5.8
Ad hoc inspections	Non specified, responsive
Road cleansing treating bleeding roads	Non specified, responsive

3.1.3. Carriageway – Potholes and Patching – Objectives and Response

3.1.3.1. **Response**

3.1.3.1.1. The response time varies depending on the depth and location of the pothole. This is discussed in more detail in the Highway Defect Risk Register App D (viii).

3.1.3.2. **Safety**

3.1.3.2.1. In accordance with the highway defect risk register, repairs must be carried out when a pothole of 40mm depth forms in any road and at lesser depths at more vulnerable locations. Those hazards which are considered to need an urgent response will be either repaired, or signed and guarded in order to minimise the risk to road users. The timescale to attend these, depending on the circumstances, is within 2 or 4 days of being reported by members of the public or identified by staff.

3.1.3.3. **Serviceability**

3.1.3.3.1. The general public often sees potholes as a reflection of the quality of management and service delivery by the authority. They are also a source of insurance claims against the authority.

3.1.3.4. **Sustainability**

3.1.3.4.1. Emulsion and chippings pothole and patching repair work is a low cost but effective method for minor rural roads outside the urban and village environment, many of which are only constructed of layers of surface dressing. The process may also be used to repair newly surface dressed roads where appropriate. It is a method that minimises excavation.

3.1.4. Carriageway – Sweeping and Cleansing – Objectives and Response

3.1.4.1. Response

3.1.4.1.1. The response varies depending on the extent, depth and location of the hazard. This is detailed in the Highway Defect Risk Register App D (viii).

3.1.4.2. Safety

3.1.4.2.1. The County Council as Highway Authority has a duty to keep the highway safe when involved in cleaning up after traffic accidents, spillages, or when dealing with obstructions, including windblown sand.

3.1.4.2.2. Emergency works such as cleaning operations at road accidents and spillages are recorded to a recoverable account and, where possible, the costs recovered from those responsible.

3.1.4.2.3. A significant build-up of detritus can lead to a loss of skidding resistance and lead to the blockage of drainage systems increasing the risks of localised flooding.

3.1.4.2.4. Where a build-up of material presents a danger to users of the highway and its removal cannot wait until the next routine cleanse by the District Authority, emergency clearance may be warranted and the Highway Authority will be responsible for this.

3.1.4.2.5. Bitumen rich road surfaces can ‘bleed’ in periods of high temperatures. In these circumstances susceptible locations should be inspected and if necessary treated with slag dust.

3.1.4.3. Serviceability

3.1.4.3.1. Routine sweeping and cleansing of the highway is the responsibility of the District Councils, as a result of the Environmental Protection Act (1990). They have a duty to keep highways clean, pick up litter and remove refuse.

3.1.4.3.2. From a highway perspective the purpose of sweeping and cleansing is to remove debris from the side channels, to help prevent an excess of detritus being washed into gullies and surface water ponding. Together with keeping the carriageway and footway surface generally clean, this helps ensure that road markings are visible and windscreens not obscured by dirty spray.

3.1.4.3.3. If ‘un-cleaned’ roads and footways are observed during highway inspections, then the District or Borough Council is requested by the Highway Engineer to clean the highway.

3.1.4.4. **Sustainability**

3.1.4.4.1. Material arising from all cleansing operations has potential implications for pollution and should be disposed of correctly in accordance with the Environment Agency’s, or equivalent authorities, requirements.

3.1.5. Lifecycle Cost Analysis

3.1.5.1. **Routine**

3.1.5.1.1. We hold an inventory of roads and their surface condition.

3.1.5.1.2. We are still largely using historical data to justify our routine budget for the repairs to surfaces in the form of patching and pothole repairs. This is accentuated by a number of reactive works to restore serviceability ordered on a ‘day work’ basis. From 2014-15 the majority of the patching budget has been ‘capitalised’ and funded from the structural maintenance grant see Appendix G (ii).

3.1.5.1.3. Drainage and verge works cleansing are discussed under the lifecycle plans 4.0 and 20.0.

3.1.5.1.4. We currently utilise the following strategy to maintain these assets.

3.1.5.1.4.1. C/way surface - Minor or Safety repairs as necessary due to individual wear and tear based upon planned inspection or reactive response.

3.1.5.1.5. From 2017-18 all road repairs were capitalised and are funded from capital structural maintenance.

3.1.5.2. **Structural Maintenance**

3.1.5.2.1. We hold condition data on the road surfaces. For A roads it is in the form of ‘Scanner’ and ‘SCRIM’, for B’s & C’s ‘Scanner’ and the remainder of the road network CVI. The identification of schemes on the ‘A’ and ‘B’ roads is data led and verified from site inspection. The remaining roads are prioritised primarily from visual inspections based upon the severity of the defect and the location.

3.1.5.2.2. Schemes are then imported into our Works Programme Database and the latest condition data and other data sets snapped against them to inform a multi-criteria analysis. Schemes are developed around whole-life costing if possible, but the level of funding available often limits this and more pragmatic solutions are utilised instead.

3.1.5.2.3. We have sub-divided the budget for differing categories of road and treatments. See App G (ii).

3.1.6. Service Levels

1

3.1.6.1. With current funding levels it is recognised we are managing a deteriorating asset. In summary our road condition targets are:

3.1.6.2. 'A' roads (ex -NI 168)

	2013/14	2014/15	2015-16	2016-17	2017-18	2018-19
Target	4(4.3) %	4 (3.7)	4(3.6)%	4(3.8)%	4%	4(4.2%)
Actual	3(3.25)%	3(3.4)%	3(2.52)%	3(2.8)%	3(2.55)%	

3.1.6.3. 'B & C' roads (ex-NI 169)

	2013/14	2014/15	2015/16	2016/17	2017-18	2018-19
Target	13(13.1)%	13% (11.8)	11(11.4)%	11(11.5)%	12(11.9)%	12(12.3)%
Actual	11(11.45)%	11(10.71%)	6(6.48)%	8(7.69)%	8(7.54)%	

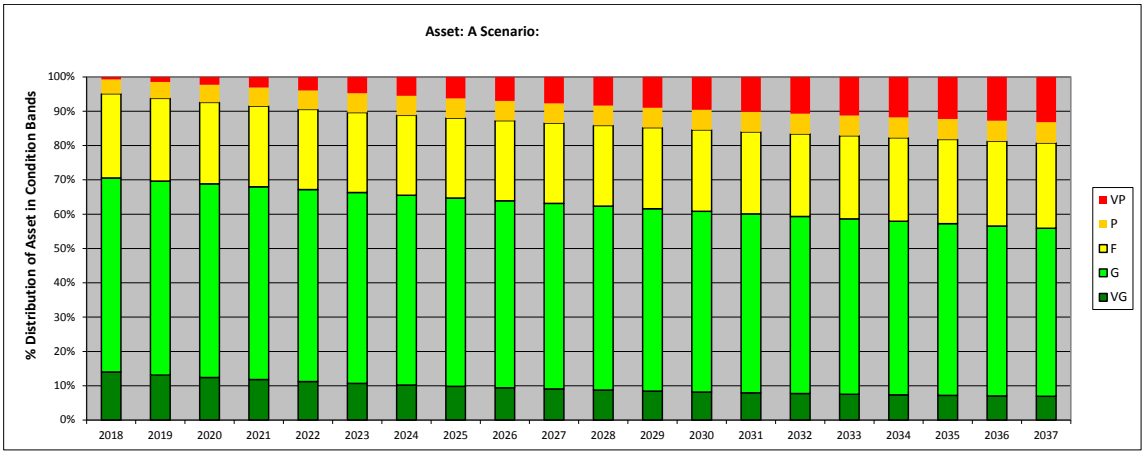
3.1.6.4. 'U' roads (ex-224b)

	2013/14	2014/15	2015-16	2016-17	2017-18	2018-19
Target	32%	32%	32%	32%	32%	32%
Actual	24%	22 (21.7)%	17 (16.9)%	18%	15% (14.7%)	

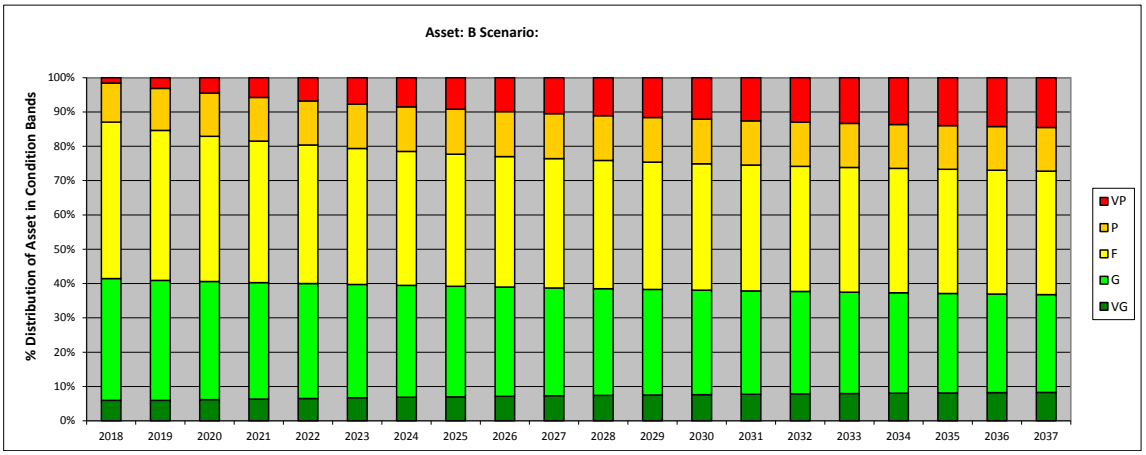
3.1.6.5. In 2011 the Government set up The Highways Maintenance Efficiency Programme (HMEP) to "*led transformation initiative aiming to maximise returns from investment and deliver efficiencies in highway maintenance services"* and as a consequence produced a Carriageway Lifecycle Planning Toolkit for Authorities to use

3.1.6.6. This has been populated with our data to produce graphs indicating a possible future condition with the funding (see section 8 of main document) and treatment scenarios/strategy (see 2.1.4 main doc) we are currently employing. Below are 3 graphs showing the condition of our classified network predicted some 20 years into the future

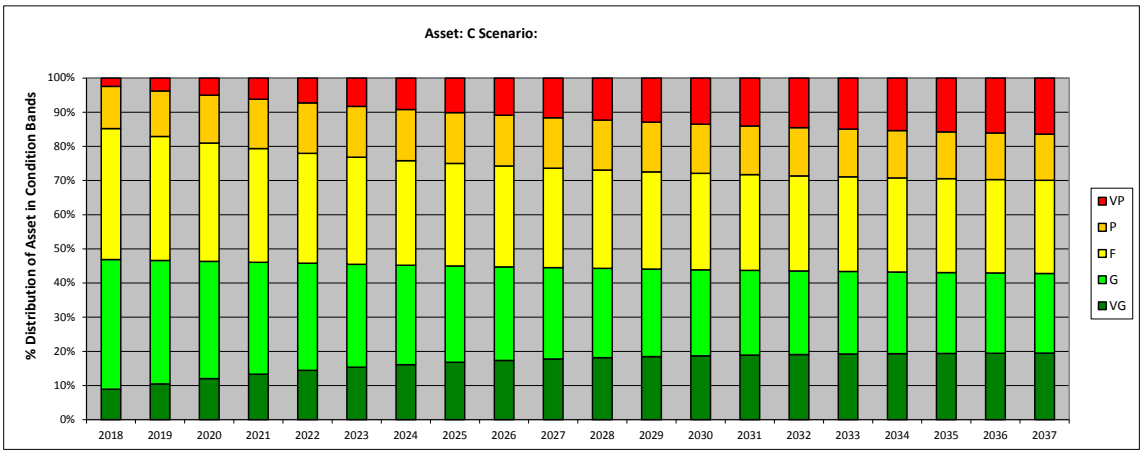
3.1.6.7. A Class roads



3.1.6.8. B class roads



3.1.6.9. C class roads



3.1.6.10. Each graph above shows a similar picture of a slow decline to the classified network which has been the conclusion for some time.

3.1.6.11. Carriageway ‘safety’ performance indicators:

- SCRIM (CSC) – We monitor the result above IL but do not target it. – 2017/18 result 67.95%
- Priority A 2hrs from when defect issued to contractor – Target 96%, result 2017/18 = 85%

- % Safety Inspections on time – we have established this indicator during 2012/13 and use the results as a baseline 96%. The targeted service level is 100%. The result for 2017-18, rolling 12 months result = 94.2%.

3.1.7. **Risk**

3.1.7.1. **Related to Service Levels for Condition of carriageway**

3.1.7.1.1. Risk – Failure to achieve ‘A’ road target for 18/19

Impact = 3 x Likelihood = 2 = 6 medium risk

3.1.7.1.2. Risk – Failure to achieve ‘B’ & ‘C’ road target for 18/19

Impact = 3 x Likelihood = 3 = 9 medium risk

3.1.7.1.3. Risk – Failure to achieve U road target for 18/19

Impact = 3 x Likelihood = 1 = 3 low risk

3.1.7.2. **Related to Service Levels for Safety of carriageway**

3.1.7.2.1.
- Risk – Failure to comply with target response for dangerous damage for carriageways Priority A 2hrs from when defect issued to contractor – Target 96%

Impact = 2 x Likelihood = 4 = 8 medium risk

3.1.7.2.2.
- Risk – % Safety Inspections on time – we have established this indicator during 2012/13 and use the results as a baseline 96%. The targeted service level is 100%. The result for 2017-18, rolling 12 months result = 94.2%.

Impact = 2 x Likelihood = 3 = 6 medium risk

3.1.8. **Backlog**

3.1.8.1. The UKPMS treatments recommended by the surveys in 2006-7 have been accepted as service levels.

3.1.8.2. Any negative movement against the service level will be considered a backlog and this demonstrated by the difference in the cost of carrying out the UKPMS treatments.

3.1.8.3. These are contained in our annual Highway Asset Performance Report to members presented annually in June/July.

2

3. Footway and Cycleway Lifecycle Management Plan

3.1. This asset grouping comprises the surface and substructure of footways and cycleways used mainly by pedestrians and cyclists, and all of the maintenance arrangements.

3.2. Physical Parameters

3.2.1. By Kilometres and District

3.2.1.1. The descriptions of footway and cycleway quantity taken from the Highways Maintenance Systems and March UKPMS systems (Mar 16). The record for on-road cycleway is partial, whilst those 'shared-use' adjacent to the carriageway are not currently identified.

District	Cycleways (km)			Footways (km)	
	CT detached	CT On-road	CY Detached (inc. shared use)	FW Detached (inc. shared use)	FW contiguous Other (inc. shared use)
North Norfolk	0.1	2.52	2.16	29.38	443.12
West Norfolk	0.05	3.06	27.58	49.69	762.57
Breckland	0.01	0.06	15.19	52.78	573.39
Norwich City	0.37	7.3	28.40	67.38	590.98
Broadland	0	4.87	14.04	35.36	623.37
Gt. Yarmouth	0.18	5.52	5.16	66.19	501.72
South Norfolk	0.07	0.58	6.09	33.43	560.62
Total	**0.78**	**23.9**	**98.62**	**334.22**	**4055.77**
	123.30			**4389.99**	

3.2.1.2. Footways Hierarchy by length (km), width (metres) and area (m^2):

	Total (km)	% of Total	Ave Width (m)	Area (m^2)
Cat 1	120.09	2.56	2.70	328,544
Cat 2	447.30	9.95	2.1	938,996
Cat 3	3107.19	66.87	1.78	5,613,540
Cat 4	900.48	20.62	1.7	1,486,281
Total	**4576.06**	**n/a**	**n/a**	**8,367,361**

3.3. Lifecycle Options

3.3.1. Creation/Acquisition

3.3.1.1. County Council schemes to create new footways or cycleways are funded from the LTP and are part of the County's policy to allow individuals to travel in more sustainable ways. Other pedestrian and cycle improvement schemes are introduced as traffic engineering schemes, which are mainly related to safety.

3.3.1.2. Developer funded schemes can provide new footway and cycleways in relation to new housing and industrial estate developments. These schemes are delivered through Section 38, 106 or 278 agreements.

3.3.1.3. Regeneration schemes are another source that can increase the size of these assets. These schemes tend to be funded from a variety of sources including LTP funding.

3.3.1.4. In recent years the de-trunking of roads which used to be the responsibility of the Government's Highways Agency has taken place. These routes are now the responsibility of Norfolk County Council and new lengths of cycleway and footway have been included in the transfer.

3.3.2. Upgrading

3.3.2.1. Specific proposals may arise from time to time, which will effectively upgrade a piece of footway or cycleway. The number of such schemes is small but those that do are generally aimed at increasing the width of the footway or cycleway.

3.3.3. Renewal/Replacement

3.3.3.1. There are a large number of structural maintenance schemes carried out in each year in order to maintain the surface of footways. Generally these are aimed at keeping the surface of the footway/cycleway in good order to maintain the safety of the users and prolong the life of the asset.

3.3.4. Disposal

3.3.4.1. A small length of footway may be disposed of through the effects of stopping up or closure orders generated by other schemes. These events are related to schemes promoted by the County or others but are generally small in area and have little material impact on the size and extent of the asset.

3.4. Non Asset Options

3.4.1. Managing Demand

3.4.1.1. The County Council has been encouraging both walking and cycling through programmes of footway, cycleway and road crossing facilities. Demand has been managed by the County Council using the following methods:

- In Kings Lynn, Norwich and Great Yarmouth conurbations, strategic cycle and pedestrian networks have been identified. Improvements are principally provided through development opportunities and the LTP process.
- 20 Walking and Cycling studies in Market Towns have been undertaken identifying local need, which have been include in the forward programme.
- Assessment systems exist whereby requests for new footways and pedestrian crossings are assessed and prioritised.
- The council is also delivering schemes associated with and developed through school travel plans as part of the Safer & Healthier Journeys to School initiative.

- Traffic engineering and safety schemes are used to control traffic and reallocate road-space to other modes including pedestrians, cyclists and public transport particularly in town centres. These schemes also improve the permeability for the network for pedestrians and cyclists, by easing the difficulties crossing carriageways.

3.4.2. Amending Standards

3.4.2.1. The application of standards is linked with the objectives of safety, accessibility and conservation.

3.4.2.2. ‘Quiet Lanes’ schemes have been completed in two rural areas of the County. In these different standards of maintenance and development is applied in order to protect their character.

3.4.2.3. Work has been done with local communities to encourage the use of the quiet lanes by walkers, cyclists and horse riders.

3.4.2.4. The use of approved unbound surface materials allows works to be undertaken in a sustainable and cost-efficient method. The term 'TROD' is used in Norfolk to describe these unbound footway/paths.

3.4.2.5. These can develop solely from use by the general public; for example, continued footfall across a grass verge will wear the turf through creating a well-defined track (often muddy).

3.4.2.6. Compared to alternatives, a formalised trod or the placing of unbound material to improve its surface under routine maintenance will provide and enhancement over a 'do nothing' approach to a muddy track of grass verge. Typically it will provide a level surface, greater width and improved drainage. It is neither ‘sealed’ using bitumen nor cement as a binder, therefore not waterproof, nor as robust as a 'bound' footway.

3.4.2.7. If we choose to formalise these areas the typical construction is likely to be a single layer of unbound granular material similar to ‘Type 1’ granular sub base. A thickness of 75 to 100mm is appropriate.

3.4.2.8. If it was a formal construction we would look to achieve the same width standards as footway construction; a minimum width of 900mm but possibly 1.2m or 1.5m depending upon predicted usage. The minimum width for disabled access of doors and similar consideration for double buggy pushchairs have led to our minimum use of a width of 0.9m.

3.4.2.9. If it was the case of placing material via routine maintenance to enhance a footfall made track then we would seek to apply the material over at least 600mm in width.

3.5. **Lifecycle Treatment Options**

Do Minimum	These activities are the routine maintenance tasks carried out to ensure safety for users. • Pothole repair • Odd kerb / Iron work replacement • Patching
Medium Life	These are carried out to a programme based upon the results of surveys. The expected life of these treatments would be 5-10 years. • Patching • Surface dressing • Slurry seal resurfacing • Replacement of vehicular crossing kerbs
Long Life	These are carried out to a programme on the results of surveys. They are aimed at providing a long life for the asset. The expected life of the treatments would be 20 –40 years. • Resurfacing with or without renewal of odd/vehicular access kerbs • Reconstruction with or without renewal of odd/vehicular access kerbs.

3.6. Structural Maintenance

3.6.1. Identification of Footway and Cycleway Schemes - General

3.6.1.1. We have adopted the standard System Intervention Levels for application of structural maintenance treatments prescribed within the currently approved set of UKPMS Rules and Parameters and other DfT advice for the for consistent calculation of Condition Indices, BVPIs, and structural maintenance “backlog”.

3.6.1.2. If necessary we will vary these at our discretion (subject to member approval), to consider other options for technical prioritisation. Any variations from the current version of UKPMS Rules and Parameters utilised by the authority will be recorded for LTP monitoring purposes. The UKPMS system is still being developed and not all of the functionality suggested in the Code of Practice is currently available.

3.6.1.3. The tables in this section relate to the 1989 Code of Good Practice and our footway hierarchy, and in the absence of such summary tables from UKPMS represent a good visual guide to practitioners, but should not be considered an intervention level.

3.6.1.4. Any proposal will be prioritised against others see Section 3.10.2 and 8.

3.6.1.5. Surfacing

3.6.1.5.1. Structural maintenance should be considered when the percentages of the areas described in the following table are exceeded.

<table>
<tr><th rowspan="2">Footway Category</th><th colspan="2">Severity</th><th rowspan="2">% of Area</th><th rowspan="2">Treatment</th></tr>
<tr><th>Flexible</th><th>Rigid</th></tr>
<tr><td>1a & 1

(Main Shopping Areas/ Prestige, Primary Walking)</td><td rowspan="3">Trips greater than 13mm but less than 20mm

Coarse cracking, crazing of the surface.

Depressions more than 10mm less than 30mm.</td><td rowspan="3">Trips greater than 13mm but less than 20mm

Cracks or Gaps more than (20mm wide x 6mm deep) but less than (20mm wide x 20mm deep)

Depressions more than 10mm less than 30mm.

Rocking flags that are not dangerous</td><td>20</td><td rowspan="3">Restore Surface</td></tr>
<tr><td>2

(Busy Urban/

Secondary Walking)</td><td>30</td></tr>
<tr><td>3, 4

(link and local access)</td><td>40</td></tr>
<tr><td>4

(little used rural)</td><td colspan="2">When potentially dangerous</td><td colspan="2">Patch or Restore Surface</td></tr>
</table>

3.6.1.5.2. Modes of Deterioration

- Projections (including manhole frames, boxes, etc.)
- Dangerously rocking flags
- Cracks or gaps between flags
- Isolated potholes
- Depressions and bumps
- Slippery surfaces

3.6.1.5.3. The speed of response will be related to the intensity of use and the degree of danger.

3.6.1.5.4. The choice of surface treatment will depend on the failure mode, type of construction and importance of the footway or cycleway. Generally, less used footways will only require surface treatment and heavily used ones reconstruction of the surface. Although not specified separately, cycleways should be treated to footway standards in normal circumstances.

3.6.1.6. Kerbs

3.6.1.6.1. The purpose of kerbs is to protect footway and cycleway users, to provide water channels, to lead surface water into gullies and to define and support the edge of the carriageway, e.g. to prevent over-riding.

3.6.1.6.2. Apart from urgent repairs undertaken for safety reasons, defective kerbs should be replaced generally in association with other carriageway or footway works when the percentage of the lengths described in the tables below are exceeded.

3.6.1.6.3.

Kerb deterioration (other than upstand)		
Category of Footways	**% of Length**	**Treatment**
1a, 1 & 2	10%	Replace kerbs
3 & 4	20%	

Loss of upstand			
Category of Footways	**Severity**	**% of Length**	**Treatment**
All	Total loss	10-20%	Restore upstand if appropriate for location
Busy Protected	<30mm	100%	
Busy Unprotected	<75mm	100%	
Little used or no formal footway	<30mm	100%	

3.6.1.6.4. In addition to loss of upstand, deterioration may take any of the following forms:

- Longitudinal cracking
- Broken
- Spalled
- Badly aligned
- Badly tilted, i.e. more than 1 in 12
- Generally disintegrated
- Sunken channel blocks or setts

3.6.1.6.5. There may be a need for new kerbing provision in association with new works adjacent to an unprotected footway if over 20% of the length was affected by over-riding of footway, road drainage discharging across footway, surface water not reaching gullies, edge deterioration. This would have to be approved by our Environmental Co-ordinator.

3.6.1.6.6. A process map for general footway scheme identification and treatment selection can be seen in App D (xi).

3.6.2. **Identification of Cat 1 and 2 Footway Condition – UKPMS Footway Network Survey**

3.6.2.1. Our service levels are based on the collection and analysis of the Footway Network Survey (FNS) measurements. We carry these out on 50% of Category 1,1A and 2 footways and 25% of category 3 and 4 footways each year. The complete category 1 and 2 network will be covered every two years, and category 3 and 4 footways every four years. The definition of investigatory levels to meet requirements for serviceability will be a matter for local determination, preferably in consultation with users.

3.6.2.2. FNS surveys are undertaken on foot using accredited surveyors and software accredited in accordance with the UKPMS survey manual. The resultant survey data is then processed on a compliant UKPMS system to produce annual performance results. The report from this gives a combined figure for all survey categories, as well as individual values for each of the hierarchies included in the survey.

3.6.2.3. In addition to providing the performance report against our service level, the survey data can be manipulated to produce data for differing areas, priority listings and indicative generic footway treatments. These generic treatments are predefined within the PMS and are triggered by the level of defects recorded within a section. The trigger varies from surface to surface; therefore it is essential that inventory data is collected in tandem with the defect data, to ensure the accuracy of the treatment selection and overall ex-BVPI. If inventory data is not available then the default feature width is used to provide the feature.

3.6.2.4. A guide on the use of the Footway Network Survey for pragmatic scheme building can be seen in App D (xii).

3.7. Footways and Cycleways – Routine Maintenance Activities

3.7.1. Routine maintenance is the regular ongoing day to day work that is necessary to keep assets operating, including instances where portions of assets fail and need immediate repair to make them operational again.

3.7.2. Maintenance undertaken on footways and cycleways has been sub-divided into activities, the standards of which have been displayed in tabular form and are followed by details on objectives and response arrangements.

3.7.3. Reactive activities are by their nature unplanned and occur in response to sudden changes, whilst the other activities are carried in a planned manner.

3.7.4. **Condition monitoring**

3.7.4.1. *See Appendices:*

- D (i) for Highway Safety Inspections
- D (ii) for Condition Inspections.

3.7.5. **Reactive activities**

3.7.5.1. See ‘Appendix D (v) - ordering timescales and priority response’

Remaining Reactive Activity	Service Standard	Code of Practice 2005
Street Works Inspections	See regulatory Management Appendix D (vii)	
Ad hoc Inspections	Non specified, responsive	
Pre-cautionary and post salting treatment	When icy conditions forecast or after prolonged period of icy conditions or snowfall as resources permit Dependant on winter maintenance priority of road see policy See Section 5.8	Approve and adopt policy
Footway Cleansing	Non specified, responsive	
Trips/ Potholes	Hazardous footway trips/potholes Highway Defect Risk Register App D (viii).	
Patching	Non specified condition and judgement based	

3.8. Footways and Cycleways – Potholes, Trips and Patching - Objectives and Response

3.8.1. **Safety**

3.8.1.1. The objective is to:

- Prevent defects in the surface, kerbs and edging causing hazards for users.

3.8.1.2. Those defects which are considered dangerous and need to be repaired urgently or signed and guarded to safeguard users. These will be attended to within 24 hours of being reported by members of the public or from when identified by staff as part of routine maintenance. Otherwise repairs are programmed within the ongoing structural maintenance programme for patching repairs.

3.8.2. Serviceability

3.8.2.1. The objective is to:

- Prevent defects in the surface, kerbs and edging causing hazards for users
- Limit encroachment and weed growth
- Maintain the integrity of the network

3.8.2.2. The general public often sees potholes and trips as a reflection of the quality of management and service delivery by the authority. They are a major cause of insurance claims against the authority.

3.8.2.3. It will also be important in determining priorities for footway maintenance to ensure that opportunities are taken to aid social inclusion, particularly improving accessibility for older and disabled people and also the use of prams and pushchairs.

3.8.2.4. Proposed treatments should include the provision of 'pram' crossings at suitable locations, access crossings if the kerb line is being replaced and textured paving adjacent to selected crossing points at marginal cost during the course of works.

3.8.3. Sustainability

3.8.3.1. The objective is to:

- Prevent defects in the surface, kerbs and edging causing hazards for users
- Convenience and ease of use
- Minimise cost over time

3.8.3.2. 'Emulsion and chippings' used for pothole and patching repair work is a low cost but effective method of repair outside the urban and village environment, where much of the network is only constructed of layers of surface dressing.

3.8.3.3. The use of approved unbound surface materials allows works to be undertaken in a sustainable and cost-efficient method. This can be used in a routine or new build response if assessed as providing a fit for purpose solution.

3.8.3.4. Opportunities should be taken to revitalise tree-lined avenues as part of adjoining structural maintenance footway schemes. Replacement planting is best undertaken at this time, it provides the best opportunity to provide an inclusive street design and consultations with residents, together with improved after-care. Such projects should be promoted in association with advice from the Department's Senior Landscape Architect.

3.8.3.5. For further advice on footway environmental issues, refer to the *'Highway Corridor'* document and policy database.

3.8.4. **Response**

3.8.4.1. These are detailed in the Highway Defect Risk Register App D (viii).

3.9. Footways and Cycleways - Sweeping and Cleansing - Objectives and Response

3.9.1. See Carriageway Lifecycle plan (5.2).

3.10. Lifecycle Cost Analysis

3.10.1. **Routine**

3.10.1.1. Currently we hold an inventory of footways/cycleways and condition on their surface.

3.10.1.2. We are still largely using historical data to justify our routine budget for the repairs to surfaces and kerbs. This is accentuated by a number of reactive works to restore serviceability ordered on a day work basis. The patching budget denoted in the carriageway lifecycle plan encompasses some footway patching.

3.10.1.3. Drainage, verge works and cleansing are dealt with under other lifecycle plans.

3.10.1.4. We currently utilise the following strategy to maintain these assets.

3.10.1.5. Footways and Kerbs - Minor or Safety repairs as necessary due to individual wear and tear based upon planned inspection or reactive response

3.10.1.6. **Routine Works Budget**

2014/15		Actual Spend	
		County	City
Revenue	Repairs to footways, kerbs	£580,746	£97,831

2015/16		Actual Spend	
		County	City
Revenue	Repairs to footways, kerbs	£678,424	£145,193

2016/17		Actual Spend	
		County	City
Revenue	Repairs to footways, kerbs	£533,039	£131,449

2017/18		Actual Spend	
		County	City
Revenue	Repairs to footways, kerbs	£488,623	£182,755

2018/19		Original Budget	
		County	City
Revenue	Repairs to footways, kerbs	£615,000	110,000

3.10.1.6.1. From 2014-15 all footway patching was capitalised and are funded from capital structural maintenance footway.

3.10.2. **Structural Maintenance**

3.10.2.1. Treatments Analysis

3.10.2.1.1. The identification of footways are prioritised primarily from visual inspections. These are initiated by findings from safety/reactive, a list created by our Asset Team drawn from footway condition data or the visual representation of condition treatment data held on the Norfolk Mapping Browser and give a visual indication of the relative need.

3.10.2.1.2. Schemes are then imported into our Works Programme Database and the latest condition data and other data sets snapped against them to inform a multi-criteria analysis.

3.10.2.1.3. Schemes are developed around whole-life costing if possible, but the level of funding available often limits this and more pragmatic solutions are utilised instead

3.10.2.1.4. The presumption should be to replace flagged footways with a flexible surface unless they are in a conservation zone or there are other significant environmental/ street scene concerns which are given a higher weighting. Then the footway materials may be chosen for their aesthetic appeal rather than purely for cost.

3.10.2.1.5. Our preferred current structural intervention based upon the refurbishment of an asphalt footway is two slurry treatments between reconstructions. It is unlikely the underlying materials would not have deteriorated to allow more intermediate treatments than this.

3.10.2.1.6. We have sub-divided the budget for differing categories of footway and treatments.

3.10.2.2. Structural Maintenance Investment in Footways

	2017-18	2018-19	2019-20
Cat 1 & 2 schemes	£495,790	£450,000	£450,000
Cat 3 & 4 schemes (reconstruction/resurface)	£1,322,485	£1,350,000	£1,350,000
Cat 3 & 4 schemes (intermediate i.e. slurry))	£437,086	£437,086	£437,086
Footway Patching (See 3.10.1.6.1)	££971,193	£971,193	££971,193

3.11. Service Levels

3.11.1. The conditions of footways are indicated by the FNS survey. Service levels were established our members at the ETD overview and scrutiny panel in July 2013. These are based only upon those footways at condition level 4 (structurally unsound) in the FNS.

3.11.2.

Footway Hierarchy	Condition March 2018	Survey coverage	Service Levels Condition level 4 only	Backlog
Cat 1	12.7%	100%	12.5%	Yes
Cat 2	25.6%	100%	25%	Yes
Cat 3	30.1%	100%	30%	Yes
Cat 4	31.6%	100%	30%	Yes

3.11.3. There is also joint carriageway / footway indicators we monitor in relation to safety:

- Number of incidents relating to dangerous damage to footways and carriageways requiring attention responded to within
  - Priority A - 2hrs from time of report – Target 96%, result 2017/18 = 85%
- % Safety Inspections on time –
  - The targeted service level is 96%. The result for 2017-18 = 94.2%.

3.12. Risk

3.12.1. Related to Service Levels

3.12.1.1.

- Risk – Failure to comply with target response for dangerous damage within 24 hours

Impact = 1 x Likelihood = 4= 4 low risk

3.12.1.2.

- Risk – Failure to meet footway condition service level for 14/15 (same for all footway hierarchies)

Impact = 3 x Likelihood = 3 = 9 medium risk

3.13. Backlog

3.13.1. Any negative movement against the FNS service level's condition 4 will be considered a backlog and this demonstrated by the difference in the cost of carrying out the UKPMS treatments.

3.13.2. These are contained in our annual Highway Asset Performance Report to members presented in annual in July.

4. Highway Surface Drainage Lifecycle Management Plan

4.1. These assets are designed to:

- Prevent the accumulation of surface water on carriageways, footways and cycleways.
- Prevent pollution from highway drainage affecting watercourses.
- Reduce future maintenance liability by minimising water damage to the highway structure.

4.1.1. Physical Parameters

4.1.1.1. This asset comprises all highway drainage features including gullies, kerb offlets, grips, backdrains, soakaways, catchpits, associated pipework and outfalls. We only have an inventory of features situated on the surface of the carriageway.

4.1.1.2. Information on the definitions of drainage system types used in this section is available in the Highway Inventory User Guide, which is available from the Highways Asset Management Team on request.

4.1.1.3. **Grips and Ditches**

4.1.1.3.1. These datasets are held in the highway inventory module of the HMS database (Feb 16).

District		Grips (No.)
1	North Norfolk	29,690
2	West Norfolk	52,877
3	Breckland	26,097
4	Norwich City	4
5	Broadland	18,605
6	Gt Yarmouth	3,257
7	South Norfolk	36,073
Total		**166,603**

Maintenance Areas	Grips (No.)
North	51,552
South	62,170
West	52,877
City	4
Total	**166,603**

District		Grips (Linear mtrs)
1	North Norfolk	49,999
2	West Norfolk	89,644
3	Breckland	47,824
4	Norwich City	11
5	Broadland	31,712
6	Gt Yarmouth	5,688
7	South Norfolk	60,986
Total		**285,863**

Maintenance Areas	Grips (Linear mtrs)
North	87,399
South	108,810
West	89,644
City	11
Total	**285,863**

4.1.1.3.2. The backdrain figures include all those within the database (Feb 16) including those with ownership recorded as Highway Ditch, Back ditch or unknown.

District		Backdrains (Number)
1	North Norfolk	4,949
2	West Norfolk	9,391
3	Breckland	6,987
4	Norwich City	5
5	Broadland	3,978
6	Gt Yarmouth	1,444
7	South Norfolk	14,685
Total		**41,440**

Maintenance Areas	Backdrains (Number)
North	10,371
South	21,672
West	9,391
City	5
Total	**41,440**

District		Backdrains (Linear mtrs)
1	North Norfolk	163,743
2	West Norfolk	413,090
3	Breckland	279,609
4	Norwich City	298
5	Broadland	115,415
6	Gt. Yarmouth	45,036
7	South Norfolk	524,962
Total		**1,542,152**

Maintenance Areas	Backdrains (Linear mtrs)
North	324,194
South	804,571
West	413,090
City	298
Total	**1,542,152**

4.1.1.4. **Gullies and Kerb Offlets**

4.1.1.4.1. These datasets are held in the highway inventory module of the HMS database (Feb 16).

District		Gullies (No.)
1	North Norfolk	16,348
2	West Norfolk	28,548
3	Breckland	21,636
4	Norwich City	20,905
5	Broadland	21,104
6	Gt. Yarmouth	14,716
7	South Norfolk	22,048
Total		**145,305**

Maintenance Areas	Gullies (No.)
North	52,168
South	43,684
West	28,548
City	20,929
Total	**145,305**

District		Offlets (No.)
1	North Norfolk	592
2	West Norfolk	3,353
3	Breckland	1,108
4	Norwich City	40
5	Broadland	1,061
6	Gt. Yarmouth	531
7	South Norfolk	2,430
Total		**9,115**

Maintenance Areas	Offlets (No.)
North	2,184
South	3,538
West	3,353
City	40
Total	**9,115**

4.1.1.5. **Drainage Kerbs and Linear grids**

4.1.1.5.1. This data set is held in the highway inventory module of the HMS database (Mar 15). It includes such features as 'beany blocks', combined kerb/drainage features. The linear surface drainage on both roads and footways includes attributes slit, metal grating and drainage inlet. Measurements are in nearest lin.m.

District		Drainage Kerbs (mtrs)
1	North Norfolk	2,129
2	West Norfolk	11,540
3	Breckland	2,375
4	Norwich City	3,202
5	Broadland	1,756
6	Gt. Yarmouth	2,104
7	South Norfolk	7,931
Total		**31,038**

Maintenance Areas	Drainage Kerbs (mtrs)
North	5,989
South	10,306
West	11,540
City	3,202
Total	**31,038**

District		Channel Blocks (mtrs)
1	North Norfolk	2,860
2	West Norfolk	3,298
3	Breckland	827
4	Norwich City	966
5	Broadland	1,666
6	Gt. Yarmouth	5,541
7	South Norfolk	1,295
Total		**16,453**

Maintenance Areas	Channel Blocks (mtrs)
North	10,067
South	2,122
West	3,298
City	966
Total	**16,453**

4.1.1.6. **Filter Drains**

4.1.1.6.1. This data set is held in the highway inventory module of the HMS database (Feb 16). It includes stone filled ditches, French drains and fin drains.

District		Filter Drains (No.)
1	North Norfolk	63
2	West Norfolk	180
3	Breckland	28
4	Norwich City	1
5	Broadland	88
6	Gt. Yarmouth	48
7	South Norfolk	271
Total		**679**

Maintenance Areas	Filter Drains (No.)
North	199
South	299
West	180
City	1
Total	**679**

District		Filter Drains (Linear mtrs)
1	North Norfolk	4,207
2	West Norfolk	16,942
3	Breckland	1,633
4	Norwich City	51
5	Broadland	4,208
6	Gt. Yarmouth	7,291
7	South Norfolk	20,068
Total		**54,399**

Maintenance Areas	Filter Drains (Linear mtrs)
North	15,706
South	21,701
West	16,942
City	51
Total	**54,399**

4.1.1.7. **Piped systems**

4.1.1.7.1. Surface drainage features such as gullies, kerb offlets and filter drains are recorded in the highway inventory module of the HMS database.

4.1.1.7.2. Underground drainage records of all estates built since 1974 are held centrally and can be requested from Highway Development Control.

4.1.1.7.3. The local area offices hold some 'as built' drawings from County Council schemes and investigation surveys.

4.1.1.8. **Outfalls**

4.1.1.8.1. Few records are kept on these, though some can be identified within 'as built' drawings held at the local area office. They can be to the following types:

- Anglian Water
  - Surface Water Main Drainage Pipe System
  - Combined System
- Environment Agency - main River under their control
- Inland Drainage Board Non – main river or stream under their control
- District Council ‘sewer ditches’ (few in number - in Breckland from old rural district council)
- Private Ditch

4.1.1.9. **Culverts**

4.1.1.9.1. These are contained in the Structures lifecycle plan.

4.1.2. Lifecycle Asset Options

4.1.2.1. **Creation/Acquisition**

4.1.2.1.1. These fall into 2 broad areas:

- County Council schemes
- Private developers

4.1.2.1.2. County Council Schemes:

4.1.2.1.2.1. Where they have been placed within the highway normally as part of:

- Maintenance schemes to alleviate flooding on a specific highway.
- Schemes to resolve flooding issues over a significant area.
- An improvement scheme for another primary purpose where the opportunity is taken to improve the surface water drainage.

4.1.2.1.3. Private Developers:

4.1.2.1.3.1. Highway drainage may need to be provided by developers as part of planning consent. The Highways Development Control Team approves these. A commuted sum is required for their future maintenance through a section 38 agreement. Drainage records of all estates built since 1974 are held centrally and can be requested from highway Development Control.

4.1.2.1.4. The Area offices maintain these via the highway maintenance fund in all cases.

4.1.2.2. **Renewal/Replacement**

4.1.2.2.1. Upon the realisation that a surface water drainage system is no longer satisfactory, its replacement should be considered based upon drainage investigation works, local knowledge and best design practice.

4.1.2.2.2. This may result in renewal of existing provision or significant enhancement.

4.1.2.3. **Upgrading**

4.1.2.3.1. Upgrading is normally considered in conjunction with the renewal and replacement process.

4.1.2.3.2. The surface water drainage facilities should be reviewed and works carried out as part of significant maintenance and integrated transport schemes.

4.1.2.4. **Disposal**

4.1.2.4.1. This is normally considered in association with renewal and replacement. Existing drainage provision is seldom removed and is either utilised as part of the new design or disconnected and left in-situ.

4.1.3. Non Asset Options

4.1.3.1. Demand Management

4.1.3.1.1. In order to clarify public accountability for action under the Land Drainage legislation, all Enforcement Authorities (Environment Agency, Inland Drainage Boards, Anglian Water Services, District Councils) within Norfolk have agreed the following Statement of Common Policy on Land Drainage in Norfolk:

4.1.3.1.2.

- In event of wide scale flooding all authorities will respond and co-operate in alleviating the danger to public and damage to buildings.
- In responding to other land drainage problems the following authorities will take a lead by initially investigating problems in the areas specified:
    - Environment Agency - Main River within the meaning of Part IV of the Water Resources Act 1991 including urban flooding affected by Main River
    - Internal Drainage Board – Non-main river problems within the Internal Drainage District.
    - County Council - Drainage problems in County Council smallholdings, estates or highways, or other associated County Council property.
    - District Council - Small urban flooding problems or isolated rural problems affecting domestic or commercial buildings.
- Any Authority receiving a request, which is not for them, will take the message and themselves pass it on for the customers to the appropriate lead Authority.
- Each lead Authority will decide what action, if any, it will take in pursuing enforcement or remedial activities, and for informing other agencies which may be involved.
- All enforcement authorities will work together in finding solutions to more widespread problems

The demand for scale of highway drainage provision can be minimised at development stage by reducing surface water run-off entering the highway as part of planning conditions.

4.1.3.2. **Amending Standards**

4.1.3.2.1. Ground conditions vary throughout the county and soakage tests can determine the scope and nature of the design for new works.

4.1.4. Lifecycle Treatment Options

Do Minimum	The do minimum activities are the routine activities we carry out in order to ensure the safe passage of highway users. Cleansing activities Drainage Investigation Odd new provision of grips, ditches, gullies and offlets
Medium Life	Reinforcement of existing system with additional capacity Pipeline repair to return capacity Partial pipeline upgrade Additional gullies Additional soakage capacity
Long Life	Significant renewal or enhancement New area provision Whole pipeline upgrade

4.1.5. Drainage - Routine Maintenance Activities

4.1.5.1. Routine maintenance is the regular on-going day to day work that is necessary to keep assets operating, including instances where portions of assets fail and need immediate repair to make operational again.

4.1.5.2. The routine works undertaken on the ‘drainage asset’ have been sub-divided into activities, the standards of which have been displayed in tabular form along with details on objectives and response arrangements.

4.1.5.3. Reactive activities are by their nature unplanned and occur in response to sudden changes, whist the other activities are carried out in a planned manner.

Drainage Activities		
Activity Type	**Activity**	**NCC Service Standard**
Preventative	Cleansing - Gully Emptying	From schedule either;- • Annual • Biennial or • Triennial Frequency based upon risk and multi-criteria assessment.
Preventative	Cleansing - Kerb Offlets	Clear when required
Preventative	Linear Drainage such as ‘beany blocks’ and ‘aco channels’	Clean once per year.
Preventative Preventative	Cleansing - Culverts & Manholes Cleansing - Soakaways and Catchpits	Clear when required Use individual maintenance plan for system if available
	Cleansing - Interceptors, holding tanks	
Preventative	Cleansing - Piped drainage	Clear when require
Preventative	Cleansing - Grips and Back drains	Clear vegetation from grips and back drains and dig out when required. If a pro-active schedule of cleaning of grips is carried out, it should commence after the last grass cut and completed if possible before the worst effects of winter, but certainly finished by the end of March

Preventative	Cleansing - Private Ditches	Responsibility of adjoining landowners
Condition Monitoring	Drainage Systems	With safety inspections of carriageway, cycleway and footway, with attention to known problems or specific areas after heavy rainfall as opportunity allows.
Condition Monitoring	Surface Boxes and Ironwork	System required for referral to utilities for defects in their covers.
Reactive	Address problem upon identification	Clean/repair to restore serviceability

4.1.6. Drainage Systems - Objectives and Response

4.1.6.1. Response

4.1.6.1.1. This varies dependent upon the extent of depth and location of the hazard. Responses to are detailed in the Highway Defect Risk Register App D (viii).

4.1.6.2. Safety

4.1.6.2.1. The objectives are to:

- Prevent the accumulation of surface water on carriageways, footways and cycleways
- Ensure our systems are in a safe condition

4.1.6.2.2. The failure to remove surface water from the road can lead to ponding or more substantial localised flooding causing a safety hazard to highway users, particularly on high speed roads.

4.1.6.2.3. Displaced covers and frames can be potential hazards for all highway users

4.1.6.2.4. Damaged covers or leaking pipes and chambers may cause subsidence leaving a void in the highway.

4.1.6.3. Serviceability

4.1.6.3.1. The objectives are to:

- Prevent the accumulation of surface water on carriageways, footways and cycleways
- Ensure our systems are working

4.1.6.3.2. Ponding or flooding can cause roads to be blocked causing traffic disruption whilst adjoining property may suffer associated water damage.

4.1.6.3.3. Gullies are emptied to remove detritus. This ensures the continued efficient functioning of the gully and its connection.

4.1.6.3.4. The frequency of emptying depends partly upon location, presence of dirty industries, the degree of tree cover, level of rainfall and frequency of sweeping. This is detailed in the table in 4.1.5.3.

4.1.6.3.5. Where, despite effective maintenance operations, flooding of the highway occurs, with implications for safety or serviceability, relevant warning signs should be placed in position as quickly as possible and users advised through local media. The cause of the flooding should be determined and given prompt attention, in order to restore the highway to a reasonable condition. If it is subsequently determined that the flooding is attributable to deficiencies in infrastructure or the maintenance regime, given the nature of the weather conditions under which it occurred, then action to permanently relieve the problem should be considered urgently. If the event is attributable to the actions of a third party, the matter should be taken up with them at the earliest opportunity.

4.1.6.3.6. All aspects of water draining on to and off of the highway, involvement and responsibilities of other bodies and how to progress such issues is fully described in our IMS Guidance *'SP03-04-G03'.*

4.1.6.3.7. Ironware comprising covers, gratings, frames and boxes set in carriageways, footways and cycleways have the potential to compromise safety and serviceability and in certain cases cause noise and disturbance to local residents. Although responsibility for defective ironwork where this is part of the apparatus installed by a Utility may lie with that Utility, claims are often also pursued against the authority. Defects identified during inspection or from users should therefore be formally notified to the Utility using IMS Procedure *'SP03-01-G08'*.

4.1.6.3.8. Manhole covers and boxes in the carriageway should be installed to a tolerance of +/– 5mm to the surrounding level. Gully frames and gratings should be installed level or not exceeding 10mm lower than the surrounding carriageway. When boxes, frames and covers are found to be greater than 20mm lower than the surrounding carriageway they should be re–set.

4.1.6.4. **Sustainability**

4.1.6.4.1. The objectives are to:

- Prevent pollution from highway drainage affecting watercourses
- Fulfil duty of the Authority to prevent nuisance to adjoining landowners by flooding and work with others in the wider community to minimise future risk of flooding
- Reduce future maintenance liability by minimising water damage to the highway structure

4.1.6.4.2. Inadequate drainage provision and maintenance can cause pollution of nearby watercourses if highway run-off becomes contaminated.

4.1.6.4.3. Material arising from all road drainage emptying and cleansing operations has potential implications for pollution and should be disposed of correctly in accordance with Environment Agency, or equivalent authority, requirements.

4.1.6.4.4. In order to clarify public accountability for action under the Land Drainage legislation, all Enforcement Authorities (Environment Agency, Inland Drainage Boards, Anglian Water Services and District Councils) within Norfolk have agreed a Statement of Common Policy Land Drainage in Norfolk (see 4.1.3.1.1.).

4.1.6.4.5. Failure to remove surface water from the highway can allow the foundations of roads and footways to become penetrated by water which can contribute to structural failure. Embankments and cutting can also become unstable. It can also reduce the effective life of highway assets causing an increased frequency of works.

4.1.6.4.6. For further advice on drainage environmental issues, refer to the *'Highway Corridor'* document and policy database.

4.1.7. Surface Water Management Plans

4.1.7.1. A Surface Water Management Plan (SWMP) is a framework to help understand the causes of surface water flooding and agree the most cost effective ways of managing surface water flood risk.

4.1.7.2. Surface water includes flooding from surface run-off, ordinary watercourses and ground water.

4.1.7.3. The predicted consequences of flooding to property, businesses and infrastructure are analysed and areas identified to be at more significant risk have been delineated into Critical Drainage Areas (CDA's).

4.1.7.4. CDA's are geographic area (usually a hydrological catchment) where multiple and interlinked sources of flood risk (surface water, groundwater, sewer, main river and/or tidal) cause flooding.

4.1.7.5. The main outputs are a co-ordinated Action Plan to prioritise projects to reduce surface water flood risk and detailed mapping of areas prone to surface water flood risk. Our Flood & Water Management team leads this function.

4.1.7.6. There are five surface water management plans currently in Norfolk. These are:

1. Greater Norwich Urban Area	- Adopted 2012
2. Kings Lynn & West Norfolk District	- Adopted Oct 2015
3. Great Yarmouth District	- Adopted 2014
4. North Norfolk District	- Adopted 2016
5. South Norfolk District	- Project started Nov 2013 Stage 1 - complete Stage 2 - ongoing

4.1.7.7. Current publications can be seen on our website, follow the links to Surface Water Management Plans.

4.1.8. Lifecycle Plan

4.1.8.1. Upon re-surfacing damaged ironwork is lifted and refurbished. Known drainage issues should also be addressed prior to or as part of surfacing schemes. The cost is borne by the surfacing schemes.

4.1.8.2. We have analysed our ordering and inventory systems to aid lifecycle analysis for routine maintenance. We have linked inventory items to our routine maintenance rates for cleansing or renewal.

4.1.8.3. Assumptions have been made on:

4.1.8.4.
- Inventory/SOR linkage
- Spend on reactive service lead requests being broadly similar
- Traffic Management

4.1.9. Lifecycle Cost Analysis

4.1.9.1. Routine

4.1.9.1.1. Currently we only have a limited number of inventory items complete in extent and with enough reliability to give a high or medium confidence. These are grips, ditches, kerb offlets and gullies. Our budgets are based upon the planned cleansing frequencies see 4.1.5.3.

4.1.9.1.2. Our records of our underground systems such as soakaways, catchpits and pipes are limited or incomplete. As a result we are still largely using historical reactive need based data to justify our routine budgets

4.1.9.1.3. A large number of reactive works to restore serviceability ordered on a day-work basis, is expected throughout the year in response to weather events. Historical reactive need based data to justify our routine budgets

4.1.9.2. Routine Works Budget

4.1.9.2.1.

2014/15	Actual Spend	
	County	City
Gully Emptying	£450,472	£49,132
Drainage Cleansing	£398,333	£12,363
Drainage Repairs	£1,254,747	£78,539
Emergency Cleaning	£226,988	£14,983
Total	£2,330,540	£155,017
Grand Total	£2,485,557	

4.1.9.2.2.

2015/16	Actual Spend	
	County	City
Gully Emptying	£376,937	£71,903
Drainage Cleansing	£316,989	£8,421
Drainage Repairs	£1,353,940	£82,246
Emergency Cleaning	£238,351	£20,335
Total	£2,286,217	£182,905
Grand Total	£2,469,122	

4.1.9.2.3.

2016/17	Actual Spend	
	County	City
Gully Emptying	£413,842	£74,529
Drainage Cleansing	£323,750	£11,301
Drainage Repairs	£1,125,710	£96,276
Emergency Cleaning	£290,790	£14,382
Total	£2,154,092	£196,488
Grand Total	£2,350,580	

4.1.9.2.4.

2017/18		Actual Spend	
		County	City
Gully Emptying	Revenue	£310,616	£86,762
Drainage Cleansing		£284,946	£12,729
Emergency Cleaning		£274,700	£13,599
Drainage Repairs		£723,345	£68,750
Total		£1,593,607	£181,840
Grand Total		£1,775,447	

4.1.9.2.5.

2018/19		Original Budget	
		County	City
Gully Emptying	Revenue	£401,430	£85,000
Drainage Cleansing		£512,500	£20,000
Emergency Cleaning		£322,880	£20,000
Drainage Repairs		£512,500	£41,000
Total		£1,749,310	£166,000
Grand Total		£1,915,310	

4.1.9.3. **Structural Maintenance**

4.1.9.3.1. Schemes are identified by the local area offices. They are categorised into 5 bands based on the urgency leading to a rolling 5 year programme.

4.1.9.3.2. We have an assessment system in place based upon the example in the HMEP document ‘Guidance on the Management of Drainage Assets, Appendix B’ which aids the ranking of schemes within a band and also allows comparisons to be made.

4.1.9.3.3. Our members have approved an additional budget of £1.5m to be spent over the next 3-years 2017/18.18/19,19/20 on ‘market town’ drainage schemes.

4.1.9.3.4. Our structural maintenance funding on drainage for 2018-19 is:

- Small repairs delivered by area teams
  - £330,000 (Capitalised from 2017-18)
- Schemes
  - £600,000 from structural maintenance budget
  - £75,000 – potential match funding for bidding opportunities with Flood & Water Team, otherwise will go to St Mt schemes

4.1.10. **Service Levels**

4.1.10.1. There are no statutory indicators identifying the condition of highway drainage systems.

4.1.10.2. Members have approved the cost of listed schemes as the service level. We are considering whether this is sufficient in the future.

4.1.11. ## Risk

4.1.11.1. **Financial**

4.1.11.1.1. • Risk – Insufficient Routine Budget / Overspend

Budget based upon inventory, risk assessment and actual spend over last 5 years.

Impact = 1 (overspend up to £100,000) x Likelihood (Unlikely) =2 = Risk 2 low risk

4.1.11.2. **Operational**

4.1.11.2.1. • Risk - The ability to deliver the required standards and liability

Highway drainage will not be unduly affected by unusual seasonal conditions.

Impact = 5 (liability in 3rd party claim) x Likelihood (Rare) = 1 = Risk 5 low risk

4.1.12. ## Backlog

4.1.12.1. Any negative movement against the service level will be considered a backlog and this demonstrated by the difference in the cost of carrying out the treatments. These are reported annually to members.

5. Non-illuminated Traffic Signs & Bollards - Lifecycle Management Plan

5.1. These assets are designed to:

- Assist in managing the movement of vehicles and pedestrians in the highway
- Warn about hazardous locations
- Advise about traffic regulations
- Inform highway users about destinations

Our primary aim is to ensure that these are legible, visible and effective.

5.2. Physical Parameters

5.2.1.1. Non-illuminated Traffic Signs & Bollards

5.2.1.1.1. The number of Non-illuminated Traffic Signs & Bollards is drawn from inventory items held on the Highways Management System (Mar 16). Reflector posts are included in the Non-illuminated Signs totals.

All forms of illuminated signs or bollards, internal, external and remote are excluded from these totals and are included in the street lighting lifecycle plan.

District		Non-illuminated Signs (no.)
1	North Norfolk	18,180
2	West Norfolk	18,310
3	Breckland	16,847
4	Norwich City	7,473
5	Broadland	12,544
6	Gt Yarmouth	5,295
7	South Norfolk	18,916
Total		97,565

Maintenance Areas	Non-illuminated Signs (no.)
North	36,019
South	35,763
West	18,310
City	7,473
Total	97,565

District		Non-illuminated Bollards (no.)
1	North Norfolk	673
2	West Norfolk	1214
3	Breckland	922
4	Norwich City	1920
5	Broadland	847
6	Gt Yarmouth	1,730
7	South Norfolk	1540
Total		8,846

Maintenance Areas	Non-illuminated Bollards (no.)
North	3250
South	2462
West	1214
City	1920
Total	8,846

5.3. Lifecycle Options

5.3.1. Creation and Acquisition

5.3.1.1. These fall into 3 broad areas:

- County Council schemes
- Privately funded destination signing schemes (tourism/signs to establishment)
- Private developers

5.3.1.2. County Council Schemes:

Where they have been placed within the highway normally as part of:

- Accident investigation and prevention works
- Traffic regulation orders
- Informatory signing schemes
- Ongoing development and maintenance of the highway network
- Positive decision to remove illuminated signs and bollards and replace with non-lit within regulations or specific dispensation

5.3.1.2.1. Privately funded destination signing schemes (tourism/signs to establishment, village nameplate signs).

5.3.1.2.1.1. These are funded by third parties subject to our approval. The schemes are subject to our design and installation. We recover both our technical and administration costs.

5.3.1.2.2. Private Developers:

5.3.1.2.2.1. Signs can be placed within the highway by developers to discharge their planning conditions.

5.3.1.2.2.2. Our Highways Development Control Team approves these and a commuted sum is taken for their future maintenance via a section 38 agreement.

5.3.1.2.2.3. The Area offices maintain these via the highway maintenance fund in all cases.

5.3.1.3. Renewal or Replacement

5.3.1.3.1. Upon any actual damage or degradation to a traffic sign, its replacement should be considered in line with national guidance, which seeks to reduce clutter. Current local member approved practice is to undertake a risk based assessment of signs in need of replacement to ascertain whether the sign is still needed. This assessment can be applied to all roads, but it is more likely to question sign provision on Norfolk's minor road network. The risk assessment form can be seen in 'Appendix D (xiv)'. Replacement signs should be within the framework of the traffic sign regulations.

5.3.1.3.2. The condition of the associated signs or posts should be considered when attention is drawn to one of them, in order to ensure that any necessary works are optimised.

5.3.1.3.3. Renewals can be necessitated by changes in legislation policy and technical guidance.

5.3.1.4. **Upgrading**

5.3.1.4.1. Upgrading is normally considered in conjunction with the renewal and replacement process.

5.3.1.4.2. During significant maintenance and integrated transport schemes the opportunity should be taken to review the current signing facilities and carry out necessary works.

5.3.1.5. **Disposal**

5.3.1.5.1. This is normally considered in association with renewal and replacement or route integrity inspections.

5.4. Non Asset Options

5.4.1. Managing Demand

5.4.1.1. These assets should only be installed at those locations approved by our highway engineering staff.

5.4.1.2. In addition to statutory DfT requirements, we have developed policies stating criteria for the provision of:

- Village nameplates (Provided free of charge on A and B roads in line with TSRGD 2002. Parish Councils fund the provision and replacements of such signs on the remaining roads, and/or if additional legends are incorporated)
- Signs to Establishments
- Signs to Tourist Attractions
- ‘Residents Only’ Parking scheme
- Provision of Temporary Signs to Special Events
- Signing of Route Hierarchy
- Provision and Maintenance of Finger Post Direction Signs
- Traffic Regulation Orders (Waiting Restrictions)
- Direction Signs Design Standards
- 20 mph limits and Zones

5.4.1.3. The method for assessing requests, undertaking works and recharging costs are detailed in the Technical Group procedure Manual Section 7 Traffic Management.

5.4.2. Amending Standards

5.4.2.1. Local policies may revise the criteria given in the traffic signs regulations and general directions regarding destination, regulatory and warning signs.

5.5. **Treatment Options**

Do Minimum	Reactive cleansing based on road hierarchy
Medium Life	Replace faulty clips. Straighten post.
Long Life Treatment	Replace sign if assessed as 'still required'(consider post condition at same time)

5.6. **Non-illuminated Traffic Signs & Bollards – Routine Maintenance Activities**

Activity Type	Activity	NCC Service Standard
Preventative	Cleaning	Reactive cleansing based on road hierarchy inc. block chevrons roundabouts
	Weed growth	Treat block chevrons roundabouts routinely for weed growth
	Fittings	When required (condition reported when cleaned)
	Painting of signs, supports and frames	When required (condition reported when cleaned) but not exceeding 10 year interval
Condition Monitoring	Safety Inspections	As Carriageway, Cycleway & Footway Standards
		As Carriageway Standards
	Degradation retro-reflectivity, deterioration legibility	With routine Safety inspections including end of day , inspection of signs on routes with centre lines and studs
	Route Integrity	N/A
Reactive	Repairs to damage	Speed of repair will depend upon degree of danger but important and regulatory signs replaced as a matter of urgency
	Isolated new signs or upgrades	After approval by Highway Engineer

5.7. Non-illuminated Traffic Signs & Bollards – Objectives and Response

5.7.1. Safety

5.7.1.1. The objective is to:

- Identify risks to users
- Separate potential traffic conflicts
- Keep all traffic signs legible, visible and effective, as far as possible,
- At all times in relation to the road use and traffic speeds

5.7.1.2. The following defects in signs and bollards should be treated as 36 hour response defects. The speed of permanent repair will depend on the degree of danger but important warning and regulatory signs should be replaced as a matter of urgency.

- Matters affecting the legality of important warning and regulatory signs
- Damage, deterioration, or vandalism to signs and bollards leaving either the sign or situation to which it applies in a dangerous condition
- Missing traffic cylinders across gaps in central reserve fence at emergency crossing points.

5.7.1.3. Vegetation potentially obscuring road signs should be recorded during safety inspections of carriageways, footways and cycle routes, and treated accordingly.

5.7.1.4. All traffic signs are relevant, legible and visible, as far as possible at all times, in relation to the road use and traffic speeds.

5.7.1.5. Stop and give way signs at minor roads should be included in the inspections of signs on the major road to which they control entry.

5.7.1.6. Any graffiti, which is obscuring warning, advisory, or direction signs, should be removed.

5.7.2. Serviceability

5.7.2.1. The objective is to:

- Contribute to ease of use
- Contribute to network integrity

5.7.2.2. The legal context for bollards and reflector posts is provided by Section 66 (2) of the Highways Act 1980. This enables a highway authority to provide (within a publicly maintainable highway which includes a carriageway) such raised paving, pillars, walls, rails or fences as they think necessary for the purpose of safeguarding persons using the highway.

5.7.2.3. Section 92 of the Road Traffic Regulation Act 1984 provides that where the passage of vehicles is prohibited by a traffic regulation order, the highway authority may place bollards or other obstructions, as they consider appropriate for preventing their passage.

5.7.2.4. We will remove graffiti placed on any of its highway assets, which is considered to be racist or otherwise offensive. We will do so as soon as reasonably practicable, depending on its nature and location, but within 10 days of being observed or reported.

5.7.2.5. In areas where signs are prone to defacing by graffiti, masking agents can be attached to the face of signs which will aid cleaning.

5.7.3. **Sustainability**

5.7.3.1. The objective is to:

- Support modes of sustainable transport
- Contribute to economic development
- Heavy traffic routing to optimise maintenance.

5.7.3.2. Traffic Signs can assist in supporting modes of sustainable transport and if they are not kept in good order their effectiveness can be compromised. They also can make a contribution to the local economy and minimise adverse environmental impact on communities and optimise the use of maintenance funds.

5.7.3.3. When signs are replaced, consideration should be given to combining signs to reduce signing clutter. This may however, create unacceptably large signs, and unless the number of destinations can be reduced, separate signs may be more appropriate. On all roads below route hierarchy '3', 'finger post' signs should be used at junctions.

5.7.3.4. For further advice on signage environmental issues, refer to the *'Highway Corridor'* document and policy database.

5.7.4. **Response**

5.7.4.1. These are detailed in the 'Highway Defect Risk Register (Appendix D (viii))'.

5.8. Lifecycle Plan

5.8.1. We have analysed our ordering and inventory systems during 2007 to aid future lifecycle analysis. We have linked inventory items to our maintenance rates for refurbishment.

5.8.2. Assumptions have been made on:

- Inventory/Schedule of rate linkage
- Traffic Management
- Annual cleaning of all non-lit signs and bollards
- Completeness of the inventory
- Lifecycle renewal of bollards, signs, posts and foundations in excess of 25 years (ignoring limited surfacing gain)

5.9. Lifecycle Cost Analysis

5.9.1. Routine

5.9.1.1. We currently utilise the following strategy to maintain these assets.

Signs, posts and bollards	- Cleaning, either as necessary or using proactive order based upon inventory - Replaced as necessary due to individual wear and tear

5.9.1.2. We do not hold condition data on the individual signs and bollards. They are inspected during safety inspections and those requiring treatment prioritised for replacement depending upon the severity of the defect, the location and whether it is risk assessed 'as still required'.

5.9.1.3. **Routine Works Budget**

2014/15	**Actual Spend**
County (exc. City)	£510,703
City	£25,425
Total	£536,128

2015/16	**Actual Spend**
County (exc. City)	£440,640
City	£32,531
Total	£473,171

2016/17		**Actual Spend**
Capital		£200,000
Revenue	County (exc. City)	£162,247
	City	£26,176
Total		£388,423

2017/18		**Actual Spend**
Capital		£368,277
Revenue	County (exc. City)	£164,965
	City	£5,432
Total		£538,674

2018/19		**Original Budget**
Capital		£200,000
Revenue	County (exc. City)	£197,320
	City	£12,500
Total		£409,820

5.10. Service Levels

5.10.3.1. There are no statutory indicators identifying the condition of signs and bollards. We will consider whether a local standard can be developed in the future.

5.11. Risk

5.11.3.1. Financial

5.11.3.1.1.
- Risk – Insufficient Budget / Overspend

Budget based upon inventory, lifecycle planning and actual spend over last 5 years.

Impact = 1 (overspend up to £100,000) x Likelihood (Unlikely) = 2

= Risk 2 low risk

5.11.3.2. Operational

5.11.3.2.1.
- Risk - The ability to deliver the required standards and liability

We have a proven highway inspection regime in place and have developed a risk based method of assessment to consider removing signs at end of their life.

Impact = 5 (liability in 3rd party claim) x Likelihood (Rare) = 1 = Risk 5 low risk.

6. Road Markings & Road Studs - Lifecycle Management Plan

6.1. These assets are designed to:

- Assist in managing the movement of vehicles and pedestrians in the highway
- Warn about hazardous locations
- Advise about traffic regulations

They convey instructions to road users in a manner, which is clearly visible, both by day and by night. Our primary aim is to ensure that they are legible, visible and effective.

6.2. Physical Parameters

6.2.1. Road Markings and Road Studs

6.2.1.1. The number of the Road Markings is drawn from inventory items held on the Highways Management System (Mar 15).

District		Transverse marking (no. sets)
1	North Norfolk	7,981
2	West Norfolk	10,917
3	Breckland	9,378
4	Norwich City	14,342
5	Broadland	7,913
6	Gt Yarmouth	6,421
7	South Norfolk	9,883
	Total	66,835

Maintenance Areas	Transverse marking (no. sets)
North	22,315
South	19,261
West	10,917
City	14,342
Total	66,835

District		Longitudinal Lin.m (inc. gaps in broken lines)
1	North Norfolk	653,093
2	West Norfolk	838,038
3	Breckland	749,444
4	Norwich City	320,323
5	Broadland	389,192
6	Gt Yarmouth	336,515
7	South Norfolk	720,110
	Total	4,005,021

Maintenance Areas	Longitudinal Lin.m
North	1,378,800
South	1,469,554
West	838,038
City	320,323
Total	4,007,615

District		Hatching zone length (not lines)
1	North Norfolk	23,919
2	West Norfolk	48,041
3	Breckland	24,799
4	Norwich City	18,484
5	Broadland	13,678
6	Gt Yarmouth	7,564
7	South Norfolk	33,251
	Total	169,736

Maintenance Areas	Hatching zone length (not lines)
North	45,161
South	58,050
West	48,041
City	18,484
Total	169,736

The number of Road studs is drawn from inventory items held on the Highways Management System (Feb 16).

District		Road studs (no.)
1	North Norfolk	20,558
2	West Norfolk	40,737
3	Breckland	30,930
4	Norwich City	288
5	Broadland	9,712
6	Gt Yarmouth	4,557
7	South Norfolk	29,236
	Total	136,017

Maintenance Areas	Road studs (no.)
North	34,827
South	60,166
West	40,737
City	288
Total	136,017

6.3. Lifecycle Options

6.3.1. Creation and Acquisition

These fall into 2 broad areas:

- County Council schemes
- Private developers

6.3.1.1. County Council Schemes:

6.3.1.1.1. Where they have been placed within the highway normally as part of:

- Accident investigation and prevention works
- Traffic regulation orders
- Public requests (approved by our Traffic Engineers)

6.3.1.2. Private Developers:

6.3.1.2.1. Privately funded destination signing schemes (tourism/signs to establishment, village nameplate signs).

6.3.1.2.2. These are funded by third parties subject to our approval. The schemes are subject to our design and installation. We recover both our technical and administration costs.

6.3.1.2.3. The Area offices maintain these via the highway maintenance fund in all cases.

6.3.2. Renewal or Replacement

6.3.2.1. Upon any degradation or damage of road markings and studs, their repair should be considered within the framework of the traffic signs regulations and general directions together with, local operational and policy guidance.

6.3.2.2. The condition of the associated markings and studs should be considered when attention is drawn to one of them, in order to ensure that any works are optimised.

6.3.2.3. If the status of a road changes for example its route hierarchy or classification the existing provision should be reconsidered. It could be upgraded as part of the change or downgraded upon the next resurfacing treatment.

6.3.2.4. Renewals can be necessitated by changes in legislation or technical guidance.

6.3.3. Upgrading

6.3.3.1. Upgrading is normally considered in conjunction with the renewal and replacement process.

6.3.3.2. Upon significant maintenance surfacing and integrated transport schemes the opportunity should be taken to review the current lining and apply any necessary works to the new surface.

6.3.4. Disposal

6.3.4.1. This is normally considered in association with renewal and replacement or route integrity inspections.

6.4. Non Asset Options

6.4.1. Managing Demand

6.4.1.1. These assets should only be installed at those locations approved by our traffic engineering staff. These staff should re-assess the need to maintain road studs and centre line markings off the route hierarchy when surfacing work is planned.

6.4.1.2. We have developed policies stating criteria for the provision of:

- ‘Residents Only’ Parking scheme
- Traffic Regulation Orders (Waiting Restrictions)z\\l
- Clearway markings at Bus Stops
- Use of Roundels
- 20 mph limits and Zones

6.4.1.3. Some of these can be found on our intranet (only visible to County Council staff): NCC Intranet: CES Policies

6.4.2. Amending Standards

6.4.2.1. Local policies may revise the criteria given in the traffic signs regulations and general directions regarding destination, regulatory and warning signs.

6.5. Treatment Options

Do Minimum	• Isolated repairs • patch using temporary markings • Odd road studs
Medium / Long	• Bulk renewal of road studs • Renewal of set of markings • Length of life dependent on wear and tear.

6.5.1. Road Markings and Road Studs – Routine Maintenance Activities

Activity Type	Activity	NCC Service Standard
Preventative	Bulk renewal of studs and lines	See Serviceability (6.6.2.)
Condition Monitoring	Safety Inspections	With road frequency
	Degradation retro-reflectivity, deterioration legibility Reflective Conspicuity Route Integrity	Visual inspection with safety inspections of highways.
Reactive	Isolated new markings or upgrades	After approval by Asst/Highway Engineer

6.6. Road Markings and Road Studs – Objectives and Response

6.6.1. Safety

6.6.1.1. The objectives are to:

- Provide route delineation in poor weather
- Keep in safe condition, potential for damage if loose

6.6.1.2. Road markings and studs are used to separate potential traffic conflicts promoting safety of all road users.

6.6.1.3. The maintenance objective is to keep all road markings and studs legible, visible and safe as far as possible at all times.

6.6.2. **Serviceability**

6.6.2.1. The objective is to:

- Promote ease of use in darkness and bad weather

6.6.2.2. Highway users will readily see any lack of maintenance of road markings and road studs, a high proportion of which are safety features or fundamental to the implementation of integrated transport policy. The following practice should be used for maintenance:

- Renew markings when more than 30% of their area becomes ineffective or worn.
- Mandatory markings should be masked during any road treatment as required or replaced as soon as reasonably practicable afterwards. At sites where absence of markings may cause danger, temporary markings should be used where permanent materials cannot be applied immediately.
- Other markings and reflective studs should be replaced as soon as economically practicable after completion of the surfacing work. Ideally ‘Stop’ and ‘Give Way’ markings within 7 days, other mandatory within 14 days and other markings and studs within 28 days.
- During resurfacing ‘No road markings’ and ‘Road studs removed’ boards should be displayed until all have been replaced.
- Missing/defective reflective studs should be replaced individually/in bulk, depending on individual highway circumstances. Renew pads when 10% of length becomes ineffective or worn, unless road is due to be resurfaced / surface dressed when studs will be re-set and pads renewed.

6.6.3. **Sustainability**

6.6.3.1. The objectives are to:

- Support sustainable modes
- Provide edge delineation to reduce edge damage

6.6.3.2. Road Markings and studs can be used to delineate between differing modes of traffic such as bus and cycle lanes encouraging sustainable transport. If they are not kept in good order this can be compromised.

6.6.3.3. Waiting restrictions can minimise adverse environmental impact caused by inappropriate parking and restore the amenity value of verges.

6.6.3.4. Edge delineation can reduce edge damage.

6.6.3.5. For further advice on road markings environmental issues, refer to the *'Highway Corridor'* document and policy database.

6.6.4. **Response**

6.6.4.1. These are detailed in the Highway Defect Risk Register (Appendix D (viii)).

6.7. Lifecycle Plan

6.7.1. Upon re-surfacing, road studs are lifted and refurbished. The cost is borne by the surfacing schemes. This reduces the routine need.

6.7.2. We have analysed our ordering and inventory systems during 2007 to aid future lifecycle analysis. We have linked inventory items to our maintenance rates for refurbishment.

6.7.3. Assumptions have been made on:

- Inventory/SOR linkage
- Traffic Management
- Amount of surfacing undertaken per year
- Renewal and surfacing needs being reasonably aligned
- Lifecycle renewal of lines every 5 years (minus surfacing gain)
- Lifecycle renewal of pads every 10 years (minus surfacing gain)

6.8. Lifecycle Cost Analysis

6.8.1. **Routine**

6.8.1.1. We currently utilise the following strategy to maintain these assets.

Road Markings - Refurbish/Renew as necessary due to individual wear and tear.

Road Studs - Re-pad, Raise/Replace Stud as necessary due to individual wear and tear.

6.8.1.2. We do not hold condition data on the individual markings and studs as this would not provide value for money. They are inspected upon safety inspections and during a dedicated inspection in darkness at the end of September. The inspection is visual with not based upon retro reflectivity testing. Those requiring treatment prioritised for replacement depending upon the severity of the defect and the location.

6.8.1.3. New markings are installed in accordance with the TSRGD 2002. New and replacement markings are thermoplastic screed with applied ballotini. Dependant on the location either hand or machine application methods is used. Trials of sprayed paint road markings have been undertaken but the results were not favourable.

6.8.1.4. **Routine Works Budget**

6.8.1.4.1.

2014/15	Actual Spend	
	County (ex. City)	City
Markings	£525,300	£55,682
Studs	£0	
Total	£580,982	

2015/16	Actual Spend	
	County (ex. City)	City
Markings	£469,798	£54,245
Studs	£0	
Total	£524,043	

2016/17	Actual Spend	
	County (ex. City)	City
Markings	£351,433	£69,246
Studs	£55,372	
Total	£476,051	

2017/18	Actual Spend	
	County (ex. City)	City
Markings	£392,409	£54,936
Studs	£25,246	
Total	£472,591	

2018/19		Original Budget	
		County (ex. City)	City
Markings	Capitalised 2018-19	£500,000	£51,000
Studs			
Total		£551,00	

6.8.2. **Structural Maintenance**

6.8.2.1.1. There is capitalised budget for the structural maintenance of road markings and road studs of £500,000 in 2018-19.

6.8.2.1.2. All work on this asset type is normally undertaken as routine in response to safety/service inspections or as part of resurfacing /surface dressing schemes during which we renew.

6.8.2.1.3. Occasionally installation, upgrade or installation is carried out as part of works on another asset such as bridges or improvement works. In these circumstances the cost is borne by that scheme type.

6.9. Service Levels

6.9.1. There are no statutory indicators identifying the condition of road markings and road studs.

6.9.2. We will endeavour to meet the standards described in the routine activities and objectives and response.

6.10. Risk

6.10.1. Financial

6.10.1.1.

- Risk – Insufficient Budget / Overspend

Budget based upon inventory, lifecycle planning and actual spend over last 5 years.

Impact = 1 (overspend up to £100,000) x Likelihood (Unlikely) = 2 = Risk 2 low risk

6.10.2. Operational

6.10.2.1.

- Risk - The ability to deliver the required standards and liability

The condition of lines will not be unduly affected by unusual seasonal conditions. We have a proven highway inspection regime in place.

Impact = 5 (liability in 3rd party claim) x Likelihood (Rare) = 1 = Risk 5 low risk

7. Barriers, Fences and Guard Rails - Lifecycle Management Plan

7.1. These assets are designed to protect highway users from road traffic or hazardous locations. Our primary aim is to ensure that they are able to perform their safety function.

7.2. Physical Parameters

7.2.1. Safety Fence

7.2.1.1. The actual linear meter lengths as recorded in the Highways Management System Inventory (Mar 16) are:

District	Safety Fences (lin. m)
North Norfolk	3,931
West Norfolk	14,373
Breckland	8,989
Norwich City	4,065
Broadland	3723
Gt Yarmouth	4,113
South Norfolk	26,863
Total	66,059

Areas	Safety Fences (lin. m)
North	**11,768**
South	35,854
West	14,373
City	4,065
Total	66,059

District	Pedestrian Guard Rails (lin. m)
North Norfolk	5,057
West Norfolk	12,526
Breckland	5,603
Norwich City	16,367
Broadland	3,231
Gt Yarmouth	5,661
South Norfolk	9,648
Total	58,093

Areas	Pedestrian Guard Rails (lin.m)
North	17936
South	11,264
West	12,526
City	16,367
Total	58,093

7.3. Lifecycle Options

7.3.1. Creation and Acquisition

7.3.1.1. These fall into 2 broad areas:

- County Council Schemes
- Private Developers

7.3.1.1.1. County Council Schemes

7.3.1.1.1.1. These are normally placed within the highway as a result of one of the following reasons:

- Accident investigation and prevention works, including pedestrian crossings.
- Works to prevent damage to structures.
- To protect against access into cuttings, watercourses and rail-tracks.
- New works for another primary purpose where the installation of barriers, rails or fences is necessary to comply with design standards or safety audits.

7.3.1.1.2. Private Developers

7.3.1.1.2.1. Usually these are placed within the highway to discharge planning conditions. The Highways Development Control Team approves these. A commuted sum is required for their future maintenance through a section 38 agreement with the County Council.

7.3.1.2. Renewal or Replacement

7.3.1.2.1. The opportunity to replace sections of barriers or fencing to any appropriate new standards should be considered if a significant proportion of the total length is damaged.

7.3.1.3. Upgrading

7.3.1.3.1. Upgrading is normally considered in conjunction with the renewal and replacement process.

Following the annual structural inspections and subsequent risk assessments, the locations with significant defects and the highest risk scores for improvement are selected and placed into a programme of works and may be upgraded as a result (see Condition Inspections 7.8.1.).

7.3.1.4. Disposal

7.3.1.4.1. This is normally considered if a risk assessment determines there is no longer a need for a barrier (see condition inspections further below).

7.3.1.4.2. If sections of pedestrian guard-rail are to be removed in isolation of any other change to a specific site this must be approved by a safety audit.

7.3.1.4.3. Wherever possible, safety barriers being removed which are in good condition and are fully functioning are removed to store for use elsewhere when the need arises, for example to replace damaged sections of barriers elsewhere.

7.4. Non Asset Options

7.4.1. Managing Demand

7.4.1.1. These assets should only be installed at those locations complying with technical standards and where our LRRRAP (Local Road Restraint Risk Assessment Process) risk assessment identifies sites as High Priority (or higher scoring Medium Priority sites).

7.4.2. Amending Standards

7.4.2.1. No local policies exist and we currently work to existing design standards and the Well-Maintained Highways Code of Practice.

7.5. Treatment Options

7.5.1.

Do Minimum	• Replace bolts, re-tension upon inspection. • Repair RTA damage, considering integrity on adjoining lengths.
Medium Life	• Planned replacement of isolated sections of fence.
Long Life Treatment	• Planned replacement of total lengths of fence.

7.6. Routine Maintenance Activities

7.6.1

Activity Type	Activity	Service Standard
Preventative	Cleaning safety barriers marked with chevrons	As required
Condition Monitoring	Safety Inspections	
	Integrity – (Pedestrian guard rails, boundary fences and environmental barriers)	As Carriageway / Footway Standards
	Service Inspections	
	Tensioned safety fences checked to correct torque	Over a 2-year cycle
	Structural condition & mounting height (Steel and wire rope safety barriers)	Over a 5 year cycle
	Adjacent to bridges	With bridge every two years
Reactive	Damage to integrity	In accordance with Highways risk register see App D(viii)

7.7. Objectives and Response

7.7.1. Safety

7.7.1.1. The objective is to:

- Maintain the integrity and location of safety fences for vehicles and pedestrians.

7.7.1.2. They separate potential conflicts of differing highway use and help users to identify risks.

7.7.1.3. Safety fences provide separation for traffic on high-speed roads and protection against the approach to structures, cuttings and other objects that may otherwise pose a risk to road users.

7.7.1.4. Guard-rails provide pedestrian control and also protect vulnerable road users.

7.7.1.5. When damaged they should be made safe in accordance with our Highway defect risk register, see App D (viii). A permanent repair should be undertaken as soon as possible, unless the damage is clearly superficial with no loss of integrity of the fence of barrier.

7.7.1.6. Safety fencing repairs & design normally conform to the specification for works, which is contained within the DfT's 'Design Manual for Roads and Bridges' (Volume 2: TD 19/06). Any exceptional departures are signed off by senior engineering managers.

7.7.2. Serviceability

7.7.2.1. The objective is to maintain the above in a sufficiently sound structural condition to serve their function, and not be dangerous to road users or pedestrians. The design of new safety fences and barriers, and criteria for their provision, is laid down in the DfT's 'Design Manual for Roads and Bridges' (Volume 2: TD 19/06). However, this is written to standards for the Highway Agency's trunk road network, which carries significantly more traffic and at higher speeds than on our local network. There is also new guidance specifically written with local authorities in mind - 'Provision of Road Restraint Systems on Local Authority Roads September 2011'. These two standards are those to which the County Council works to.

7.7.2.2. In most cases boundary features such as fencing will be the responsibility of the adjoining landowner. Owners should be contacted if possible and advised to make safe. If they cannot be contacted or they do not carry out works as requested we should carry out repairs to make safe if necessary.

7.7.2.3. If safety fencing is provided with chevron signs these should be cleaned, using the same regime as traffic signs.

7.7.2.4. Sections of safety fence that are found to be mounted at heights outside the limits specified or for which structural integrity is not in doubt should be treated as a Category 2 defect during condition inspections (see below).

7.7.2.5. Responses to identified defects are detailed in the Highway Defect Risk Register App D (viii).

7.7.3. Sustainability

7.7.3.1. The objective is to:

- Maintain appearance and condition of fencing.

7.7.3.2. All fences and barriers, whether for safety purposes or general use, are important features and their overall appearance is an environmental consideration. They should be cleaned and painted when necessary.

7.7.3.3. Environmental Consideration should be given to the overall appearance of all types of fences and maintained in a clean appearance.

7.8. Condition inspections, assessment and design

7.8.1. Condition Inspections

7.8.1.1. The condition of safety fences is managed by a regime of inspections (see 7.6.1) and subsequent risk assessments.

7.8.1.2. The design of new safety fences and barriers, and criteria for their provision, is laid down in the DfT's 'Design Manual for Roads and Bridges' (Volume 2: TD 19/06), being the standard which the County Council works to.

7.8.1.3. We are inspecting to the installation standards outlined in the "National Highways Sector Schemes for Quality Management in Highway Works" sector 2B scheme "For the supply, installation, maintenance and repair of road restraint systems".

7.8.1.4. The Bridges team identifies defects to 5 categories:

Cat 1: No comments

Cat 2: General comments, loose bolts, RTAs

Cat 3: Low level of beam, set back inadequate

Cat 4: Potentially out of specification, not safety fencing

Cat 5: Potentially dangerous, out of specification, illegal lamp column position

7.8.2. **Risk Assessment**

7.8.2.1. We then risk assess those sites inspected and identified as either category 4 or 5. This determines the risk to road users at the site and therefore the importance of the barrier itself.

7.8.2.2. This is done using a Local Road Restraint Risk Assessment Process (LRRRAP) based on the design & maintenance guidance specifically written for Local Authority roads – 'Provision of Road Restraint Systems on local Authority Roads September 2011'.

7.8.2.3. Some assumptions in the LRRRAP are required for individual sites in order for it to be applied fully.

7.8.2.4. These assessments produce a priority list based on the risk score given to each site. High priority being the most in need of action (such as upgrade/replacement), Medium priority may warrant upgrade or amendment works and should be included in the programme of works where possible, unless other suitable interventions are available. Low priority sites are considered for removal or replacement with non-VRS solutions if necessary – both circumstances would be subject to a safety audit before implementation.

7.8.2.5. The High priority sites, along with higher scoring Medium priority sites, then receive outline design to establish a preliminary cost.

7.8.3. **Design Process**

7.8.3.1. High or Medium Priority Sites

7.8.3.1.1. We apply TD 19/06 where:

- Traffic speeds are greater than 50mph
- Traffic Flows are over 5000AADT
- Road class = 2
- Whether the road is ‘improved’

7.8.3.1.2. If TD 19/06 does not apply, the following factors are considered:

- Speed
- Traffic Flow
- Nature of Hazard (In relation to route)

7.8.3.2. Medium or Low Priority Sites

7.8.3.2.1. Are not usually put forward for any design work, unless there is an identified safety concern raised by the Network Safety team.

7.8.4. **Prioritisation**

7.8.4.1. Those High priority and higher scoring Medium priority sites should be placed a in a forward programme of works in the following financial year where budgets allow.

7.8.4.2. Those lower scoring Medium and Low priority sites are only to be remedied if funding is available.

7.9. Lifecycle Cost Analysis

7.9.1. We currently utilise the following strategy to maintain these assets:

Safety Barriers and Fences	- Routine	Replaced as necessary due to individual wear and tear identified from: • In response to RTAs. • Planned tension inspections.
	- Structural	Removed, replaced or upgraded as necessary following • Condition inspection • Risk assessment • Prioritisation

7.9.1.1. Occasionally installation, upgrade or replacement is often carried out as part of works on another asset such as bridges or roads. In these circumstances the cost is borne by that scheme type.

7.9.1.2. Our proposed funding is detailed in the following table:

2018-19	Capital	Revenue
Inspection Access	NA	£4,500
Risk Assessment & Design	£32,000	NA
Structural improvements	£60,000	NA
Tensioning	NA	£30,000
RTA	£50,000	N/A
Total	£142,000	£34,500
Grand Total	£176,500	

7.9.1.3. Capital funding is expected to remain broadly at these levels in the future but the structural improvement element my need to increase depending upon the number of high priority sites identified.

7.10. Service Levels & Backlog

7.10.1. There is no recognised national indicator for this asset type.

7.10.2. We use a service measure whereby if sites assessed as High Priority through risk assessment were not to be funded then they would represent a backlog and reported to members as part of our annual Highway Asset Performance report. It uses information from structural integrity surveys being carried out of the whole stock over a 5-year period.

8. Winter Service Lifecycle Management Plan

8.1. Background

8.1.1. We treat sections of our network when icy conditions are predicted or during prolonged periods of icy conditions or snowfall, depending upon their importance and the resources available.

8.1.2. Full details of the routes to be treated, depending upon circumstances, together with the treatment actions required to fulfil the service are contained in the Winter Service Operational Plan. The plan is produced annually for the upcoming Winter season starting in September. The data in this lifecycle plan relates to the 2017/18 Winter Service season.

8.2. Physical Parameters

8.2.1. Several assets are utilised to deliver the required treatment and assess need. These are described in this lifecycle plan:

- Salt Domes and strategic stock sites
- Salt supply
- Grit Bins
- Gritter Fleet
- Snowploughs
- Farmer Snowploughs
- Weather Stations
- 4WD vehicles
- Heavy Plant
- Salt Loaders

8.2.2. **Salt Domes/Strategic Stockholding**

8.2.2.1. There are seven operational salt domes complete with dynamic weighbridges which serve the County network, including Norwich City. One of these is also used through a mutual aid agreement to service part of the trunk road network. In addition there are strategic stock holdings located at Swaffham and at Ellesmere Port in Cheshire.

8.2.2.2. The Salt Domes have been provided and maintained under a 20 year Public Finance Agreement (PFI) by Compass Minerals, which will expire in April 2020.

8.2.2.3. The domes hold a stock of 6.3mm dry rock salt treated with ‘Thawrox’, an agricultural by-product (ABP). Loading and salt husbandry are provided under the terms of the PFI.

Dome Location	Capacity		Wash down & Weighbridge
	Max	Min	
Ketteringham	1300	700	Yes
Watton	1100	460	Yes (No wash down)
Diss	800	380	Yes
Aylsham	1480	1000	Yes
Sculthorpe	2000	400	Yes (No wash-down)
Saddlebow	3500	1300	Yes
Caister	1500	425	Yes
Total	**11680**	**4665**	

8.2.2.4. Strategic Stockholding

Site Location	Capacity		Wash down & Weighbridge
	Max	Min	
Swaffham	5000	3000	No
Dockside (Ellesmere Port)	3000	2000	No
Total	**8000**	**5000**	

8.2.3. **Grit Bins**

8.2.3.1. The County Council and Norwich City Council approve the location of and manage the supply of salt to 1895 grit bins throughout the County and City, although the bins themselves are purchased and maintained by parish and town councils. These are placed at locations where they will benefit the safe and free movement of vehicular and pedestrian traffic. These are not normally located on priority gritting routes.

8.2.3.2. A list of grit bin locations is retained electronically and managed by the Highways Services Team.

8.2.4. **Gritter Fleet**

8.2.4.1. The County Council retains a fleet of vehicles necessary to fulfil its decision to treat specified routes.

8.2.4.2. The fleet consists of Unibodies, Bulk gritters and specialist equipment both owned and hired. A number of the Unibody vehicles are also used on other highway maintenance activities.

8.2.4.3. For the 2017/18 season these served 48 Routes for Priority 1 and 2 precautionary treatments in the County, including Norwich City but excluding Highway Agency trunk roads.

8.2.4.4. In addition to those serving these routes, 7 spare vehicles are available at Depot locations.

Serial Code	Type	Owned	Hired
13	Tip Grit / Multi / Epoke	3	0
14	Unibody	10	0
90	Bulker	42	0
90	Brine sprayer	1	0

8.2.5. **Snow Ploughs**

8.2.5.1. All the gritting vehicles have individual snowploughs allocated to them. In addition some other Highway Maintenance lorries also have snowploughs allocated to them.

8.2.5.2. The County Council also provides and maintains snow ploughs for use by farmers in adverse weather events, which are fitted to the farmers' own prime movers. This information is contained within the Winter Services Operational Plan. A register of Farmers enlisted to undertake this action is retained electronically and managed by the Highways Services Team.

8.2.5.3. The County Council promotes and writes to all farmers seeking expressions of interest to participate in highway snow clearing. The Highways Services Team arrange individual agreements, annual inspection of equipment and the allocation of snow clearing areas with those farmers that wish to participate.

8.2.6. **Weather Stations**

8.2.6.1. These are maintained, calibrated and serviced under contract by specialist service supplier.

8.2.6.2. NCC own 6 Weather stations in Norfolk and has access to a further 5 as follows:

Weather Stations	Location	Type	Owner
A140 Yaxley	Eye - Suffolk	ROSA	SCC
A12 Hopton	Great Yarmouth	ROSA	HE
A148 Harpley	West Norfolk	ROSA	NCC
A149 Wells-next-the-Sea	North Norfolk	ROSA	NCC
A148 Cromer	North East Norfolk	ROSA	NCC
A149 Smallburgh	East Norfolk	ROSA	NCC
A47 Necton	Breckland	ROSA	HE
A1042 Heartsease	Norwich	ROSA	NCC
A11 Harling	Harling	ROSA	HE
A147 Norwich Barn Road	Norwich	ROSA	NCC
A10 Litteport	Cambridgeshire	ROSA	CCC

8.2.7. **4WD Vehicles**

8.2.7.1. The County Council procures the use of 4WD vehicles and drivers for use in adverse weather events. These vehicles are owned by third parties, typically farmers. A register of 4WD vehicles is retained electronically and managed by the Highways Services Team.

8.2.7.2. The County Council promotes and writes to all providers annually seeking expressions of interest to participate. The Highways Services Team arranges individual agreements.

8.2.8. **Heavy Plant**

8.2.8.1. The County Council, through its existing contracts and Partners, is able to procure at short notice heavy plant and machinery to assist during adverse weather conditions

8.3. Lifecycle Options

8.3.1. Creation and Acquisition

8.3.1.1. The salt domes were provided as part of a PFI with Salt Union. Whilst it is not anticipated that additional salt domes will be required, if deemed necessary they can be provided under the existing agreement.

8.3.1.2. Parish, Town, District and Norwich City Councils can provide additional grit bins and gift them to Norfolk County Council. Norfolk County Council will undertake to fill them at the start of the Winter Service season and replenish them once with salt as resources permit and weather dictates.

8.3.1.3. The Commercial Manager makes procurement decisions regarding the gritting fleet on an annual basis.

8.3.2. Renewal or Replacement

8.3.2.1. Salt Domes

8.3.2.1.1. It is not anticipated that the salt domes will be replaced at least until the end of the PFI. In the meantime Compass Minerals (or their specialist supply chain partners) are responsible for and will undertake any necessary maintenance under the PFI agreement to maintain the domes in a serviceable condition.

8.3.2.2. Grit Bins

8.3.2.2.1. Each season the locations of the authority owned grit bins are re-assessed with regard to the forthcoming season's priority network. Any found surplus to requirement are removed or relocated.

8.3.2.2.2. Due to the current competitive cost of grit bins they are normally replaced rather than repaired if damaged. If they have been gifted by a Parish, under the terms of the agreement Norfolk County Council will approach them to consider whether they wish to fund its replacement.

8.3.2.3. Weather Stations

8.3.2.3.1. These have an anticipated serviceable life of 12 years, though they may be replaced prior to this if advances in technology provide a more suitable and cost-effective alternative. The following table indicates when the County owned weather stations were last replaced, and the schedule for future replacements.

8.3.2.3.2.

Weather Stations	Location	Last replaced	Replacement Due
A148 Harpley	West Norfolk	2012	2024

A149 Wells-next-the-Sea	North Norfolk	2011	2023
A148 Cromer	North Norfolk	2014	2026
A149 Smallburgh	East Norfolk	2009	2021
A1042 Heartsease	Norwich	2014	2026
A147 Norwich Barn Rd	Norwich	2011 (new)	2023

8.3.2.4. Gritter fleet

8.3.2.4.1. The Commercial Manager considers the replacement of plant each year. Dedicated Gritters have an anticipated service life of 10 years. Any vehicles also used on alternative work service life of 8 years.

8.3.3. **Disposal**

8.3.3.1. When we dispose of end of service life vehicles and snowploughs they should produce an income, this is subsequently returned to the Highway Maintenance Fund.

8.4. Non Asset Options

8.4.1. **Managing Demand**

8.4.1.1. The treated lengths of the Priority 1&2 gritting routes and required de-icing material spread rate, together with the necessary carrying capacity of the vehicle directly impacts on the plant required to deliver the service.

8.4.1.2. To help manage this we have developed policies detailing assessment criteria for the treatment of the priority network and treatment options for Winter Service including the provision of grit bins.

8.4.1.3. Norfolk's Cabinet approved the current Winter Maintenance Policy on 31 January 2005, this can be viewed on **our website**.

8.4.1.4. The number of grit bins in Norfolk (excluding Norwich) rose from 205 (in 1995) to 1557 (in 2017/18). A considerable number of Parish Councils have funded the provision of bins which has resulted in the significant increase in service provision. Norwich City currently has 281 grit bins.

8.4.2. **Amending Standards**

8.4.2.1. Changes in technology will influence the methods used to apply salt to highway surfaces. Any changes in method of treatment will directly influence the use of existing assets. We endeavour to use national best practice where results can be proven. The Authority may participate in trials with various organisations, Authorities and suppliers that may result in more effective or efficient delivery of winter services.

8.5. Lifecycle Treatment Options

8.5.1. All of the assets used in providing this service undergo different maintenance regimes to keep them available to deliver the service.

Minimum / Medium Life	Grit Bins • Repair damage to County purchased bins, report damage of Parish/Town/District /City Council gifted bins to relevant Parish/Town Council. Salt domes • Maintained by Compass Minerals under the PFI arrangements or its nominated Supply Chain contractor. Gritters • Maintenance regime for regular inspections and repairs to gritting fleet under annual contract. Snowploughs • Inspect & repair as necessary under annual contract. Weather Stations • Serviced and maintained by Vaisala under annual contract.
Long Life	Grit Bins • Renew if County purchased bin, report damage of Parish / Town/District/ City Council gifted bins. Salt domes • Maintained by Compass Minerals under the PFI arrangements or its nominated Supply Chain contractor • Consider options for post PFI maintenance (ends April 2020) and retention from 2015. Snowplough • Consider need for replacement equipment when maintenance and repair becomes uneconomic and unviable in the Highway Services Team opinion. • Consider renew plough if linked to new vehicle purchase. Weather Stations • Replace after 12 years or sooner if maintenance and repair becomes uneconomic in the Maintenance contractor's opinion. There may be a case for renewal prior to this if sufficient advances in technology provide a more suitable and cost effective alternative.

8.6. Winter Service - Objectives, Standards & Response

8.6.1. Purpose and objectives

8.6.1.1. The Winter Service can contribute significantly to each of the core objectives set out below. It can also be a major influence on customer satisfaction through demonstration of an efficient, effective and proportionate response to winter conditions.

8.6.1.2. Safety

8.6.1.2.1. Detailed statutory obligations and users' needs vary in different parts of the UK, but safety is a prime consideration for the Winter Service.

8.6.1.3. Serviceability

8.6.1.3.1. Maintaining the availability and reliability of the highway network is a key objective for the Winter Service and one where user judgements of performance will be immediate rather than longer term.

8.6.1.4. Sustainability

8.6.1.4.1. Low temperatures and the formation of ice can cause serious damage to the fabric of running surfaces and Winter Service can therefore make an important contribution to whole life costs.

8.6.2. **Background**

8.6.2.1. An amendment to Section 41 of the Highways Act 1980 was made in 2003, coming into force on 10th September 2003. The following subsection was added:

"(1A) In particular, a highway authority is under a duty to ensure, so far as is reasonably practicable, that safe passage along a highway is not endangered by snow and ice."

8.6.2.2. The duty is not however to simply clear snow and ice. The wording of the amendment puts a duty on the highway authority to ensure safe passage is not endangered by snow or ice. Therefore preventative gritting falls within this new duty.

8.6.2.3. This amendment reverses the decision in recent case law, Goodes –v- East Sussex County Council 2000, where the House of Lords had determined that highway authorities are under no statutory duty to pre-salt icy roads.

8.6.2.4. A review of Norfolk County Councils Winter Maintenance Policy was carried out and the resultant policy changes were detailed and approved by Cabinet 31st January 2005 and implemented for the 2005/06 Winter Service season.

8.6.2.5. In April 2008 a 10 year strategy review project was completed, approved by Scrutiny Cabinet and implemented from the 2008/09 Winter Service season.

8.6.2.6. In July 2011 a Winter Service Review project was completed, approved by Scrutiny Cabinet and implemented from the 2011/12 Winter Service season.

8.6.2.7. The County Council treats the network both outside and within Norwich City. A memorandum of understanding has been agreed between Authorities and is subject to annual review.

8.6.2.8. Highway England's Trunk Road's operations are under the control of Ameys as Managing Agent to the Department of Transport. The Managing Agent is responsible for Winter Maintenance operations on the Trunk Road network.

Norfolk County Council as a subcontractor to Compass Minerals provides loading operations for the Managing Agent of the De-Icing Product from Kings Lynn Salt Dome.

8.6.3. Priorities for Treatment

8.6.3.1. In accordance with our Winter Service Policy, our network hierarchy forms the starting point for winter service treatment priorities subject to modification to accommodate:

- Wider transport and other priorities
- Accessibility dependencies
- Known problems including significant gradients, exposed areas and other topological factors
- Co-ordination and co-operation with other authorities
- Overall risk assessment including the need to maintain consistency

8.6.3.2. Priorities in Norfolk have been established with regard to this, on the basis of a reasonable level of available resources, and associated costs needed to carry out operations within response and treatment times. The priorities of highways for treatment are detailed in the Winter Service Operational Plan.

8.6.3.3. Approximately 73% of public transport service bus routes prior to 08:30hrs are treated by an overnight P1 and P2 action when frost is forecast, and before buses are scheduled to run. The school bus situation is more difficult to assess, as not all buses reaching schools before 9.00am are on P1 or P2 treatment routes. Many routes serving rural communities are minor roads, which are P3 treatment routes. P3 routes are only treated during periods of prolonged frost, and then only when resources permit. School buses, minibuses and taxis cover more than 900 routes, mainly through rural communities, some of which coincide with the P1/P2 treatment network. However, around 500 of these routes coincide with the priority 3 network or have no priority status at all.

8.6.3.4. The Winter Service Operational Plan details policy and operational requirements and is reviewed annually, taking into to account any new developments regarding the network, legal framework, Code Of Practice and best practice. The following notes relate only to policy.

8.7. Lifecycle Cost Analysis

8.7.1. Extent and frequency of Treatment

8.7.1.1. Cabinet approved the current treatment regime in March 2005. This was reaffirmed in April 2008 and July 2011. As part of the initial review, background costs from 2002/03 were calculated to show the cost of current provision per average km treated. At that time we treated 32% (1,920 miles) of our network every time the formation of ice on the carriageway was predicted.

8.7.1.2. At the time it was calculated that to treat 40% of the network it would cost an additional £375,000 coupled with a further £300,000 - £400,000 cost for salt storage. The costs for additional footway and cycleway treatment were also calculated.

8.7.1.3. Our practices for winter service in terms of a network hierarchy based upon function and risk assessment, service planning and decision-making were reviewed. They were found to be robust.

8.7.1.4. The response from a questionnaire to stakeholder groups demonstrated a general satisfaction with the current level of Winter Service. There is no basis for a significant change in the current service levels

8.7.1.5. There has been no significant growth in the treated network since 2004/05 season.

8.7.1.6. Winter Service outturn budgets

	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Total	£5,428,000	£3,527,267	£3,084,639	£2,863,199	£2,597,491	£3,370,390

8.7.1.7.

Number of treatments	159	65	63	65	63	113
Average cost per treatment	£34,138.36	£54,265	£48,962	£44,049	£40,515	£29,826
Priority 1&2 Miles treated per Action	2080	2094	2115	2041	2041	2200
Priority 1 & 2 Kilometres treated per Action	3348	3371	3403	3284	3284	3500
Cost per kilometre	£10.20	£16.10	£14.39	£13.41	£12.33	£8.52
Cost per mile	£16.41	£25.19	£23.14	£21.58	£19.85	£13.55

8.7.1.7.1. The initial planned budget for 2018-19is as below:

8.7.1.7.2.

	2018-19
Total	£3,132,370

8.7.1.7.3. Service requirements and actual expenditure will be impacted by the weather experience.

8.8. Service Levels

8.8.1. There are no statutory indicators identifying the condition of winter maintenance assets.

8.8.2. The indicator we monitor is in relation to response:

- Percentage of routes gritted within 3.5 hours of the specified time – target 100%

8.8.3. We monitor the number of turn-outs and operational efficiency each season.

8.8.4. We monitor the accuracy and performance of our specialist procured Weather Forecast supplier.

8.8.5. As part of the PFI contract we undertake a 5 year price benchmarking exercise.

8.8.6. We carry out an internal annual review with key stakeholders of winter maintenance operations at the end of each Winter Service season.

8.8.7. We review best practice through engagement with other Authorities, suppliers and by membership of national winter maintenance discussion groups and consortiums.

8.8.8. We will consider annually whether other local standards can be developed in the future.

5.9. Structures Lifecycle Management Plan

5.9.1. Physical Parameters

5.9.1.1. This asset grouping comprises bridges, culverts, retaining walls, subways, large signs, gantries and other structures that support the highway and other routes and rights of way.

5.9.1.2. Records of Norfolk County Council (NCC) and privately owned structure assets are held on our Bridge Management System (BMS) called AMX (see section 5.9.10). The assets are generally categorised in accordance with the Well-managed Highway Infrastructure Code of Practice (CoP) and Chartered Institute of Public Finance and Accountancy's (CIPFA's) Code of Practice on Transport Infrastructure Assets (2013), although other categories have been introduced to cover structures which either fall outside the scope of the CoP or vary slightly from the CoP but have been used historically by NCC.

A full list of structure categories is given below. The structure types not included in the CoP's are shown in *Italic*.

Structure Type	Description	Comment
Bridge: vehicular (BVEH)	A structure with a span of 1.5m or more spanning, and providing passage for vehicular traffic, over an obstacle, e.g. watercourse, railway, road, etc.	
Bridge: pedestrian/cycle (BPED)	As for vehicle bridge, but provides passage for pedestrians and cyclists.	This category does not include Public Rights of Way (PROW) bridges and bridges carrying permissive paths.
Bridge: rail (BRWY)	*A structure that carries a railway over the public highway*	*This category should also include ex-railway bridges that do not fall into the PROW category (i.e. they do not carry a PROW or permissive path).*
Bridge: prow (PROW)	*A structure situated on a Public Right of Way. Note – the following bridge types are not recorded: plank (ligger) bridges without a handrail attached to the plank and with an overall length of less than 5.0m, privately owned vehicular structures (where there is current evidence of vehicle usage)*	*This category should include bridges carrying permissive paths such as Marriotts Way, Paston Way, etc. Plank bridges, without handrails attached to the plank, with an overall length less than 5.0m are managed and maintained by Highways Maintenance.*

Culvert (CULV)	A drainage structure with a span between 0.9m *and 1.5m* passing beneath a network embankment or between open drainage ditches. We tend to categorise all structures between 0.9m and 1.5m as culverts.	The CoP description for a culvert includes **all** structures with spans greater than 1.5m. Culverts are defined as any drainage structure beneath a highway embankment that has a proportion of the embankment, rather than a bridge deck, between its uppermost point and the road running courses.
Small Culvert *(SMCU)*	*As Culvert but with spans equal to or less than 0.9m.*	*This category should not cover pipes that are part of sewerage system which typically link gullies and chambers.*
Dutch Ford *(DTCH)*	*A highway ford where a pipe or a number of pipes exist under the running surface. The running surface remains dry under normal flow conditions but becomes submerged when the pipe(s) capacity is exceeded during periods of higher flow.*	
Retaining Wall (RETW)	*A wall where the dominant function is to act as a retaining structure with a retained height greater than or equal to 1.5m.*	*Note: Section 167 of the Highways Act 1980 gives highway authorities special powers in relation to highway retaining walls of height greater than 4'6" (approx.. 1.35m) but technical approval only applies to walls with retained heights ≥ 1.5m.*
Small Retaining Wall (SMRW)	*A wall where the dominant function is to act as a retaining structure with a retained height less than 1.5m.*	
Structural Earthworks – reinforced/strengthened soil/fill structure (STEA)	A structure where the dominant function is to stabilise the slope and/or retain earth. All structures with an effective retained height of 1.5m or greater.	
Service Tunnel *(STNL)*	*A structure that provides passage for utility service pipes and cabling.*	*Described as a Subway: pipe in the CoP*
Sign/Signal Gantry	A structure with the primary function of supporting traffic signs and signalling equipment	

(SIGN)		
Mast: CCTV/High Lighting Mast (MAST)	A mast carrying CCTV equipment or a lighting column over 20m in height	
Subway (SUBW)	A structure with a span of 1.5m or more that provides passage for pedestrians.	*Described as an Underpass: pedestrian in the CoP*
Drainage Systems	*Foul and surface water systems including components (i.e. pipes and chambers) where some elements exceed 0.9m span or diameter.*	*These systems are generally adopted by others and the category is primarily used for the technical approval of drainage systems on new developments. Archived after approval.*
Miscellaneous Structure (MISC)	*Highway Structures that do not fall into any of the previous categories.*	*These structures are likely to fall outside any inspection and maintenance regime and are unlikely to be included in any Asset Valuation (AV) or Lifecycle planning process. E.g. Carrow Tramway (Filled In)*

Notes:-

Culverts have been sub-divided to differentiate between those that can generally be internally inspected (≥ 0.9m span) and those that cannot (< 0.9m span). Also note that BD2/12, Technical Approval of Highway Structures, applies to all highway structures with a clear span or internal diameter greater than 0.9m.

Small multi-span structures are categorised according to span as well as their form of construction, i.e. a number of nested pipes with a combined span in excess of 1.5 metres would still be regarded as a culvert. Where a number of nested pipes pass under a ford the structure is categorised as a Dutch Ford.

5.9.1.3. The bridge records held on AMX are linked to the County Council's digital mapping systems. The aim is to include all transportation-related structures within Norfolk, e.g. Public Right of Way bridges, rail bridges, etc. to enable us to deal with general queries and to provide information to others who access our mapping systems.

5.9.1.4. The following table shows the number of each type of structure held on the AMX system and includes both NCC and privately owned structures.

Structure Type	BVEH	BPED	BRWY	PROW	CULV	SMCU	DTCH	RETW
Number in Norfolk	1101	162	80	481	504	2247	31	162
Structure Type	**SMRW**	**STNL**	**STEA**	**SIGN**	**MAST**	**SUBW**	**MISC**	**TOTAL**
Number in Norfolk	86	4	2	0	16	17	145	5050

5.9.2. Ownership

5.9.2.1. The County Council is responsible for the majority of highway structures in Norfolk but a significant proportion are owned and maintained by other bodies and private individuals, e.g. Highways England, Network Rail, Highways England Historical Railways Estate (formally British Rail Board (Residuary) Limited), Environment Agency, Mid Norfolk Railway, North Norfolk Railway, Bure Valley Railway, Internal Drainage Boards (IDB's) and adjacent landowners. The breakdown of ownership is as follows:-

Owner	BVEH	BPED	BRWY	PROW	CULV	SMCU	DTCH	RETW	SMRW	STNL	STEA	MAST	SUBW	MISC
Norfolk CC	753	135	2	393	395	1652	29	56	46	1	2	8	15	24
Highways England	121	7	0	0	19	49	0	30	0	0	0	0	2	9
Network Rail	37	0	45	7	0	0	0	0	1	0	0	0	0	4
HE Historical Railways	31	0	10	0	0	0	0	11	0	0	0	0	0	7
MNR and NNR	14	1	18	1	0	0	0	0	0	0	0	0	0	0
District, Borough & Town Councils	15	5	5	11	2	11	0	4	3	0	0	3	0	8

Owner	BVEH	BPED	BRWY	PROW	CULV	SMCU	DTCH	RETW	SMRW	STNL	STEA	MAST	SUBW	MISC
Suffolk CC	21	3	0	3	1	2	1	0	0	0	0	0	0	1
Cambridge shire CC	1	0	0	0	0	0	0	0	0	0	0	0	0	0
EA	8	1	0	7	0	2	0	0	1	0	0	0	0	1
IDBs	47	0	0	2	44	151	0	0	0	0	0	0	0	0
Private - Responsible	20	4	0	1	6	10	0	24	1	0	0	0	0	3
Private – Not Responsible	20	3	0	23	7	72	0	17	13	3	0	3	0	38
Private - Unknown	13	3	0	33	30	297	1	19	21	0	0	2	0	50
Numbers in Norfolk	1101	162	80	481	504	2247	31	162	86	4	2	16	17	145

5.9.2.2. The privately owned structures fall into three groups as shown in the table above. The structures that are deemed to be owned by responsible owners are typically those owned by utilities and larger commercial organisations such as Anglian Water, Tesco or Middleton Aggregates. The owners that are deemed to not take responsibility for their assets i.e. 'Private – Not Responsible' are generally known individuals where it is considered that they do not have the means or expertise to maintain or manage the assets. Assets of unknown ownership are recorded as 'Private – Unknown' on the Bridge Management System database.

5.9.2.3. In most cases the ownership of a structure is quite clear but in some instances (particularly with regard to retaining walls and culverts) ownership is unknown or disputed by the recorded owner. In circumstances where ownership cannot be proven or when there is a need to deal with a structure which poses a hazard to highway users, the County Council exercises its duty of care under the Highways Act and carries out the necessary repairs.

5.9.2.4. Of the retaining walls, 20 have been identified as being integral with a building e.g. part of a building basement. In these cases the owner is recorded as 'Private – Assumed Responsible' as it is considered likely that the owner or occupier would carry out the necessary repairs to ensure the integrity of the building.

5.9.2.5. For the purposes of the Transport Asset Management Plan, Lifecycle Planning and Asset Valuation it is assumed, for the reasons set out earlier, that in addition to our own structures, the County Council has a maintenance liability for all structures owned by the Internal Drainage Boards, the 'Private – Not Responsible' and the 'Private – Unknown' owners tabulated above. This gives a total number of structures which are assumed to be maintained by the County Council as follows:-

5.9.2.6.

Owner	BVEH	BPED	BRWY	PROW	CULV	SMCU	DTCH	RETW	SMRW	STNL	STEA	MAST	SUBW	MISC
Norfolk CC	753	135	2	393	396	1652	29	56	46	1	2	8	15	24
IDBs	47	0	0	2	44	151	0	0	0	0	0	0	0	0
Private	33	6	0	56	37	369	1	36	34	3	0	5	0	88
Numbers in Norfolk	833	141	2	451	477	2172	30	92	80	4	2	13	15	112

5.9.2.7. Since last year, all small culverts i.e. span/internal diameter ≤0.9m are inspected and maintained by the Area teams, and not the Bridges Team, as they are fundamentally highway drainage.

5.9.3. Life Cycle Options

5.9.3.1. Every highway structure will go through the three lifecycle phases of asset creation, maintenance (including upgrading) and asset disposal. The life of a structure will generally be dictated by its rate of deterioration and the level of maintenance afforded to it, although other factors, such as changes to the highway network, may result in the premature disposal of a structure.

5.9.3.2. Creation and Acquisition

5.9.3.2.1. New bridges are constructed from time to time. They are generally the result of a new highway scheme funded through the LTP or by developer contributions.

5.9.3.2.2. The Norwich Northern Distributor Road (NNDR), which at the time of writing is partially open and is hoped to be fully open in the spring, will result in the creation of nine major structures, 7 bat gantries and number of small culverts. The major structures will include six overbridges carrying a mix of County highway and private accesses, two bridges to carry the NNDR over the Norwich to Sheringham Railway and existing Plumstead Road and a box culvert underpass to serve as a drainage structure and to maintain a bat corridor.

5.9.3.3. **Maintenance (Treatment Options)**

5.9.3.3.1. Maintenance works are defined as the activities and operations undertaken to manage and maintain the asset and can include inspection, assessment, component renewal, upgrade, etc. Maintenance can be categorised into regular maintenance, programmed maintenance and reactive maintenance.

5.9.3.3.2. Regular maintenance covers inspections, structural reviews and assessments, cyclic maintenance and the management of sub-standard structures.

5.9.3.3.3. The inspection and assessment regime is covered in Section 5.9.5 of this report.

5.9.3.3.4. Cyclic maintenance tasks, which are revenue funded, are carried out to help maintain the condition and functionality of a structure in order to prevent the need for more expensive maintenance works. Typical examples of cyclic maintenance activities are:-

- Clearing expansion joints and drainage systems
- Removal of vegetation
- De-silting culverts

5.9.3.3.5. Programmed maintenance includes preventative maintenance, component replacement and upgrading.

5.9.3.3.6. Preventative maintenance is work carried out to maintain the condition of the structure and maximise the service life. Typical examples of routine maintenance activities are:-

- Pointing of Masonry
- Concrete Repairs
- Repainting of metal components
- Parapet and headwall repairs

Other preventative maintenance may also include concrete rehabilitation methods such as re-alkalisation or cathodic protection.

Some older structures will have historical or protected status and it is assumed that they will need to be maintained in perpetuity.

5.9.3.3.7. Modern bridges are designed to have a life of 120 years. During their lives there is an expectation that major components will need to be replaced at intervals. Typically examples of components that may need replacement include:-

- Waterproofing membranes
- Bearings/Movement Joints
- Parapets/safety fences

5.9.3.3.8. Best practice (Well-managed Highway Infrastructure (CoP) and the LoBeg Good Practice Guide to Lifecycle Planning for Highway Structures) suggests that whole life maintenance costs can be minimised by implementing lifecycle planning. A key part of lifecycle planning is to define optimal intervention thresholds for different types of maintenance works.

5.9.3.3.9. To help bridge engineers and managers with lifecycle and financial planning the Structures Asset Management Planning Toolkit (Structures Toolkit) was published in May 2012. The guidance was specifically written to enable its functionality to be incorporated into computer based Bridge Management Systems (BMS). In 2013, the Bridges team procured a BMS and this and the Structures Toolkit are discussed in more depth in Section 5.9.7.3.

5.9.3.4. **Upgrading**

5.9.3.4.1. The need for upgrading is usually identified during routine inspections or as part of a structural assessment, i.e. components are identified as not complying with current standards, e.g. parapets. Alternatively a structure may be assessed, as substandard i.e. strengthening is required.

5.9.3.4.2. The 40 tonne assessment (and resulting strengthening) programme which started around 1989 has very nearly been completed. There was an aspiration to complete the strengthening programme in 2012/13 but two bridges, Rungays Bridge and Repps Staithe Bridge remain on the strengthening programme (see below). The current position is as follows:-

Group of Structures	No. of Structures
Structures which passed their assessment or are too new to assess (i.e. no strengthening needed)	746
Structures which have been strengthened	157
Structures subject to a permanent weight restriction in-lieu of strengthening	40
Structures which still require attention i.e. reassessment, strengthening or other load limiting measures to be put in place	2

5.9.3.4.3. It was also hoped that Repps Staithe Bridge would be removed and infilled in February 2013 as part of works, promoted by the Environment Agency, to realign a soke dyke. Works are now programmed to start in March 2018 to install a 1.35m diameter HDPE pipe beneath the existing deck and to fill the void between the pipe and deck with concrete.

5.9.3.4.4. The final bridge to be strengthened as part of this programme is Rungays Bridge. The assessment of Rungays Bridge, which is located near Marshland St James and provides the only access to a number of farms, was delayed for several years due to the need for a specialist to determine the capacity of an unusual half joint detail. This assessment work was carried out by Norfolk's then strategic partner, Mott MacDonald, in January 2013 and found the half joint to have a capacity of 7½ tonnes.

5.9.3.4.5. The bridge is currently monitored on a regular basis. A feasibility study is programmed for 2018/19 to look at options for strengthening or possibly replacing the bridge.

5.9.3.4.6. Although the 40 tonne strengthening programme is nearing its completion, further strengthening schemes may need to be carried out in the future where identified through the further assessment work. The structural reviews, which are carried out as part of the principal inspection regime, are used to determine whether additional assessment work is required where there has been a significant change, for example, in condition or use. This is covered in more detail in Section 5.9.5.2 of this report.

5.9.3.4.7. It will not always be feasible to deal with a notionally weak bridge as soon as a weakness has been identified as this could lead to severe network management and funding difficulties. Furthermore, it is possible that more complex methods of assessment could achieve a higher theoretical load carrying capacity.

5.9.3.4.8. When a bridge is identified as substandard the principles set out in guidance (BD79) 'The Management of Sub-Standard Highway Structures' are put into effect. This utilises a risk management approach and comprises a review of potential failure mechanisms together with the likelihood of such a failure occurring, the initiation of a monitoring regime and the consideration of the potential benefits of further levels of assessment. This approach is used as part of the process to prioritise strengthening schemes.

5.9.3.4.9. Other upgrading and major maintenance schemes are included in a major maintenance programme. Since the safety of highway users is always given the highest priority such schemes generally have a lower priority than bridge strengthening.

5.9.3.5. **Renewal or Replacement**

5.9.3.5.1. Renew or replace? – the choice is usually based on the recommendation made in a study of options.

5.9.3.5.2. Smaller structures e.g. brick culverts and small footbridges, are often physically too small to repair or the cost of repair is close to that of replacement, consequently replacement is usually the recommended option.

5.9.3.5.3. Medium and larger sized structures are generally more economic to repair rather than to replace. However, the decision will depend on a number of factors such as the age of the structure, the extent of the defects and any historical value attached to the structure.

5.9.3.6. **Disposal**

Disposal usually involves one of the following:-

- Infilling culverts which have become redundant because of changes to the drainage regime. This is only normally undertaken in isolation to other programmes of work (e.g. as part of the redevelopment of a site or as part of a highway improvement) in situations where the economic balance between the cost of infilling compares favourably with the cost of on-going maintenance.
- Infilling bridges – this may be an option for dealing with substandard bridges on disused rail lines.
- Infilling subways – this should be considered in situations where road crossings are installed to supplement or replace a subway.
- When stopping-up a highway containing a bridge/structure the responsibility for future maintenance of the structure should be considered carefully. The land beneath the highway will normally revert to the landowners abutting the highway and this can lead to multiple owners for a structure. Owners need to be made aware of their obligation so that there can be no denial of their responsibility at a later date and to avoid poor management of a structure.

5.9.4. Non Asset Options

5.9.4.1. Managing Demand

5.9.4.1.1. There are no specific policies about managing demand. Structures are treated as part of the highway network.

5.9.4.2. Amending Standards

5.9.4.2.1. Where a bridge is found to have a substandard load carrying capacity the need to strengthen is reviewed in the context of the status of the traffic route and the availability of local alternative routes. Where feasible a restriction (weight or width) is usually considered in preference to strengthening.

5.9.4.2.2. In cases where a structure is suffering repeated damage e.g. due to a substandard carriageway width, a traffic management system (either controlled or uncontrolled) will be considered.

5.9.5. Inspections and Assessments

5.9.5.1. Inspection Regime

5.9.5.1.1. The condition of structures should be managed by a regime of inspections. The inspection regime should identify defects that can then be remedied before causing an unacceptable safety or serviceability risk. The inspection regime should consist mainly of planned Routine, General and Principal Inspections although Acceptance, Special and Monitoring Inspections are also carried out on a reactive basis. Our practices are detailed Appendix D (v).

5.9.5.2. **Structural Reviews**

5.9.5.2.1. A structural review is carried out to establish or confirm the validity of the latest load carrying assessment of a structure (or original design if there has been no subsequent assessment). A structural review requires a review of the assessment or design criteria and assumptions, including the condition of the structural elements.

5.9.5.2.2. The 'Well Managed Highway Infrastructure' recommends that structural reviews should follow alternate Principal Inspections when these are carried out at 6 yearly intervals (as recommended in the Inspection Manual for Highway Structures) or if the Principal Inspection intervals have been changed the interval for structural reviews should be determined. Fundamentally, where the PI interval is greater than 6 years a structural review should be carried out at every PI so that they are never at an interval greater than 12 years. During the inspection the bridge inspector can check whether further deterioration has occurred to critical members and whether there are signs of any structural damage based on knowledge of the likely collapse mechanism.

5.9.5.2.3. Where the assessment assumptions are no longer valid (especially due to further deterioration of the structure) or there are signs of the onset of structural failure, the structural review will recommend that a further load carrying assessment is carried out.

5.9.5.3. **Re-Assessments**

5.9.5.3.1. Where the structural review identifies the need for a re-assessment, work will then be carried out to establish the current load carrying capacity of the bridge to current assessment standards. If the structure is shown to have a load carrying capacity of less than 40 tonnes than it will be placed back into the strengthening programme to be restricted or strengthened in the future.

5.9.6. Structures – Objectives and Response

5.9.6.1. **Safety**

5.9.6.1.1. The primary objective is to provide safe passage over or under a 'hazard'.

5.9.6.1.2. Vehicular damage to parapets and headwalls should be made safe and substantive repairs organised as soon as practicable as necessitated by the location and use.

5.9.6.2. **Serviceability**

5.9.6.2.1. All inspections designate defects as high, medium or low priority according to the same criteria.

High (H); work should be done during the next financial year to ensure the safety of the public or safeguard structural integrity or avoid a high cost penalty.

Medium (M); All other work required to ensure public safety or structural integrity - to be carried out within the next two financial years.

Low (L); Minor defects of non-urgent nature.

5.9.6.2.2. Work requiring attention sooner than required under the above definition of priority H is classified as H but is reported sooner either by phone or in writing depending on urgency.

5.9.6.2.3. Where structural defects are considered to have a direct bearing on the load carrying capacity of a structure a review of the assessed capacity will be undertaken (see Section 5.9.5.2).

5.9.6.2.4. Routine maintenance programmes have historically only been aimed at addressing high priority defects identified during inspections. However, medium priority defects on critical 'high and very high' importance elements (as defined in the Bridges Group guidance on Bridge Condition Indicators (BCIs) produced by The Association of Directors of Environment, Economy, Planning and Transport (ADEPT)) are now also being considered as if they were high priority and included in the maintenance programme.

5.9.6.2.5. The programme for minor routine maintenance aims to remedy high priority defects within one year of identification. Works are prioritised to ensure that the most urgent work (e.g. safety related, offensive graffiti removal) is carried out first. The remaining high priority defects are dealt with on a geographical basis to minimise travelling time by both supervising and maintenance staff to maximise productivity.

5.9.6.2.6. Records of completed maintenance are prepared to assist with future estimating and to review the effectiveness of repairs.

5.9.6.2.7. Bridge Inspectors have access to the maintenance history and previously recorded defects at the time of planning future inspections. These are either held on the BMS or linked through the BMS to records of previous repairs. This enables inspectors to comment on deterioration rates and the effectiveness of previous repairs.

5.9.6.2.8. We will remove offensive graffiti (e.g. racist, personally offensive) placed on any highway structure. We will do so as soon as reasonably practicable, depending on its nature and location, but aim to remove within 10 days of being observed or reported.

5.9.6.3. **Sustainability**

5.9.6.3.1. Upon the development of a scheme involving a structure, which would affect a watercourse, we liaise with the relevant drainage authority to ensure that our works do not adversely affect the capacity and management of the drainage catchment area.

5.9.6.3.2. We also incorporate features designed to provide passageways where appropriate to ensure that our structure does not form a barrier to wildlife. Our Environment Team provide advice on a case by case basis.

5.9.6.3.3. The bridges designed for the Norwich Northern Distributor Road (NNDR) will incorporated a number of measures to maintain the existing foraging and migration routes of bats. These include the planting of hedgerows across the bridges and the installation of solid panels and fencing to create dark corridors.

5.9.6.3.4. The use of sustainable materials is encouraged.

5.9.7. Asset Management Planning

5.9.7.1. Introduction

5.9.7.1.1. Asset Management Planning is used to assess current and future needs of a stock of structures, enabling 'what-if' analyses to be performed, for example, impact of different levels of spend on performance. The methodology uses standard inventory, inspection and work programme data, alongside data on deterioration rates, service lives and treatment types/effects. The Code of Practice, 'Well Managed Highway Infrastructure', requires the development of Lifecycle Plans as part of the asset management planning process. Lifecycle plans are long-term strategies for managing an asset, or a group of similar assets, with the aim of providing the required performance while minimising whole life costs.

5.9.7.1.2. The standard inspection data mentioned above is that recorded in accordance with the nationally accepted County Surveyors Society (CSS – currently known as ADEPT) 'Guidance Note on Bridge Inspection Reporting' published in July 2002. The system allows for the recording of a defect's extent and severity within a range where '1A' indicates there is 'no significant defect' and '5E' indicating failure or loss of functionality. The full description of extent and severity codes are:-

5.9.7.1.3.

Extent Codes	
Code	**Description**
A	No significant defect
B	Slight, not more that 5% of the surface area/length/number
C	Moderate, 5% - 20% of surface area/length/number
D	Wide, 20%-50% of surface area/length/number
E	Extensive, more than 50% of surface area/length/number

5.9.7.1.4.

Severity Codes	
Code	**Description**
1	As new condition or defect has no significant effect on the element (visually or functionally)
2	Early signs of deterioration, minor defect/damage, no reduction in functionality of element
3	Moderate defect/damage, some loss of functionality could be expected
4	Severe defect/damage, significant loss of functionality and/or element is close to failure/collapse
5	The element is non-functional/failed

5.9.7.1.5. The allowable combinations of Extent and Severity are shown below.

5.9.7.1.6.

Extent	**Severity**				
	1	**2**	**3**	**4**	**5**
A	1A				
B		2B	3B	4B	5B
C		2C	3C	4C	5C
D		2D	3D	4D	5D
E		2E	3E	4E	5E

5.9.7.1.7. When defects are recorded they should also be assigned either a High, Medium or Low priority. ‘High’ priority defects are those which should typically be dealt with within the next financial year in order to ensure public safety, the structural integrity/functionality of the structure or avoid a large future cost penalty. ‘Medium’ priority defects should be dealt with within two financial years of being recorded. Typically, High priority defects are assigned to severity levels 3 or 4 with ‘Medium’ priority defects relating to severity level 3.

5.9.7.1.8. The CSS inspection scoring system is used extensively in asset management planning and is used to define deterioration profiles and intervention trigger points in lifecycle planning.

5.9.7.2. **Traditional Approach**

5.9.7.2.1. Traditionally, the County Council has carried out maintenance work on the bridge stock, including component renewal, based on the identification of defects through the inspection programme.

5.9.7.2.2. The programming of bridge maintenance schemes has been based on the identification of 'High' priority defects and 'Medium' priority defects on the 'very high' importance (safety and durability critical) elements. In an attempt to ensure public safety, works have been prioritised on the bridges with the lowest scoring condition indicators.

5.9.7.2.3. The traditional approach has been a reactive one with very little future planning of budgetary needs.

5.9.7.3. **The Structures Asset Management Planning Toolkit**

5.9.7.3.1. A key part of lifecycle planning is to consider the deterioration profiles of components and define optimal intervention thresholds for different types of maintenance works. Maintenance works are defined as the activities and operations undertaken to manage and maintain the asset and can include inspection, assessment, component renewal, upgrade, etc.

5.9.7.3.2. Developing lifecycle plans and comparing different maintenance treatments and/or strategies is a fairly complex exercise which requires the handling of much inventory data and is therefore ideally suited to a computer application. In response to this, a Structures Asset Management Planning Toolkit (SAMPT) was developed and published by Atkins in on behalf of the DfT. On completion of the initial launch, the ownership of the Toolkit was passed to the UK Roads Liaison Group and more specifically the ULRLG's UK Bridges Board.

5.9.7.3.3. The Toolkit was launched as a prototype in Excel spreadsheet format with a number of supporting documents. It was always understood that a spreadsheet would have performance limitations and the longer term aim was that commercial software developers would development their own versions and where possible create integrated asset management modules for existing Bridge Management Systems (BMS). In recognition of this, one of the published supporting documents was a functional specification to enable the methodology to be adopted by others.

5.9.7.3.4. In 2013 the Bridges team procured a Bridge Management System (BMS) called Asset Management eXpert (AMX). One of the main reasons AMX was chosen over other systems was that it had an Asset Management module which was developed in accordance with the original Toolkit functional specification.

5.9.7.3.5. In 2014, the UK Bridges Board asked Atkins to develop an accreditation process to ensure that asset valuations carried out in third party developed software were creating outputs consistent with the spreadsheet and in 2015, The UK Bridges Board agreed to the establishment of the Structures Toolkit Accreditation Board, as a sub-group of the Bridges Board.

5.9.7.3.6. Unfortunately, in 2016 the DfT decided they were no longer willing to fund either the accreditation scheme or Atkin's further development of the Toolkit and consequently, the rates and supporting documents have not been kept up to date and not all system developers notified of changes.

5.9.7.3.7. As a result AMX is no longer 100% consistent with the latest Toolkit and despite the slight differences in asset valuation outputs, we continue to use AMX to produce lifecycle plans and asset valuations.

5.9.7.3.8. Last year Hertfordshire County Council took it upon themselves to update the Toolkit with new rates and this updated version (v3.06) was published via the HAMFIG website. These new rates have been loaded into AMX and have been used to create valuations for last year and this.

5.9.7.4. **Future Approach – Lifecycle Planning**

5.9.7.4.1. Lifecycle plans are long-term strategies for managing an asset, or a group of similar assets, with the aim of providing the required performance while minimising whole life costs.

5.9.7.4.2. The idea is that it should be possible to develop lifecycle plans for an individual structure (or groups of similar structures) based on the three different maintenance strategies 'Planned Do Minimum', 'Planned Preventative' and 'Planned targeted'. It should then be possible to see which approach is the most cost effective and allow future budgetary needs to be determined with greater accuracy.

5.9.7.4.3. In line with the original technical specification, the three different maintenance strategies are available in AMX as standard. Default intervention triggers have been set for each of these within the software (although these can be revised based on local targets, knowledge and engineering judgement).

5.9.7.4.4. Under a planned do minimum strategy 'Very High' and 'High' importance elements are treated once they reach a predefined condition trigger, i.e. 4D. Where insufficient budget is available to intervene at the trigger condition, or where elements of other importance reach condition 5B, an appropriate intervention must be applied at 5B or earlier.

5.9.7.4.5. Under a planned preventive maintenance strategy all elements of any importance are treated once they reach a predefined condition trigger. This is typically 2C, 3C or 4B. Where insufficient budget is available to intervene at the trigger condition, an appropriate intervention must be applied at 5B or earlier.

5.9.7.4.6. Under a planned targeted strategy 'Very High', 'High' and 'Medium' importance elements are treated once they reach a predefined condition trigger. This is typically 3C or 4B. Where insufficient budget is available to intervene at the trigger condition, or where elements of other importance reach condition 5B, an appropriate intervention must be applied at 5B or earlier.

5.9.7.4.7. The planning tool will also allow us to predict what the effect will be on the stock condition if the budgets required to maintain the service level are reduced. The consequences of a zero budget can also be investigated by looking at an 'Unplanned Reactive' strategy which assumes that there is no intervention until a 5B (i.e. failure) trigger point is reached.

5.9.7.4.8. This new approach will allow a more pro-active approach to the identification and prioritisation of bridge maintenance works which, providing the funding is made available, will lead to reduced whole-life maintenance costs.

5.9.7.5. **Lifecycle Planning – Development to Date and Future Challenges**

5.9.7.5.1. We first started developing lifecycle plans in 2017 so that we could extract the Asset Valuation figures for Whole of Government Accounts (see Sections 5.9.8 and 5.9.9). A little work has also been done using lifecycle planning to compare maintenance strategies and assess budgetary needs. Last year we created a number of plans based on some fairly broad assumptions and in doing so identified a number of areas where our data needed to be improved and some performance issues with AMX. AMX Solutions have since carried out some further development work and the creation of lifecycle plans is now much quicker.

5.9.7.5.2. Lifecycle planning uses information about the current condition of a structure's individual elements (e.g. deck, bearings, parapet, etc) and based on the material type and exposure condition uses a predefined deterioration model to predict how each element will deteriorate over a period of time. Then, based on the maintenance strategy (see 5.9.7.3 above), the plan determines when maintenance or replacement works (the intervention) should be carried out to return the element condition to a predetermined level. Using dimensional data and nationally published rates, the cost of the intervention can also be determined.

5.9.7.5.3. When creating a plan, AMX determines the 'current' condition of a structure's elements by looking at the data from the last general or principal inspection. The element and material types and dimensional data for each structure is taken from AMX's asset inventory.

5.9.7.5.4. When we started to create lifecycle plans we soon identified a large number of gaps in the inventory data with much component and dimensional data missing. Where possible, missing information was found by looking back through inspection reports and photographs. Where the information wasn't readily identifiable, missing data was populated by making some fairly broad assumptions, based on size and type, and through comparisons with data held on similar structure types on equivalent routes. It is hoped that the quality of the data will improve over the next few years as it is captured or verified during the next inspection cycle.

5.9.7.5.5. At the time of writing we have identified 1500 assets that should be included in our lifecycle planning/asset valuation calculation. These are primarily the vehicular bridges (span >1.5m), highway culverts (0.9m<span≤1.5m), footway and cycleway bridges and retaining walls that are identified in the table in Section 5.9.2.6 which carry or retain the public highway.

5.9.7.5.6. Assigning a deterioration profile to each individual element of all 1500 assets one at a time would be very time consuming. To make the process more manageable it was decided to use a fairly crude grouping of the assets and apply further broad assumptions regarding material types and exposure conditions. Ten asset groups were created as follows:

5.9.7.5.7.

Group	Description	Number of Assets
1	Masonry and plain/mass concrete structures	734
2	Reinforced & prestressed concrete and filler beam decks on gritted routes	284
3	Reinforced & prestressed concrete and filler beam decks on non-gritted routes	188
4	Metal beam/concrete composite decks and other metal decks on gritted routes	50
5	Metal beam/concrete composite decks and other metal decks on non-gritted routes	66
6	Corrugated metal structures and troughing decks on gritted routes	44
7	Corrugated metal structures and troughing decks on non-gritted routes	33
8	Plastic bridges	5
9	Timber bridges	14
10	Retaining walls	82
	Total	1500

5.9.7.5.8. Because of AMX performance issues, we struggled last year to create lifecycle plans for the larger groups 1 and 2. This year has been more successful and lifecycle plans have been created for all groups based on both ‘Unplanned Reactive’ and ‘Planned Do Minimum’ maintenance strategies.

5.9.7.5.9. The ‘Unplanned Reactive’ plans, where each component is allowed to deteriorate to failure (5B), are required for determining the depreciation and depreciated replacement costs (DRCs) required for asset valuation and WGA submission (see Sections 5.9.8 and 5.9.9 below).

5.9.7.5.10. The ‘Planned Do Minimum’ plans have been created with and without budgetary constraints. A comparison of the results is discussed in Section 5.9.11.

5.9.7.5.11. Lifecycle planning is still in its infancy and over the last two years we have taken the first steps to being able to create these and comply with the requirement of the ‘Well-Managed Highway Infrastructure’ code of practice. The completeness and quality of our data needs to be improved and it is hoped that this will be addressed on an ongoing basis in line with our inspection regime.

5.9.8. Asset Valuation and Depreciation

5.9.8.1. Asset valuation is the calculation of the current monetary value of an organisation’s assets (ADEPT’s Guidance Document for Highway Infrastructure Asset Valuation). The value of a single highway asset can be defined as the cost to rebuild it in its current location (Gross Replacement Cost (GRC)) with a deduction for depreciation to give the Depreciated Replacement Cost (DRC). The depreciation is the reduction in value of the asset during its service life arising from use, aging, deterioration and obsolescence. In other words, the depreciation is the cumulative cost of restoring the asset to an as-new condition.

5.9.8.2. The Structures Toolkit methodology for calculating the GRC and DRC of a highway structure is included in the Asset Management module in AMX. The GRC is calculated using the physical dimensions of the asset, a gross replacement rate and the application of a number of additional factors to reflect location, obstacle type, the environment, etc. The DRC calculation takes account of the condition of all of the individual bridge components, their deterioration profiles and an ‘Unplanned Reactive’ maintenance strategy.

5.9.8.3. The asset valuation calculation is carried out as part of the lifecycle planning process.

5.9.9. Whole of Government Accounts (WGA)

5.9.9.1. In order to comply with the UK Government’s requirements for Whole Government Accounts (WGA), Local Authorities are required to prepare their accounts in accordance with a Statement of Recommended Practice (SORP) issued by the Chartered Institute of Public Finance and Accountancy (CIPFA). The aim of WGA is to produce a consolidated set of financial statements for the UK public sector and to enable Parliament and the public to better understand and scrutinise how taxpayers’ money is spent.

5.9.9.2. A timetable setting out the requirements for submitting highway asset values for WGA was published by HM Treasury in 2009. This set out the requirement for Local Authorities to include the value of Highway assets in the accounts from 2009/10. However, initially only the GRC values were required and only since 2012 has there been a requirement to submit the DRC values as well.

5.9.9.3. The 2012 requirement for submitting DRC values was probably set to coincide with the publication of the Structures Toolkit and the revised method of calculating DRC values.

5.9.9.4. Despite the small variation (approx. 7%) between AMX and the latest Toolkit output (see Section ****) we continue to use AMX to produce the asset valuation figures for the WGA submission. It is hoped that the published Toolkit methodology will get updated at some point to allow AMX Solutions to update their software so that it produces output consistent with the Toolkit.

5.9.9.5. At the time of writing, there has been no updated rates published for 2018 and so our 2017/18 WGA figures have been created using the last year's rates. These are those that were created by Hertfordshire CC and included in v.3.06 of the Toolkit .

5.9.10. Bridge Height Restrictions and Bridge strikes

5.9.10.1. Background

5.9.10.1.1. Bridge strikes are a problem nationally particularly for Rail Authorities, although it should be noted that the provision of traffic signs, including height restriction signs, is the responsibility of the Highway Authority. The publication 'Prevention of Strikes on Bridges over Highways – A Protocol for Highway Managers and Bridge Owners' ("The Protocol") states that 'The standard minimum clearance to be provided over every part of the carriageway of a public highway is 16'-6" (5.03m). All bridges with a headroom of less than this should be signed, allowing for the appropriate safety margin, identifying the (maximum) safe vehicle height which can be accommodated.'

5.9.10.1.2. Research into bridge strikes by the Rail Safety and Standards Board (RSSB) and the Transport Research Laboratory (TRL), confirmed a suspicion that one of the contributory causes of bridge strikes is likely to be inappropriate, incorrect or insufficient signs at low bridges.

5.9.10.1.3. Further to the research, the UK Bridges Board wrote to all Highway Authority Chief Executives in 2012 to advise that the standard and variability in traffic signs at frequently struck low bridges was 'not of benefit to vehicle drivers'.

5.9.10.1.4. Headroom checks on bridges in Norfolk identified a number of bridges where signing needs to be altered or improved to meet current signing standards.

5.9.10.1.5. The National Bridge Strike Prevention Group (BSPG), which was formed in the 1990s, was responsible for developing the original bridge strike protocol. Changes to the Traffic Signs Regulations and General Directions and the proposed changes to the Traffic Signs Manual triggered the need to review the protocol and a revised document was published in July 2014.

5.9.10.1.6. The 2014 version of the Protocol introduced the need to carry out an audit of the existing low bridge sites and to develop an action plan for the amendment of traffic signs at low bridges.

5.9.10.1.7. The Protocol requires that progress on the Action Plan is reported at 6 monthly intervals to the BSPG. The Protocol includes a proforma report form for use by highway authority Bridge Strike Champions. The Team Manager Bridges fulfills the role of “Bridge Strike Champion” within Norfolk County Council and is responsible for ensuring that effective liaison takes place between Highway and Rail Authorities.

5.9.10.1.8. Highway Authorities have a duty of care to road users and it is generally accepted that they will install and maintain signing at low bridges. Correct signage of low bridges will ensure the greater safety of highway users and reduce the risk of damage to both County Council and third party owned assets.

5.9.10.1.9. The objective is to have all bridges in Norfolk with substandard headrooms signed correctly in accordance with the nationally accepted Protocol and the Traffic Signs Manual, Chapter 4.

5.9.10.2. **Inspections & Checks**

5.9.10.2.1. Headroom checks on low bridges will be carried out:-

- before and after any resurfacing work
- following a reported bridge strike
- following replacement, reconstruction or any other significant work to the bridge superstructure.

5.9.10.2.2. Safety inspections in accordance with Well-maintained Highways should include an inspection to determine the condition of traffic signs at, adjacent to and in advance of low bridges and where applicable associated road markings.

The frequencies for inspections in the inspection regime should be decided following an assessment of the risks to all road and low bridge users including:

- road category as defined in Well-maintained Highways
- traffic use and vehicle characteristics
- bridge strike history
- previous inspections

It is thus important that the Highway Authority is notified by bridge owners of any strikes on their bridges.

It is recommended that the interval between inspections should not exceed one year.

5.9.10.3. **Responsibilities and Budgets**

5.9.10.3.1. Highways Maintenance Section are responsible for inspecting bridge height restriction signing and for funding any required maintenance works. They may utilise expertise within the Highways Network - Bridges Team where signs are required to be attached to structures.

5.9.10.3.2. The Bridges Team are responsible for funding any additional signing required as a result of the audit of the signing provided at low bridge sites.

5.9.10.3.3. A programme of height restriction improvements started in 2013/14. 69 sites were originally identified during the headroom check exercise as requiring improvement. These sites have been reviewed and signing improvement schemes prepared. Signing improvements have been implemented at 44 sites. The remaining sites, some of which have been partially completed, are programmed to be completed in 2017/18.

5.9.10.3.4. In 2013/14, 2014/15, 2015/16 and 2016/17 a total of approximately £284k has been spent on signing improvement schemes. £6k has been allocated in 2017/18.

5.9.11. Funding Needs and Budgets

5.9.11.1. Future Funding Needs

5.9.11.1.1. It was hoped that this year we would be able to demonstrate future funding needs by providing lifecycle plans generated in AMX. Unfortunately, lifecycle planning is complex and in this first year of trying to create the plans we have encountered a number of problems both with the software and our asset inventory data that have prevented us fully achieving this goal. However, we have carried out sufficient work to demonstrate that lifecycle planning will be a useful tool in future years.

5.9.11.1.2. For each of the asset groups defined in the table in Section 5.9.7.5.7, we have created a lifecycle plan with no budgetary or resource constraint based on a ‘Planned Do Minimum’ maintenance strategy. The predicted expenditure per year (for the first 10 years) are as follows:-

5.9.11.1.3.

	Planned Do Minimum with No Budgetary Constraint										
	Asset Group										
Year	1	2	3	4	5	6	7	8	9	10	Total
	Costs shown in £k										
2018	2209	4893	1770	2317	796	258	304	3	25	655	**13230**
2019	347	1650	291	451	144	120	6	2	1	15	**3027**
2020	204	1501	448	140	43	103	-1	52	33	103	**2626**
2021	682	770	394	386	189	110	9	0	12	81	**2633**
2022	286	972	185	181	10	76	59	1	2	222	**1994**
2023	259	500	307	997	142	59	28	2	2	145	**2441**
2024	272	898	172	316	186	123	15	15	9	35	**2041**
2025	281	2199	392	468	25	39	70	0	4	107	**3585**
2026	861	1090	273	783	87	15	4	0	13	5	**3131**
2027	574	1065	395	224	263	122	13	0	10	205	**2871**
Total	**5975**	**15538**	**4627**	**6263**	**1885**	**1025**	**507**	**75**	**111**	**1573**	**37579**

5.9.11.1.4. What the table shows is that without budgetary constraint and under this strategy, other strategies with early interventions will be similar, there is a high cost in year one (2017) but a lower and more consistent cost requirement in future years. The high cost in year one (£13.230m) compared to future years (typically £2.5 - 3m) is due to the current condition of a large number of elements not meeting the minimum condition requirement of the strategy ('Planned Do Minimum' has an intervention trigger point of 4D) and the Toolkit methodology therefore assumes these defects need to be dealt with in the first year.

5.9.11.1.5. The average annual cost over the ten years is just over £3.7m. The average cost for years 2 to 10 (2018 to 2016) is approximately £2.7m. So under a 'Planned Do Minimum' maintenance strategy the annual budgetary need is approximately £2.7m and the current backlog is between £10m and £11m.

5.9.11.1.6. Now, the Bridges Revenue and Capital budgets for 2018/19 have been set at £0.23m and £1.2m respectively giving a total budget of £1.43m. This would appear to be only half what is needed to maintain the highway structure stock at its current level.

5.9.11.1.7. We have created another set of 'Planned Do Minimum' lifecycle plans with an annual budgetary constraint of £1.43m in order to demonstrate the likely effect of a similarly reduced budget over the coming years. We divided the £1.43m budget up between the ten asset groups in proportion with the first year costs derived from the 'Planned Do Minimum' plans that were created with no budgetary constraint. The predicted expenditure per year (for the first 10 years) are as follows:-

5.9.11.1.8.

	Planned Do Minimum with an Annual Budget of £1.43m										
	Asset Group										
Year	1	2	3	4	5	6	7	8	9	10	Total
	Costs shown in £k										
2018	226	550	185	242	85	13	28	0	0	49	**1378**
2019	217	531	175	231	72	27	23	0	0	53	**1329**
2020	207	504	168	177	71	25	24	0	0	63	**1239**
2021	196	481	160	199	72	20	9	0	0	60	**1197**
2022	187	457	152	196	66	22	17	0	0	20	**1117**
2023	178	436	144	178	67	16	8	0	0	41	**1068**
2024	170	415	138	176	63	21	15	0	0	35	**1033**
2025	161	395	132	165	59	6	18	0	0	49	**985**
2026	154	377	125	159	56	18	4	0	0	12	**905**
2027	147	358	119	153	53	14	13	0	0	15	**872**
Total	**1843**	**4504**	**1498**	**1876**	**664**	**182**	**159**	**0**	**0**	**397**	**11123**

5.9.11.1.9. What the table shows is that with a budgetary constraint equal to the current 2018/19 budget, the annual costs are more consistent (although reducing due to the effect of discounting for future years) and the year one peak is no longer present. In fact, the total cost over the 10 year period (£11.123m) is actually less than the year one cost (£13.230m) where no budgetary constraint exists.

5.9.11.1.10. The main point here is that the limited budget does not allow for the backlog to be dealt with and interventions have to be rolled on to future years. The consequence of limiting the budgets is that the condition of the bridge stock reduces at a faster rate. This is demonstrated in the following sections.

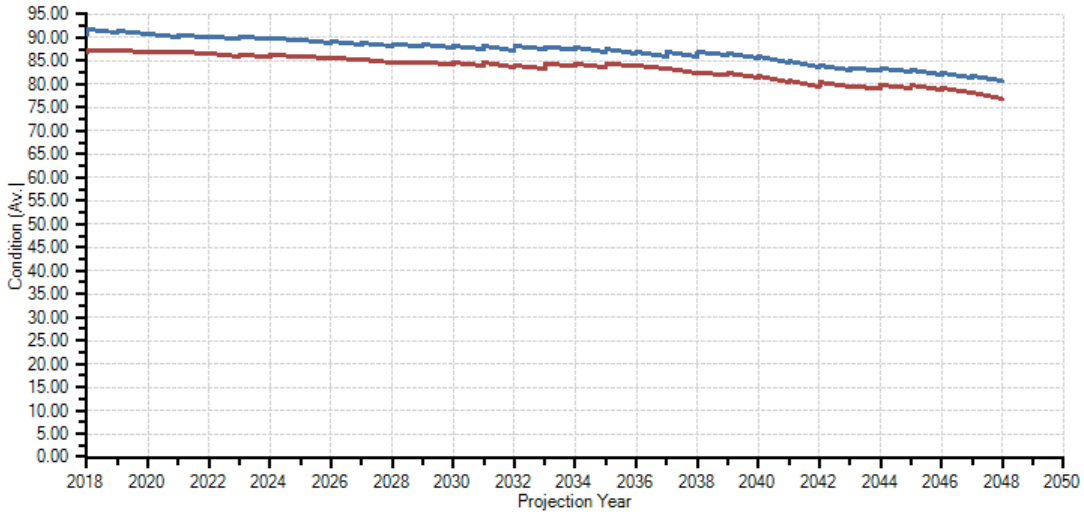
5.9.11.1.11. As a point of reference, the following County Surveyors Society Bridges Group table, which was published in 2005, provides an interpretation of average and critical stock scores.

Score	Average Stock Condition	Critical Stock Condition
100 to 95 Very Good	The structure stock is in a very good condition. Very few structures may be in a moderate to severe condition.	A few critical load bearing elements may be in a moderate to severe condition. Represents very low risk to public safety
94 to 90 Good	Structure stock is in a good condition. A few structures may be in a severe condition.	A few critical load bearing elements may be in a severe condition. Represents low risk to public safety
89 to 80 Fair	Structure stock is in a fair condition. Some structures may be in a severe condition.	Some critical load bearing elements may be in a severe condition. Some structures may represents a moderate risk to public safety unless mitigation measures are in place.
79 to 65 Poor	Structure stock is in a poor condition. A significant number of structures may be in a severe condition.	A significant number of critical load bearing elements may be in a severe condition. Some structures may represents a significant risk to public safety unless mitigation measures are in place.
64 to 40 Very Poor	Structure stock is in a very poor condition. Many structures may be in a severe condition.	Many critical load bearing elements may be unserviceable of close to it and are in a dangerous condition. Some structures may represents a high risk to public safety unless mitigation measures are in place.
39 to 0 Severe	Structure stock is in a severe condition. Many structures may be unserviceable or close to it.	Majority of critical load bearing elements unserviceable of close to it and are in a dangerous condition. Some structures may represents a very high risk to public safety unless mitigation measures are in place.

5.9.11.1.12. The effect of the budget constraint on stock condition can be seen on the following graphs. For each of the first seven asset groups, which cover over 93% of the bridge stock, there are two graphs. The first graph for each group represent the condition projection with no budgetary constraints and the second graph shows the effect of the budgetary constraint. The blue line on each graph represents the average stock condition indicator $BSCI_{Av}$ and the red line represents the critical condition indicator $BSCI_{Crit}$ for the safety critical elements.

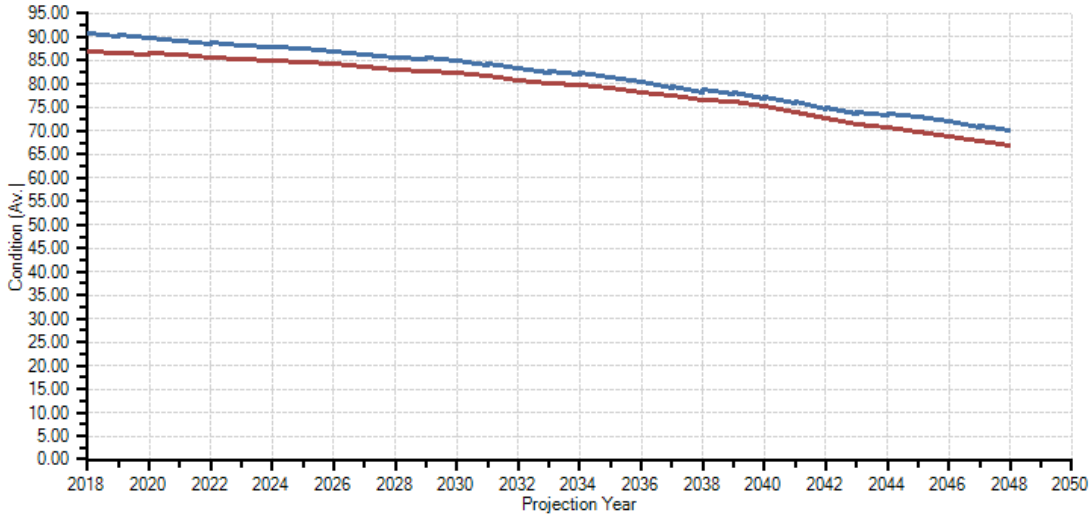
5.9.11.1.13. Group 1 (Masonry and Plain/Mass Concrete) – No Budgetary Constraint

With no budgetary constraint the average stock condition indicator $BSCI_{Av}$ for Gp1 assets starts at 90.4 (good) rises to 91.8 (good) following the maintenance work in Year 1 (2018). It takes until 2023 (Year 6) for the stock condition to drop below 90 and into the fair condition band where it remains for the remainder of the 30 year plan with a final score of 81.1.



5.9.11.1.14. Group 1 (Masonry and Plain/Mass Concrete) – Annual Budget set to £229k

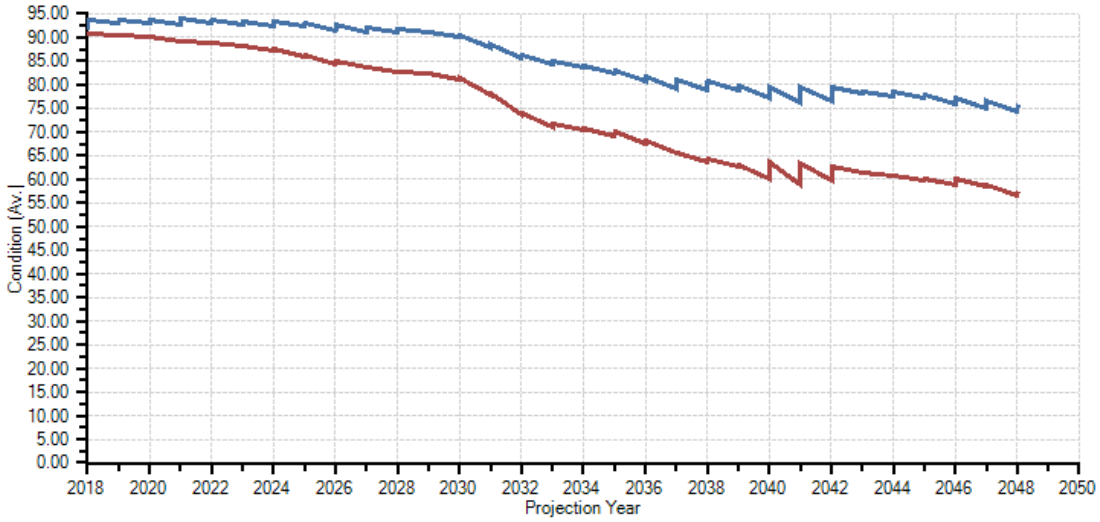
With the Gp1 budget limited to £229k per annum i.e. at current levels, the average stock condition indicator $BSCI_{Av}$ starts at 90.4 (good), reduces to below 90 (fair) by 2020, which is three years earlier than the graph above, and continues to reduce to below 80 (poor) by 2037 where it remains for the remainder of the 30 year plan with a final score of 70.2.



5.9.11.1.15. The condition projection for the critical stock condition indicator $BSCI_{Crit}$ follows a similar profile to the average stock condition. The limited funding accelerates deterioration but not dramatically so due to the rather inert materials and slow deterioration rates.

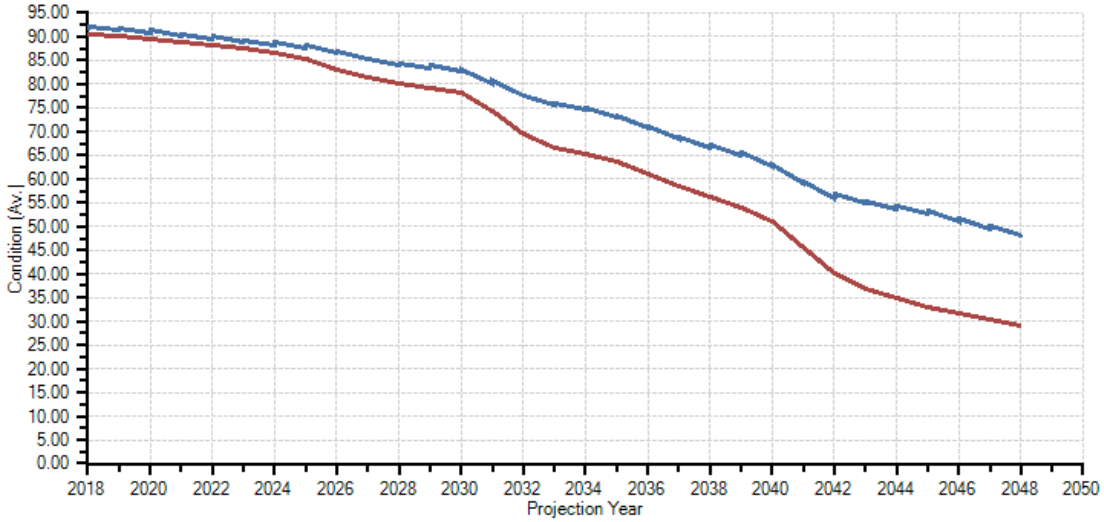
5.9.11.1.16. Group 2 (Reinforced/Pre-stressed Concrete on Gritting Routes) – No Budgetary Constraint

With no budgetary constraint the average stock condition for Gp2 assets starts at 91.7 (good) rises to 93.9 (good) following the maintenance work in Years 1 and 2 (2018 and 2019). It takes until 2031 (Year 14) for the stock condition to drop below 90 (fair) and a further 8 years (Year 22) to drop below 80 into the poor condition band where it remains for the remainder of the 30 year plan with a final score of 75.9.



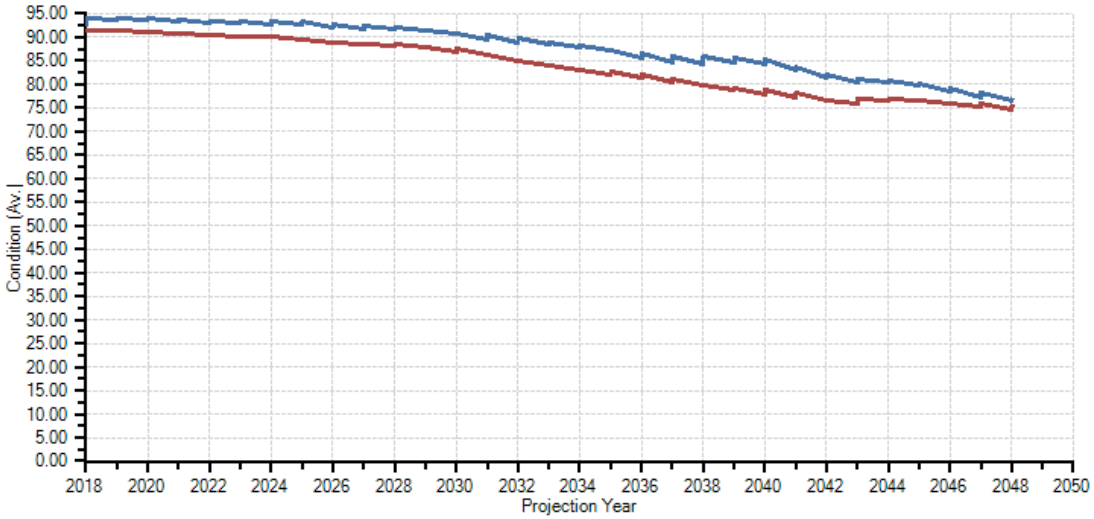
5.9.11.1.17. Group 2 (Reinforced/Pre-stressed Concrete on Gritting Routes) – Annual Budget set to £558k

With the Gp2 budget limited to £558k per annum i.e. at current levels, the average stock condition starts at 91.6 before (good), reduces to below 90 (fair) by 2023, which is eight years earlier than the graph above, and continues to reduce to below 80 (poor) by 2032 and even further to below 65 (v.poor) by 2040. At the end of the 30 year plan with a final score is 48.4.



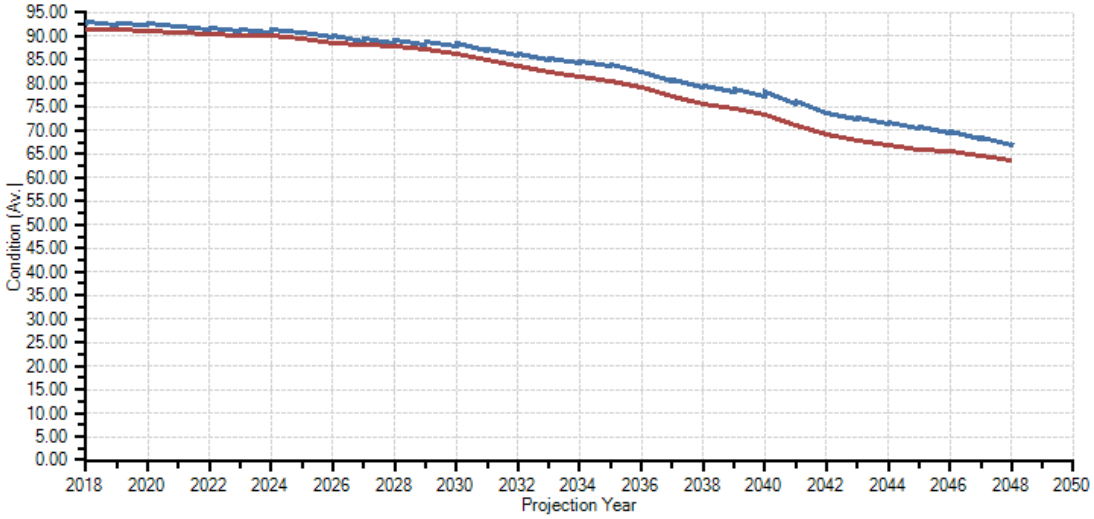
5.9.11.1.18. Group 3 (Reinforced/Pre-stressed Concrete on Non-Gritting Routes) – No Budgetary Constraint

With no budgetary constraint the average stock condition for Gp3 assets starts at 92.5 (good) rises to 94.0 (good) following the maintenance work in Year 1 (2018). It takes until 2031 (Year 14) for the stock condition to drop below 90 (fair) and a further 14 years (Year 28) to drop below 80 into the poor condition band where it remains for the remainder of the 30 year plan with a final score of 77.3.



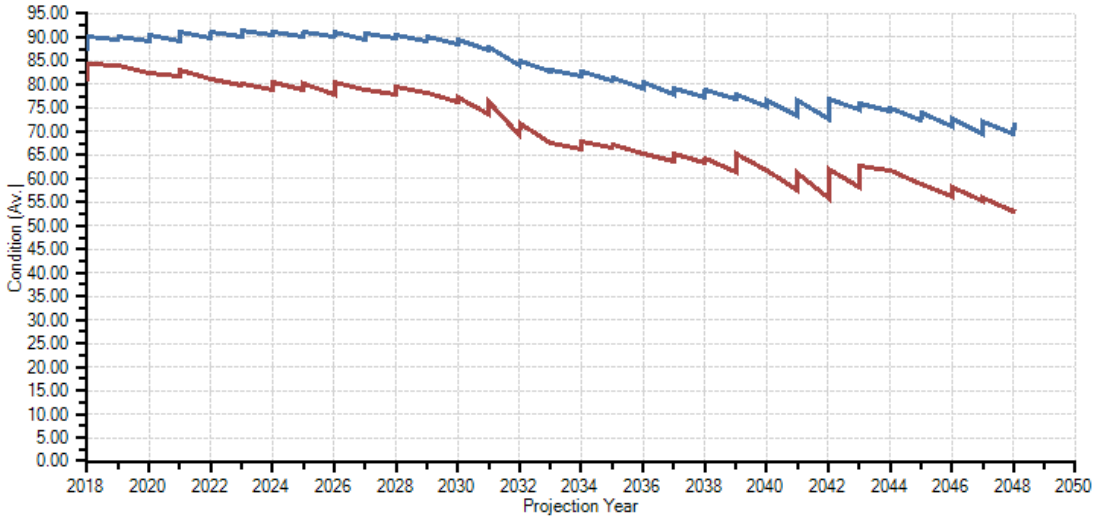
5.9.11.1.19. Group 3 (Reinforced/Pre-stressed Concrete on Non-Gritting Routes) – Annual Budget set to £186k

With the Gp3 budget limited to £186k per annum i.e. at current levels, the average stock condition starts at 92.5 before (good), reduces to below 90 (fair) by 2026, which is five years earlier than the graph above, and continues to reduce to below 80 (poor) by 2038. At the end of the 30 year plan the final indicator score is 67.5.



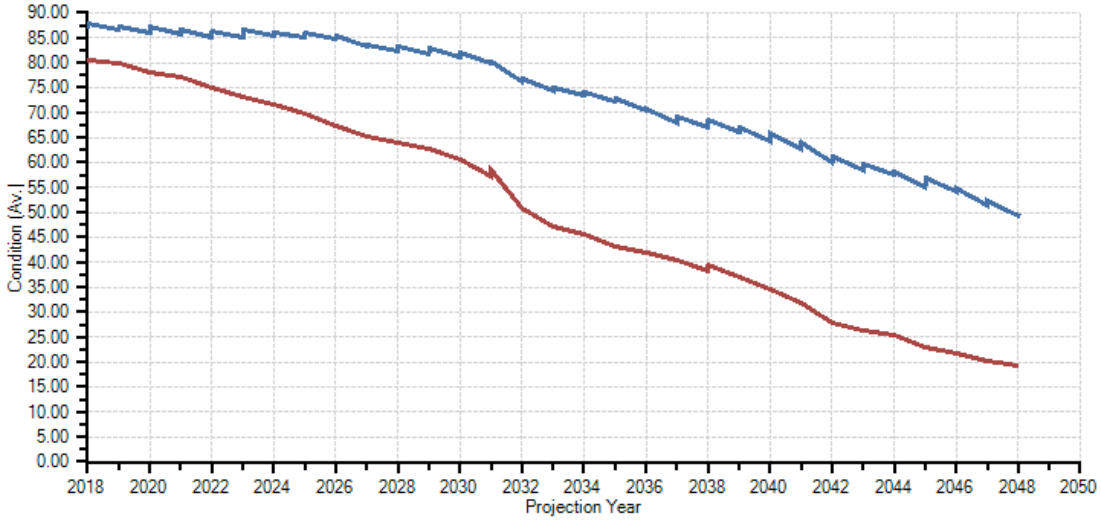
5.9.11.1.20. Group 4 (Metal Beam and Metal Decks on Gritting Routes) – No Budgetary Constraint

With no budgetary constraint the average stock condition for Gp4 assets starts at 87.3 (fair) rises to 91.3 (good) following the maintenance work in the first few years. It takes until 2029 (Year 12) for the stock condition to drop below 90 (fair) and a further 7 years (Year 19) to drop below 80 into the poor condition band where it remains for the remainder of the 30 year plan with a final score of 72.0.



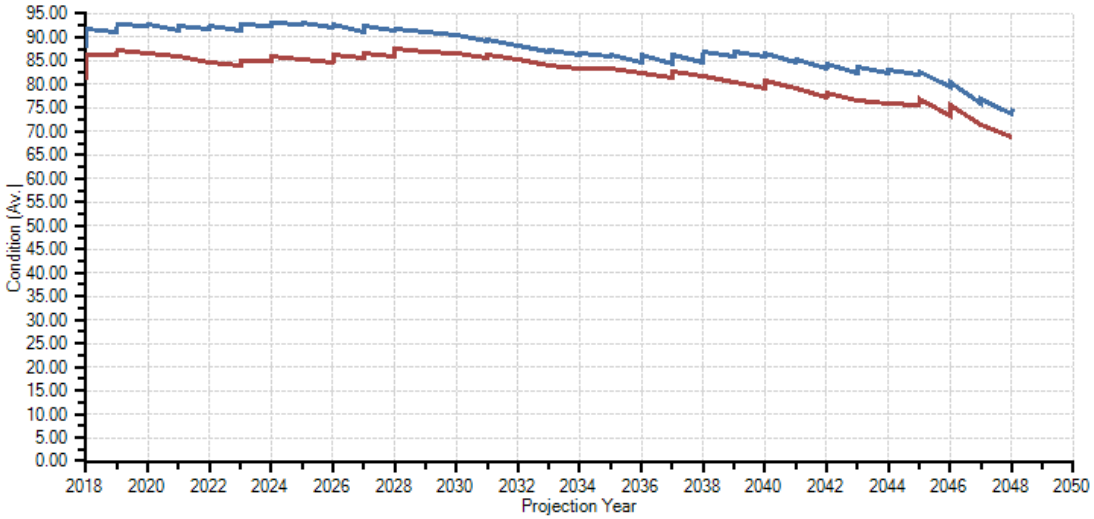
5.9.11.1.21. Group 4 (Metal Beam and Metal Decks on Gritting Routes) – Annual Budget set to £243k

With the Gp4 budget limited to £243k per annum i.e. at current levels, the average stock condition starts at 87.1 before (fair), reduces to below 80 (poor) by 2031, which is six years earlier than the graph above, and continues to reduce to below 65 (v. poor) by 2040. At the end of the 30 year plan the final indicator score is 49.9.



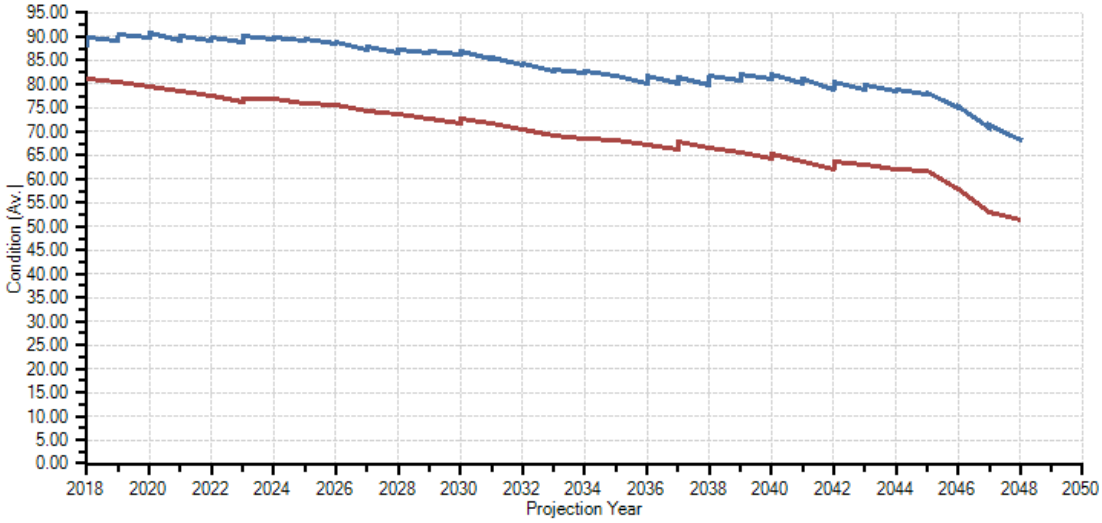
5.9.11.1.22. Group 5 (Metal Beam and Metal Decks on Non-Gritting Routes) – No Budgetary Constraint

With no budgetary constraint the average stock condition for Gp5 assets starts at 87.9 (fair) rises to 92.8 (good) following the maintenance work in the first few years. It takes until 2030 (Year 13) for the stock condition to drop below 90 (fair) and a further 16 years (Year 29) to drop below 80 into the poor condition band where it remains for the remainder of the 30 year plan with a final score of 75.1.



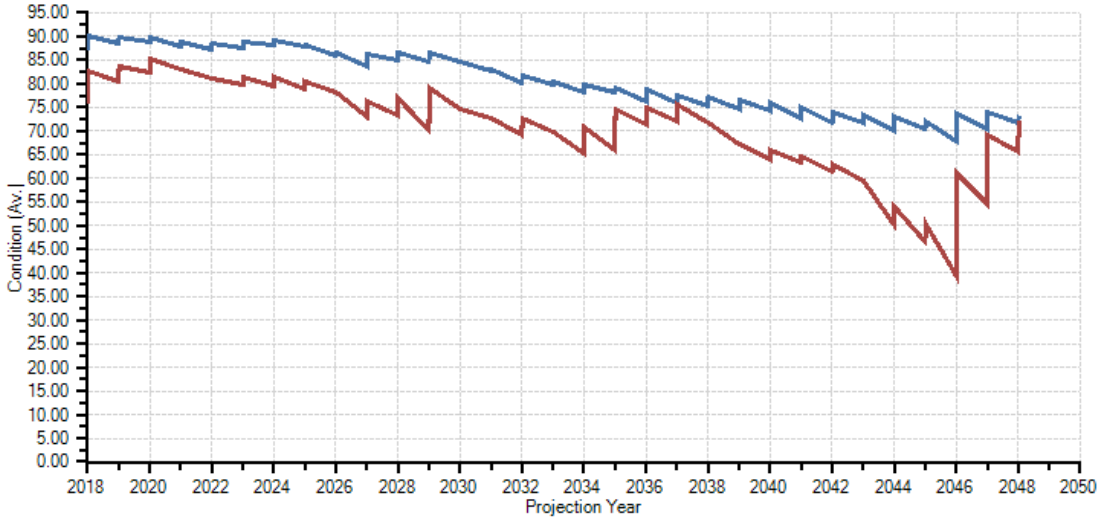
5.9.11.1.23. Group 5 (Metal Beam and Metal Decks on Non-Gritting Routes) – Annual Budget set to £86k

With the Gp5 budget limited to £86k per annum i.e. at current levels, the average stock condition starts at 87.9 before (fair), reduces to below 80 (poor) by 2039, which is seven years earlier than the graph above. At the end of the 30 year plan the final indicator score is 68.7.



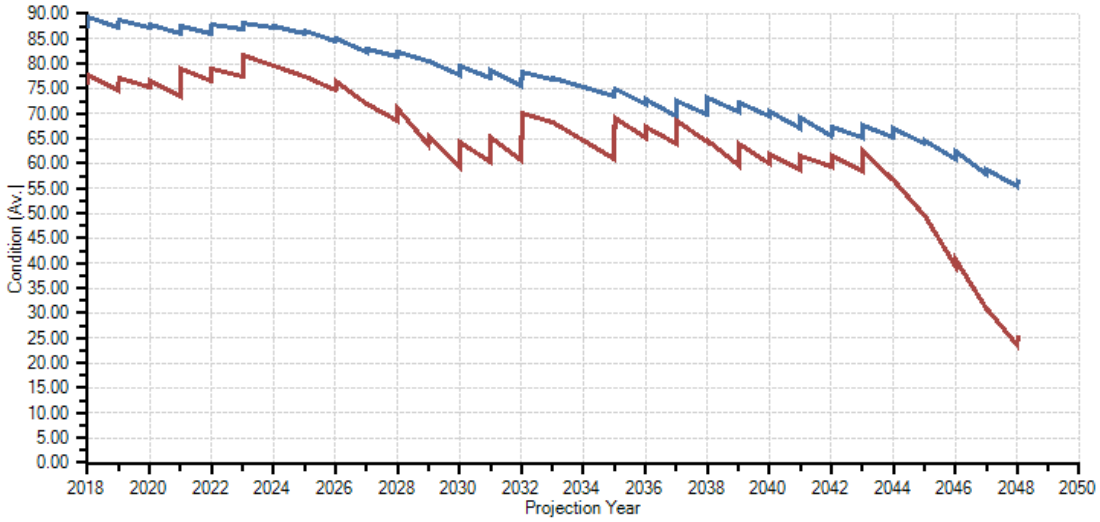
5.9.11.1.24. Group 6 (Corrugated Metal Structures and Filler Decks on Gritting Routes) – No Budgetary Constraint

With no budgetary constraint the average stock condition for Gp6 assets starts at 87.3 (fair) rises to 90.2 (good) following the maintenance work in the first few years but drops back below 90 the following year. It takes until 2033 (Year 16) for the stock condition to drop below 80 into the poor condition band where it remains for the remainder of the 30 year plan with a final score of 73.4.



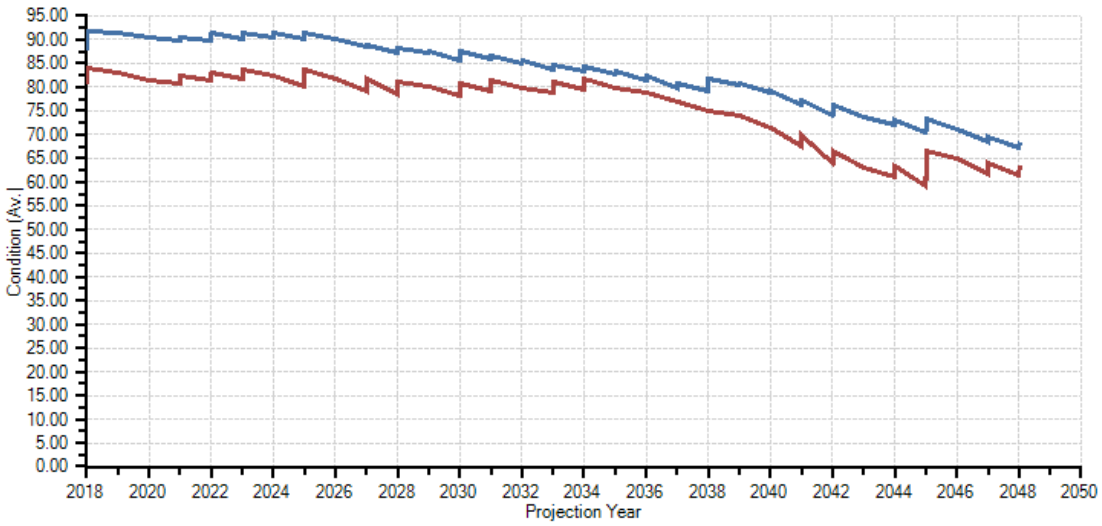
5.9.11.1.25. Group 6 (Corrugated Metal Structures and Filler Decks on Gritting Routes) - Annual Budget set to £29k

With the Gp6 budget limited to £29k per annum i.e. at current levels, the average stock condition starts at 87.3 before (fair), reduces to below 80 (poor) by 2030, and continues to reduce to below 65 (v. poor) by 2045. At the end of the 30 year plan the final indicator score is 57.1.



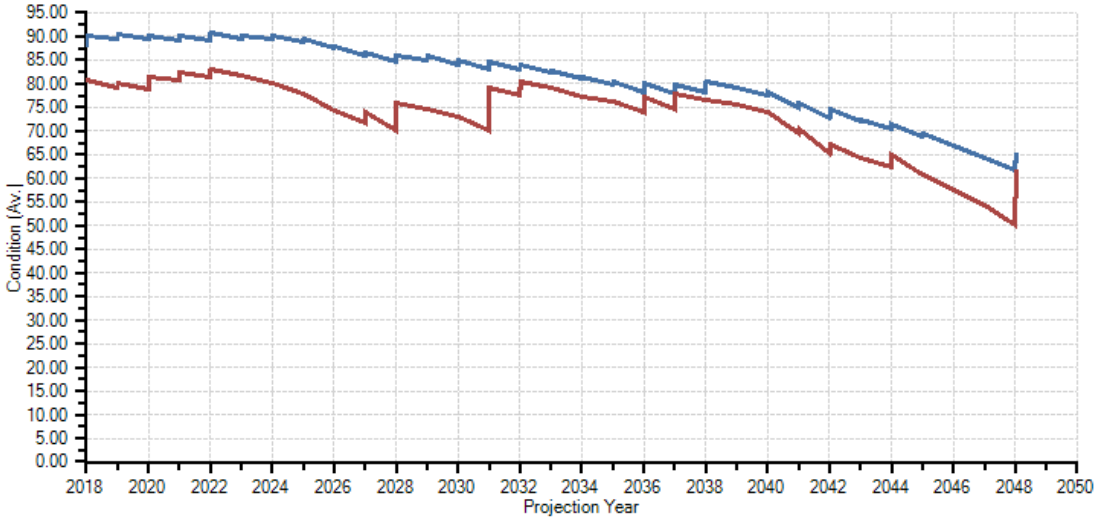
5.9.11.1.26. Group 7 (Corrugated Metal Structures and Filler Decks on Non-Gritting Routes) – No Budgetary Constraint

With no budgetary constraint the average stock condition for Gp7 assets starts at 87.9 (fair) rises to 91.4 (good) following the maintenance work in the first few years. It takes until 2027 (Year 10) for the stock condition to drop below 90 (fair) and a further 13 years (Year 23) to drop below 80 into the poor condition band where it remains for the remainder of the 30 year plan with a final score of 68.4.



5.9.11.1.27. Group 7 (Corrugated Metal Structures and Filler Decks on Non-Gritting Routes) - Annual Budget set to £29k

With the Gp7 budget limited to £29k per annum i.e. at current levels, the average stock condition starts at 87.9 before (fair), reduces to below 80 (poor) by 2036, and continues to reduce to below 65 (v. poor) by 2047. At the end of the 30 year plan the final indicator score is 61.7.



5.9.11.1.28. For each group it can be seen that the current level of funding is not sufficient to maximise the serviceable life of the assets. In each case, the budgetary constraint results in an accelerated deterioration with 'poor' condition being reached a number of years earlier as shown below:-

Number of Years to Reach 'Poor' Condition			
Asset Group	**No Budget Constraint**	**With Budget Constraint**	**Difference**
Group 1	6	3	-3
Group 2	22	15	-7
Group 3	28	21	-7
Group 4	19	14	-5
Group 5	29	22	-7
Group 6	16	13	-3
Group 7	23	19	-4

5.9.11.1.29. The most concerning condition profiles are those for the critical condition indicator $BSCI_{Crit}$ for groups 2, 4 and 6 which are the reinforced concrete, metal and corrugated steel structures located on gritting routes. The profiles show that these three groups, which include 378 assets i.e. just over a quarter of the assets included in the lifecycle planning, deteriorate rapidly without the necessary levels of funding with an alarming effect on the safety critical elements. The critical condition indicator $BSCI_{Crit}$ for each group indicates that under the current levels of funding the critical safety elements of these bridges could all be in a severe condition within the next 20-25 years.

5.9.12. Service Levels

5.9.12.1. There are no statutory indicators identifying the condition of bridge assets.

5.9.12.2. When the service levels were determined at the start on 2009/10 we considered the condition of the bridge stock to be acceptable except for a relatively small number of bridges that needed strengthening to 40/44 tonnes (or restricting) and those which are in such poor condition that they would be uneconomic to maintain without significant remedial work being carried out first. Accordingly, our service level was set to reflect the following three aspirations:-

5.9.12.3.

- To maintain the April 2009 weighted Bridge Stock Condition Indicator ($BSCI_{AV}$) scores for HGV and non-HGV Networks, which were 93 and 89 respectively.
- To raise the condition of all bridges to achieve a minimum BCI_{AV} score of 70.
- To either strengthen to 40 Tonne capacity or impose a weight restriction on all weak highway bridges and culverts on the network.

5.9.12.4. At the end of 2011 we established an indicator for monitoring the condition of our culvert stock which represents spans of between 1.499m and 0.9m. The $BSCI_{AV}$ was 95.04 on 1st April 2012 and we chose to use this value as a service level with any negative movement representing a 'backlog' in the 2013 Highway Asset Performance Report.

5.9.12.5. During 2015/16 the list of assets included in the BSCI calculation changed slightly as we removed the privately owned assets that are deemed to have responsible owners. The way the HGV and Non-HGV networks are defined also changed to be consistent with route hierarchy designations. As a consequence, The weighted $BSCI_{AV}$ service levels scores were adjusted and reset at 91.92 and 88.93 for the HGV network and non-HGV network respectively.

5.9.13. Backlog

5.9.13.1. **Backlog is defined as the cost of maintenance work required to bring the condition of the asset up to the agreed Service Level.**

5.9.14. Performance in 2017/18

5.9.14.1. Overall BSCI

5.9.14.1.1. The AMX generated weighted $BSCI_{AV}$ scores at the start of 2017/18 (i.e. April/May 2016) were 90.03 and 90.82 on the HGV and non-HGV networks respectively. These scores are currently (May 2018) 89.99 and 91.02 .

5.9.14.1.2. The HGV score decreased very slightly from 90.03 to 89.99 during 2017/18 but remains 1.93 points below the new service level of 91.92. It is estimated that a single point in the HGV $BSCI_{AV}$ score represents £4.4m of depreciation and so the backlog on the HGV network now stands at £8.5m.

5.9.14.1.3. The Non-HGV score increased from 90.82 to 91.02 during 2017/18 and remains above the service level which is now 88.93. It is estimated that a single point in the Non-HGV $BSCI_{AV}$ score represents £1.1m of depreciation.

5.9.14.1.4. The overall backlog for the $BSCI_{AV}$ has decreased slightly during 2017/18 from £8.2m to £8.5m, an increase of £0.3m.

5.9.14.1.5. The culvert stock condition indicator is currently 94.57 which is 0.47 below the service level of 95.04 set on 1 April 2012. Consequently, there is now a backlog.

5.9.14.2. **Minimum Bridge Condition Indicator (BCI) Score of 70.**

5.9.14.2.1. We have established there are currently 6 bridges with BCI scores <70. Three of these bridges are privately owned and will not be improved / maintained at the Council's expense. One of the remaining four bridges, Rollesby (Old) Bridge no longer carries highway or a public right of way and is located outside the highway boundary. Of the other three bridges, New Mills Yard and Morton's No.1 Bridge have major maintenance works planned for 2019/20 and Ringland Bridge has major maintenance works planned for 2020/21.

5.9.14.2.2. No work has been carried out on these bridges in 2017/18.

5.9.14.3. **The number of bridges requiring strengthening to 44 tonnes.**

5.9.14.3.1. No strengthening schemes were completed in 2017/18 and 2 bridges still require attention (Rungays Bridge and Repps Staithe Bridge).

5.9.14.3.2. Assessment work carried out by Mott MacDonald in January 2013 identified a reduced (7½ tonne) capacity for the half joints on Rungays Bridge and it has been put back into the strengthening programme. The bridge is currently monitored on a regular basis and a feasibility study is programmed for 2018/19 to look at options for strengthening or possibly replacing the bridge in 2019/20.

5.9.14.3.3. Repps Staithe Bridge was to be removed in 2013 as part of works, promoted by the Environment Agency, to realign a soke dyke. Unfortunately, due to a lack of funds and spiralling costs, the EA decided to abandon the scheme. The bridge was then reprogrammed for strengthening or replacement in 2014/15 until the EA indicated that their scheme may go ahead after all. Unfortunately, the EA has been abandoned once more and the existing bridge is now programmed to be strengthened in June or July 2018.

5.9.14.3.4. It is estimated that the cost of completing this strengthening work will be £315,000 at current prices. This represents the current backlog for bridges strengthening.

5.9.15. Expected Performance in 2018/19

5.9.15.1. **Overall BSCI**

5.9.15.1.1. The Revenue and Capital budgets for 2018/19 have been set at £0.23m and £1.2m respectively.

Based on these settlements, the budget forecast shows a Capital shortfall of £2.375m in 2018/19 which, if not corrected in future years, will put at risk the service level which may deteriorate further.

5.9.15.1.2. It is proposed to strengthen Repps Staithe Bridge in 2018/19 for an estimated cost of £60k. Strengthening work on Rungays Bridge is currently planned for 2019/20 with the feasibility study being carried out in 2018/19 at an estimated cost of £15k.

5.9.15.1.3. Major maintenance schemes for 2018/19 include the Novi Sad Friendship Footbridge scheme to address settlement issues (£150k).

5.9.15.1.4. In February 2016, Earsham Mill Footbridge, a single span post tensioned concrete structure carrying a public right of way over the River Waveney, collapsed due to the failure of the steel post tensioning tendons. It is proposed to replace the structure in 2018/19 at an estimated cost of £170k.

5.9.15.1.5. Re-painting of Free Bridge in King's Lynn is programmed to be carried out in phases due to budgetary constraints. Phase 1 is programmed for 2018/19 and Phase 2 for 2019/20. A sum of £15k for contract preparation has been allowed for in 2018/19.

5.9.15.1.6. In addition, a budget of £20k is allocated in the 2018/19 programme for bridge assessments, re-assessments, bridge monitoring, interim measures and weight/height restriction signing. The estimated cost of these activities in future years varies between £150k and £190k.

5.9.15.1.7. A budget of £55k is required in 2018/19 for culvert replacement work.

5.9.15.2. **Minimum BCI_{AV} score of 70**

5.9.15.2.1. Of the 7 bridges currently with BCI scores less than 70, three are privately owned and will not be improved/maintained at the Council's expense. Of the remaining bridges, none have maintenance works planned in 2016/17.

5.9.15.2.2. Major maintenance schemes are planned for :

- Morton's No.1 Bridge replacement - 2019/20.
- New Mills Yard - 2019/20
- Ringland Bridge - 2020/21

5.9.16. ## Risk

5.9.16.1. Related to Service Levels

5.9.16.1.1.
- Risk – Failure to achieve target $BSCI_{AV}$ Scores of 91.92 and 88.93 for HGV and non-HGV networks respectively.

Impact (2) x Likelihood (3) = Medium risk (6)

5.9.16.1.2.
- Risk – Failure to hold the value of outstanding works on structures of 1.5m span or less relative to inflation

Impact (2) x Likelihood (3) = Medium risk (6)

10. Street Lighting, Illuminated Signs and Bollards Lifecycle Management Plan

10.1. This asset grouping comprises all streetlights, illuminated signs and bollards that are owned by the County Council as the Highway Authority. The Park and Ride lifecycle plan contains streetlights, illuminated signs and bollards provided on the County Council's Park and Ride Sites which are off the public highway.

10.2. Physical Parameters

10.2.1. The following table shows assets owned by Norfolk County Council within each District. Inventory info April 2017.

- Street Lighting Columns (Cols)
- Lighting Subway Units (Subs)
- Illuminated Traffic Signs (Signs)
- Belisha Beacons (BBs)
- Feeder Pillars (FPs)
- Illuminated Bollards (Bols)

District		Cols	Subs	Signs	BBs	FPs	Bols
1	Nth Norfolk	4,597	95	874	48	65	214
2	KL&WNBC	8,736	0	1,734	40	267	311
3	Breckland	6,556	38	1,066	24	158	236
4	Norwich City	14,025	186	1,411	75	406	471
5	Broadland	4,614	0	755	26	131	277
6	Gt.Yarmouth	7,011	41	1,049	38	167	215
7	South Norfolk	6,248	15	1,143	16	160	295
Totals		51,787	375	8,032	267	1,354	2,019

10.2.2. The following table shows street lighting column material types owned by Norfolk County Council, within each District.

		Column Type		
District		Steel	Concrete	Other
1	North Norfolk	4,664	4	24
2	KL&WNBC	8,551	38	147
3	Breckland	6,552	19	23
4	Norwich City	14,183	1	27
5	Broadland	4,611	3	0
6	Gt. Yarmouth	6,948	5	99
7	SNDC	6,256	4	3
TOTAL		51,765	74	323

10.2.3. The following table shows lamp types owned by Norfolk County Council, within each District.

		Lamp Type		
District		SOX	SON	Other *(including CosmoPolis & LED)*
1	North Norfolk	1,761	1,142	1,789
2	West Norfolk	1,604	2,099	5,033
3	Breckland	1,965	1,688	2,941
4	Norwich City	818	5,728	7,665
5	Broadland	1,874	1,422	1,318
6	Gt.Yarmouth	1,277	2,443	3,332
7	South Norfolk	1,870	2,072	2,321
TOTAL		11,169	16,594	24,399

10.2.4. The following table shows other lamp types owned by Norfolk County Council, within each District.

		Lamp Type		
District		CosmoPolis	LED	Other
1	North Norfolk	1,013	115	661
2	West Norfolk	1,481	2,678	874
3	Breckland	1,739	98	1,104
4	Norwich City	4,397	1,269	1,999
5	Broadland	484	124	710
6	Gt.Yarmouth	1,524	1,010	798
7	South Norfolk	891	613	817
TOTAL		11,529	5,907	6,963

10.3. Lifecycle Options

10.3.1. Accruals

10.3.1.1. Growth of the stock of street lighting columns and signs is a major issue for the Authority. The growth in stock increases the day-to-day maintenance burden on the staff and the PFI Service Provider, and also increases the energy costs of the service. The PFI contract allows for lights to be accrued but each additional unit increases the annual payment which must be made to the service provider.

Since 1993 the number of street lighting columns has grown by 47% and the number of illuminated signs has increased by 92%. In the last 4 years there has been a smaller percentage increase. This being mainly due to PFI redesigns, in some cases, reducing the number of lights which has offset accruals from new developments. Illuminated signs are decreasing as need for signs are being reviewed.

Year	Illuminated Signs	Street Lighting Columns
1993	5,450	35,000
2010	11,779	50,793
2011	11,692	50,781
2012	11,485	50,829
2013	10,888	51,089
2014	10,485	51,254
2015	10,400	51,479
2016	10,318	52,162

10.3.1.2. Accrual is the result of one of three means:

- County Council Schemes
- Private Developers
- Other Lighting Authority Proposals

10.3.1.3. County Council Schemes

10.3.1.3.1. Street lighting' works are often part of the following:

- New roads, funded from the LTP and consist of bypasses and relief roads
- Improvement schemes which are introduced as traffic engineering schemes which are mainly related to safety
- Regeneration schemes. These are generally funded from Single Regeneration Budgets (SRBs).

10.3.1.4. Private Developers

10.3.1.4.1. Developer funded usually takes the form of new housing and industrial estate roads through section 38,106 or 278 agreement. These generally include street lighting, which may be adopted by the County Council, if there is a highway need.

10.3.1.5. Transfers from other Lighting Authorities

10.3.1.5.1. In recent years a considerable number of columns have been taken over from the Highways Agency after de-trunking of some major routes. The PFI contract allows for lights to be transferred from other Lighting Authorities, i.e. District and Parish/Town Councils but the County Council would charge those Authorities for the costs of bringing their lights up to standard and for future maintenance.

10.3.2. **Renewal or Replacement**

10.3.2.1. This is now carried out under a Private Finance Initiative (PFI) contract which was signed November 2007 with works commencement on 4 February 2008.

10.3.3. **Upgrading**

10.3.3.1. Structurally unsound columns were replaced during the first five years (Core Investment Programme Period) of the PFI contract with priority given to those columns with least residual life.

10.3.3.2. Following this column replacement programme there is a ten year Post Core Investment Programme Period when the rest of the stock is updated to the same lighting standards. Most of this should be achievable with lantern and lamp type changes only.

10.3.4. **Deaccrual**

10.3.4.1. It is generally unusual for systems of street lighting to be deaccrued, but occasionally they may be included within a highway ‘stopping-up’ order.

10.4. Non Asset Options

10.4.1. Non asset options have been considered for this group. The last formal consideration was during the Best Value Review in 2001.

10.4.2. **Managing Demand**

10.4.2.1. The County Council will only finance new lighting on new or improved County road or locations where there is a need to deal with a night-time accident problem or a serious crime and disorder issue.

10.4.2.2. At the present time consideration will be given to schemes to assist in the reduction of crime.

10.4.2.3. The County Council will adopt lighting to either a roadway or a footway lighting standard on new residential, retail and industrial estates if requested by the Local Lighting Authority, if there is a highway need and if the development in question is in an environmental zone where lighting is permitted.

10.4.2.4. The County Council will continue to illuminate traffic signs that are mandatory to be lit under the requirements of the Traffic Signs Regulations and General Directions.

10.4.3. **Amending Standards**

10.4.3.1. Consideration is given to the standard of lighting provided. Lighting was being provided to BS5489-1:2003. This has now been updated and the new BS5489-1:2013 is the current standard for all County Council new lighting design. All external lighting design submitted by developers for approval is now being approved in accordance with BS5489-1:2013.

10.5. Lifecycle Treatment Options

Do Minimum	These activities are the routine maintenance tasks carried out to ensure safety and maintain standards for users. • Bulk Clean and change. • Electrical testing. • Structural testing of columns. • Repair accident damage.
Medium Life	The painting of columns is a medium life treatment aimed at prolonging life and enhancing the appearance of the streetlights. This is limited to any stock affected by high corrosive elements.
Long Life	A New Specification has been introduced that consider the whole life cost of equipment.

10.5.1. Street Lighting – Routine Maintenance Activities

10.5.1.1. Routine maintenance is the regular ongoing day to day work that is necessary to keep assets operating, including instances where portions of assets fail and need immediate repair to make operational again.

10.5.1.2. The routine works undertaken on street lighting have been sub-divided into activities, the standards of which have been displayed in tabular form and are followed details on objectives and response arrangements.

10.5.1.3. Reactive activities are by their nature unplanned and occur in response to sudden changes, whist the other activities are carried in a planned manner.

10.5.1.4. The “Code of Practice for Maintenance management” refers to the “Code of Good Practice for Road Lighting Maintenance” for suggested standards and other detailed operational information. The latter code does not, however, prescribe frequencies, but recommends instead that “Highway Authorities should determine the cyclic maintenance intervals for its lighting installations.” As we were about to enter a PFI agreement, it was considered prudent to continue the established maintenance regime as laid down in the 1999 Code of Practice.

10.5.1.5. We currently work to the CSS Code of Practice and we are now designing in accordance with the BS5489-1:2013 (CEN). We have under trial two types of reflex non-illuminated bollards which are DfT approved.

No departures from the relevant codes, including the PFI, are anticipated.

10.5.1.6. **Street Lighting**

Activity Type	Activity	Service Standard	*1999 Code of Practice*
Preventative	Lamp changing	Bulk change. Individually on failure. (Investigations being carried out to see whether bulk change interval can be extended)	Burn to destruction or bulk change at regular intervals dependent on burning hours and individually on failure.
	Lantern internal and external	Every 2 years. (Modern lenses have improved sealing, preventing ingress of water	Annually. During inspections the general condition of the column and ancillary equipment should also be checked but at 2 year intervals.
	Column painting	As required	When required but not exceeding 10 year intervals.
Condition Monitoring	Scouting for illumination	2 weeks (Winter) / 4 weeks (Summer)	
	Electrical tests	On a 6 year rotating basis every installation will be tested in accordance with (BS7671) IET Wiring Regulations	Not exceeding 5 year intervals.
Reactive	Response time for repairing any fault	Emergency faults to be made safe within 2Hours/24 hours at discretion of lighting staff	7 business days from receipt of report of fault within contractors control.

10.5.1.7. **Illuminated Signs and Bollards**

Activity Type	Activity	Service Standard	*1989 Code of Practice*
Preventative	Lamp changing	Bulk change. Individually on failure	Changed at regular intervals to coincide with internal inspections and cleaning
	Internal inspection and cleaning		Every 2 years including sign supports
	External cleaning		Annually or when required
	Painting of supports and frames	As required	When required (condition reported when cleaned) but not exceeding 10 year interval
Condition Monitoring Condition Monitoring	Scouting for illumination		In conjunction with street lighting inspections
	Electrical tests	Every 6 years, CGP standard accords with 17th edition of IET wiring regulations.	Not exceeding 5 year interval
Reactive	Replacement and repair of damaged signs and bollards		These should be made safe within 24 hours and permanent repairs effected as soon as possible for important warning and regulatory signs

10.6. Street Lighting – Objectives and Response

10.6.1. Safety

10.6.1.1. The objectives are:

- Increase night visibility for all highway users
- Contribute to crime prevention and reduced fear of crime.
- To reduce night-time accidents.
- Ensure that equipment is safe

10.6.1.2. The PFI contract includes a column-testing regime to determine the structural integrity of our column stock. This enables column replacement to be based on priority needs, thereby minimising the risk to highway users.

10.6.2. Serviceability

10.6.2.1. The objectives are:

- To maintain the design standard of illumination with a reasonable degree of certainty.
- To ensure the condition of equipment is not allowed to deteriorate.

10.6.2.2. Norfolk County Council as a highway authority with lighting powers is responsible for all lighting to a roadway standard on County Roads.

10.6.2.3. Local Lighting Authorities (District and Parish/Town Councils) are responsible for lighting to a footway standard on County Roads plus lighting to any standard in non-adopted areas. (The County Council's approval is required for new lighting provided by Local Lighting Authorities on County Roads).

10.6.2.4. The County Council has offered a chargeable maintenance package to all Local Lighting Authorities**.**

10.6.2.5. A project to migrate from the mainframe computer system, which stores lighting inventory data, was completed on 1/10/04. Digitisation of associated asset plans is now well progressed with over 90% of cable network plotted on the Mayrise GIS system. This has enabled faults to be more readily identified by all users of the system.

10.6.2.6. We currently work to the CSS code of practice and we are now designing in accordance with the BS5489-1:2013 (CEN) on new schemes. We are under trial for two types of reflex non-illuminated bollards but this is DfT approved.

10.6.3. **Sustainability**

10.6.3.1. The objectives are:

- Procure and manage energy consumption in a sustainable manner.
- Give environmental concern due regard when delivering the service.

10.6.3.2. Whilst we have a policy of all-night lighting, certain lamps are capable of being dimmed. This facility has been introduced on traffic routes under the PFI contract. In addition Part Night Lighting has also been introduced for most residential areas.

10.6.3.3. Norfolk County Council applies an Environmental Lighting Zone policy to its own lighting where specifically in dark landscape areas and conservation areas restrictions are imposed on the optical properties of lanterns to minimise ‘sky glow’ or ‘spill light’. This policy is reflected in the street lighting PFI contract.

10.6.3.4. The lighting zones, as illustrated on the map in Appendix C(viii), are:

10.6.3.4.1. - Rural dark landscapes

  In rural dark landscapes ‘white’ light sources with a minimum glare class of G4 will be used for all new lighting and all replacement lighting.

10.6.3.4.2. - Market Towns and existing well-lit villages

  In market towns and existing well-lit villages ‘white’ light sources with a minimum glare class of G3 will be used for all new lighting and all replacement lighting schemes in:

- Conservation Areas

  Lighting schemes visible from Conservation Areas

  Lighting schemes on the edge of the town/village, which are visible from the rural dark landscape area.

10.6.3.4.3. - The urban areas and their suburbs

  In the urban areas and their suburbs a white light source with a minimum glare class of G2 will be used for all new and replacement lighting.

10.6.3.5. Local Conservation Officers will be consulted where new or replacement lighting is proposed in conservation areas to take into account the need to preserve and enhance the character and appearance of the individual area.

10.6.3.6. For further advice on street lighting environmental issues, refer to the 'Highway Corridor' document and policy database.

10.7. Lifecycle Cost Analysis

10.7.1. Routine

10.7.1.1. Currently we hold an inventory of street lighting equipment and electrical and structural condition data.

10.7.1.2. From 2008/09 we have been using the PFI contract unitary charge payments and the PFI credit income as the basis of the street lighting budget.

10.7.1.3. We currently utilise the following strategy to maintain these assets.

- All lighting stock over 25 years old to be replaced or otherwise brought up to relevant standard in a 5 year Core Investment Programme Period. Replacement or repairs as necessary to all remaining lighting stock to bring up to relevant standard by year 15. Maintenance based upon planned inspection or reactive response throughout the 25 year contract period to ensure 5 years residual life throughout the stock at contract end.

10.7.2. Highways Maintenance Expenditure (Routine Budget) Street lighting and illuminated signs

2014/15	Actual Spend	
Street lighting & illuminated Signs	Energy	£2,252,367.91
	PFI costs	£6,276,501.42
	Maintenance – Rt	
	Maintenance – Repair	
	Maintenance – Replacement	
	Surveys/Testing	
Total		£8,528,869.33

2015/16	Actual Spend	
Street lighting & illuminated Signs	Energy	£2,055,522.90
	PFI costs	£6,360,538.00
	Maintenance – Rt	
	Maintenance – Repair	
	Maintenance – Replacement	
	Surveys/Testing	
Total		£8,416,060.90

2016-17	Actual Spend	
Street lighting & illuminated signs	Energy	£2,216,628.06
	PFI Costs	£6,336,064.00
	Maintenance – Rt	
	Maintenance – Repair	
	Maintenance – Replacement	
	Surveys/Testing	
Total		£8,552,692.06

2017-18	Actual Spend	
Street lighting & illuminated signs	Energy	£2,127,554
	PFI Costs	£6,455,796
	Maintenance – Rt	
	Maintenance – Repair	
	Maintenance – Replacement	
	Surveys/Testing	
	Misc	£52,064
Total		£8,635,414

2018-19	Original Budget	
Street lighting & illuminated signs	Energy	£2,080,800
	PFI Costs	£6,864,730
	Maintenance – Rt	
	Maintenance – Repair	
	Maintenance – Replacement	
	Surveys/Testing	
Total		£8,945,530

10.8. Service Levels

10.8.1. There are currently two previously statutory indicators, BV 215a & b, for Street Lighting relating to the response in rectifying faults. These will no longer be statutory indicators from 2008/09 but our targets as outlined below will remain. There is no condition indicator for columns.

10.8.2. In summary our targets are:

- Rectification of Street Lighting Faults non Distributor Network Operator (former BV 215a)
- Rectification of Street Lighting Faults Distributor Network Operator (former BV 215b)

10.8.3.

	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19
215a									
Actual	4.67	4.35	4.77	4.33	3.54	3.78	5.64	4.78	
Target	4	4	4	4	4	4	4	4	4
215b									
Actual	15.57	7.11	18.08	19.28	17.65	14.84	8.88	41.27	
Target	21	21	21	21	21	21	21	21	21

10.8.4. **Risk**

10.8.4.1. **Related to Service Levels**

10.8.4.1.1. Risk – Failure to achieve BV 215a Target for 18/19

10.8.4.1.2. Impact = 3 x Likelihood= 2 = 6 medium risk

10.8.4.1.3. Risk – Failure to achieve BV 215b Target for 18/19

10.8.4.1.4. Impact = 3 x Likelihood = 2 = 6 medium risk

11. Vehicle Activated Sign (VAS) Lifecycle Management Plan

11.1. This asset grouping comprises all VA signs that are owned by the County Council as the Highway Authority.

11.2. Physical Parameters

11.2.1. The following table shows the VAS assets owned by Norfolk County Council within each district. These units are now being maintained under the Street Lighting PFI Contact and the number of VAS has reduced slightly from last year due to data checks when these units were added to Amey's Mayrise system. Some signs supplied by Westcotec are not vehicle activated but were assumed to be VAS at the time. Inventory data April 2017.

District		Number
1	North Norfolk	82
2	West Norfolk	99
3	Breckland	91
4	Norwich City	28
5	Broadland	83
6	Gt Yarmouth	36
7	South Norfolk	93
	Total	512

11.3. Lifecycle Options

11.3.1. Creation and Acquisitions

11.3.1.1. Creation and Acquisition is the result of one of two means:

- The Casualty Reduction Partnership
- Schemes designed for safety improvements

11.3.1.2. Growth of the stock increases the energy and maintenance costs to the service.

11.3.1.3. In the past year the number of signs has increased by around 4%.

11.3.2. Renewal or replacement

11.3.2.1. Individual elements are normally replaced but this strategy may change as the stock matures. Upon any actual damage or degradation to a traffic sign, its replacement should be considered in line with national guidance, which seeks to reduce clutter. Current local member approved practice is to undertake a risk based assessment of signs in need of replacement to ascertain whether the sign is still needed.

11.3.3. **Upgrading**

11.3.3.1. The opportunity to update the technology employed is reviewed on a county-wide basis.

11.3.4. **Non Asset Options**

11.3.4.1. Non asset options have been considered for this group. The last formal consideration was during the Best Value Review in 2001.

11.3.4.2. Managing Demand

11.3.4.2.1. It is believed that those sites that would most benefit from a VAS have already been installed. However they are popular and effective.

11.3.4.2.2. To reduce the growth of the stock the casualty reduction partnership are promoting the use of mobile VAS units known as SAM (Speed Activated Message) vehicles.

11.3.4.2.3. These vehicles are used to target locations of local concern. They enable the sites to be assessed and the impact of a temporary SAM to be measured.

11.4. Lifecycle Treatment Options

Do Minimum	These activities are the routine maintenance tasks carried out to ensure safety and maintain standards for users. • **Bulk clean and change.** • **Electrical testing.** • **Repair accident damage.** • **Structural testing of columns. Once the stock matures to over 12-year from installation.**
Long Life	Replace and upgrade as they become life-expired

11.5. Sign - Routine Maintenance Activities

11.5.1. **Frequency of Maintenance**

11.5.1.1. One annual maintenance visit will be carried out and a report supplied in electronic format. The inspection shall include:

Activity Type	Activity	Service standard
Preventative	Inspection	A Visual Inspection of all detectors, sign faces and miscellaneous items. Sign and detector to be checked for alignment and adjusted as required. Trim foliage and plant growth as permitted in the contract. (Street Lighting PFI Contact).
	Clean	A Clean of the sign face and detector using clean water only, in accordance with manufacturer's recommendations. (Street Lighting PFI Contact).
	Structural Inspection	Visual Structural Inspection of post and bracket supports to VAS. Any Sign supports in excess of 12 years of age shall be inspected. This shall be carried out in accordance with TR22 – ILE Technical Report on Column Corrosion. (Street Lighting PFI Contact).
	Electrical Inspection	A Visual Electrical Inspection shall be carried out *(annually)* and any faults shall be corrected and a full test carried out in accordance with BS7671 IEE Wiring Regulations. The electricity board termination shall be examined and the fuse size recorded. Any RCD fitted shall be tested using a trip/test facility. Any sustainable equipment installed such as solar power or wind generation is to be inspected and the battery age/condition recorded. (Street Lighting PFI Contact).
	Electrical Test	As-required or 6-yearly Electrical Inspection and Test will be carried out for the sign and any associated network in accordance with BS7671 IEE Wiring Regulation. (Street Lighting PFI Contact).
	Complete replacement	Westcotec to replace any VAS where it is deemed to be un-economic to repair. The similar replacement VA sign will be replaced F.O.C. (Street Lighting PFI Contact).
	Traffic Management	(Street Lighting PFI Contact).

11.6. Vehicle Activated Signs – Objectives and Response

11.6.1. Safety

11.6.1.1. The objectives are:

- Identification of risks to users
- Separation of potential traffic conflicts
- Keep all traffic signs legible, visible and effective as far as possible at all times in relation to the road use and traffic speeds

11.6.1.2. A 2-hour response will be required to any incident as specified by Norfolk County Council within contract hours or as an out-of-hours call-out. This would normally be the result of a road traffic accident, wires exposed or any other similar dangerous occurrence.

11.6.1.3. Vegetation potentially obscuring road signs should be recorded during safety inspections of carriageways, footways and cycle routes, and treated accordingly.

11.6.2. Serviceability

11.6.2.1. The objective is to:

- Contributes to ease of use
- Contributes to network integrity

11.6.2.2. One annual maintenance visit is carried out see 11.5.1.1.

11.6.2.3. All test certificates and inspection reports shall be in a standard format.

11.6.2.4. Normal response for any other reported fault will be 5 working days.

11.6.2.5. We will remove graffiti placed on any of our highway assets which is considered to be racist or otherwise offensive. We will do so as soon as reasonably practicable, depending on its nature and location, but within 10 days of being observed or reported.

11.6.2.6. All faults will be logged on the Amey/Yotta MAYRISE database and response time will commence from time of entry. Out-of-hours calls or urgent responses will be phoned to the attending engineer or fault operative directly.

11.6.3. Sustainability

11.6.3.1. The objectives are:

- Support of sustainable transport mode
- Contribute to economic development
- Heavy traffic routing can optimise maintenance.

11.6.3.2. For further advice on signage environmental issues, refer to the *'Highway Corridor'* document and policy database.

11.7. Lifecycle Cost Analysis

11.7.1. Routine

11.7.1.1. Currently we hold an inventory of VAS. Amey has now added an updated VAS inventory to their Mayrise Database.

11.7.1.2. Signs and posts
- Annual maintenance inspection, cleaning and testing
- Replaced as necessary due to individual wear and tear or RTA.

11.7.1.3. We do not hold condition data on the individual signs or columns as they are not yet 12-years old. They are inspected upon safety inspections and those requiring treatment prioritised for replacement depending upon the severity of the defect of the location.

11.7.1.4. **Routine Budget**

2014/15	**Actual Spend**
Routine works	£55,000
Energy	£2,102
Total	£57,102

2015/16	**Actual Spend**
Routine works	£60,000
Energy	£2,195.10
Total	£62,195.10

2016/17	**Actual Spend**
Routine Works	£60,000
Energy	£3,066.94
Total	£63,066.94

2017/18	**Actual Spend**
Routine Works	£60,000
Energy	
Total	
2018/19	**Original Budget**
Routine Works	£60,000
Energy	
Total	

11.8. Service Levels

11.8.1. We have standards relating to defect response and maintenance visits. These standards will now be the same as other equipment under the street lighting PFI Contract.

11.9. Risk

11.9.1. Financial

11.9.1.1.
- Risk – Insufficient Budget / Overspend

11.9.1.2. Budget based upon inventory, lifecycle planning and actual spend over last 5 years.

11.9.1.3. Impact = 1 (overspend up to £100,000) x Likelihood = 2 (Unlikely) = 2 low risk

11.9.2. Operational

11.9.2.1.
- Risk - The ability to deliver the required standards and liability

11.9.2.2. We have a proven inspection regime in place.

11.9.2.3. Impact = 5 (liability in 3rd party claim) x Likelihood (Rare) = 1 = 5 low risk.

12. Traffic Signals Lifecycle Management Plan

12.1. The Intelligent Transport System (ITS) traffic signals asset delivers a public facing and safety critical service whilst managing a number of risks.

12.2. Traffic signal installations are safety critical and correct operation is paramount to provide vital facilities for vulnerable highway users. Well maintained signals make a major contribution to improving network efficiency and reducing congestion and delay. Poorly maintained signals could compromise highway safety, increase congestion and impact the local economy.

12.3. These assets are designed to:

- Separate conflicting traffic movements
- Aid permeability of the network
- Maximise capacity of the network
- Support sustainable transport modes

12.4. The signals convey information to highway users in a manner which is clear, both by day and by night. Our primary aim is to ensure that they are effective and useable.

12.5. Physical Parameters

12.5.1. This asset group includes signal controls at junctions and crossings.

12.5.2.

District	Junction	Pelican	Puffin	Toucan	Other	Total
North Norfolk	8	1	10	1	0	20
Kings Lynn and West Norfolk	37	1	9	11	0	58
Breckland	11	2	6	11	0	30
Norwich	72	7	47	25	10	161
Broadland	18	3	13	9	1	44
Great Yarmouth	28	0	13	7	1	49
South Norfolk	12	0	3	13	2	30
Total	186	14	101	77	14	392

12.6. Lifecycle Options

12.6.1. Creation and Acquisition

12.6.1.1. Creation/Acquisition/Upgrading are major works that create a new asset or works that upgrade or improve an existing asset beyond its existing capacity or adds new facilities. These fall into 2 broad areas:

- County Council schemes
- Private developer schemes

12.6.1.2. County Council schemes: Traffic signals are generally installed in association with Traffic Engineering or safety schemes as part of the capital programme.

12.6.1.3. Developer schemes: Some signals are installed as a result of development of retail, industrial or residential land uses.

12.6.1.4. Growth of the stock of traffic signal installations is an issue for the Authority. The growth in stock increases the day to day maintenance burden on the staff and the contractor and also increases the energy costs of the service.

12.6.1.5. Instation equipment within ITS control and server rooms are to be moved and refreshed as part of County Hall North Wing refurbishment.

12.6.1.6. Since 1993 the total number of signal installations has grown by 153, the number of traffic signal junctions has grown by 46 and the number of crossings by 107.

	1993	2017	Increase
Traffic Signal Junctions	140	186	33%
Crossing Facilities	97	204	110%
Total	237	390	65%

12.6.2. Renewal or Replacement

12.6.2.1. As traffic signals age their component parts go out of production and stocks of spares diminish. Older controllers require trained staff to maintain them and sustaining these skills within a workforce is a challenge. The IEE issued guidance that ideally signal controllers should be no more than 15 years old. In Norfolk we have from experience set our TAMP standard as signal controllers to be no more than 20 years old.

12.6.2.2. In addition we have also adopted 30 years as the standard for street furniture.

12.6.3. Upgrading

12.6.3.1. Upgrading of facilities at signals takes place as a result of schemes funded from the LTP or from developer contributions.

12.6.3.2. Annual programme derived from:

- LTP, other capital programmes and priorities derived from other safety or traffic engineering projects.
- KPI Number of traffic signals operational, which monitors the down time of all installations and identifies those sites that fail to meet the requirement to be operational for 99% of the time.

12.6.4. **Disposal**

12.6.4.1. It is uncommon for signals to be taken out of use. Removal of signal assets will normally only occur as a result of other safety or traffic engineering projects. We review all site towards end of their controller life and it the local environment of technology has changed then the type of crossing could be modified, for example, the use of Zebra crossings in place of signalised crossings or removed.

12.6.4.2. When equipment is taken down which is in good condition it is stored and re-used.

12.7. Non Asset Options

12.7.1. **Managing Demand**

12.7.1.1. The demand for signals is driven by the increasing use of the car and the desire to provide safe crossing facilities for vulnerable users.

12.7.1.2. The provision of signalled facilities is costly and in all cases non-signalled options are considered.

12.7.1.3. Demand has been managed by the County Council using the following methods:

- An assessment system exists whereby requests for new pedestrian crossings are assessed and prioritised.
- Schemes linked to strategies or policy
- Feasibility studies

12.7.2. **Amending Standards**

12.7.2.1. The Traffic Signs Regulations and General Directions 2016 came into force on 22nd April 2016. As of this date, statutory Type Approval previously required under Direction 56 ceased and TOPAS Product Registration became live for new product registrations for all such traffic control equipment.

12.7.2.2. The major factor justifying the use of signals is safety of the users. All schemes undergo a safety audit process.

12.7.3. **Lifecycle Treatment Options**

12.7.3.1. There are two issues which impact on treatment options for this asset group. Sets of signals become obsolete when spare parts can no longer be obtained. This can happen some years before they cease to function.

12.7.3.2. The other major factor is the state of underground cables, which can degrade over time. At all signal installations fully ducted cable networks are being provided together with pole retention sockets permitting easy renewal of the cable network without the need for civils assistance.

Do Minimum	Preventative and reactive treatments are ‘Do Minimum’ forms of treatment aimed at keeping the signals in operation.
Medium Life	Refurbishment and limited replacement of street furniture to extend life of installation. Treatments include fitting of long life backing boards, exchange of push button units, retro fitting LED signal aspects and replacement of long extension brackets with cranked poles.
Long Life	The main work done to prolong signal life and reduce future costs is the installation of fully ducted cable networks. This allows for more cost-effective replacement in the future.

12.7.4. **Routine Maintenance Activities**

12.7.4.1. Routine maintenance is the regular on-going day to day work that is necessary to keep assets operating, including instances where portions of assets fail and need immediate repair to make operational again. A 7-year maintenance contract began in 2014/15 with potential 3 + 2 year extensions.

12.7.4.2. The routine works undertaken on traffic signals have been sub-divided into activities, objectives and response arrangements (12.7.5).

12.7.4.3. Reactive activities are by their nature unplanned and occur in response to sudden changes, whist the other activities are carried out in a planned manner.

12.7.4.4. Maintenance is undertaken with regard to the Roads Liaison Groups ‘Management of Electronic Traffic Equipment - A Code of Practice – September 2011’and Highways Agency guidelines TD24/97.

12.7.5. **Traffic Signals Activities**

Activity Type	Activity	Service Standard	2011 Code of Practice
Preventative	Lamp changing	Bulk change of halogen lamps at annual intervals. Bulk change of tungsten filament lamps and florescent tubes annually.	Bulk changed before exceeded normal specified life.
	Lens cleaning	Annually during bulk change.	Yearly
	Internal Equipment	Remote Monitoring	Remote Monitoring in place
Condition Monitoring	Routine Inspection	Operation and physical condition inspection annually.	TD24/97 gives further guidance items 1-12 of table 2.2 at
Condition Monitoring Cont.	Periodic Inspection	Internal/external inspection and testing of operation and condition annually by maintenance contractor, as detailed in Highways Agency guidelines TD24/95.	At periods not greater than 12 months
	Electrical testing	3 yearly intervals.	At least 5 yearly.
Reactive	Repair of faults	In accordance with maintenance contract In addition There are priority sites with a 2 hour response required 24 hours a day 7 days a week.	As detailed in the Highways Agency guidelines TD24/97
	Premature lamp failures.	Replaced on failure in accordance with maintenance contract. All traffic signals are remotely monitored.	As detailed in the Highways Agency guidelines TD24/97.

12.8. Traffic Signal Maintenance - Objectives and Response

12.8.1. Safety

12.8.1.1. The objectives are:

- Separation of potential traffic conflicts
- Protect vulnerable highway users

12.8.1.2. Traffic signals, pedestrian and other signal controlled crossings, enable the separation of potential traffic conflicts and are a key contributor to the safety of vulnerable road users.

12.8.1.3. Ensure that equipment and systems do not harm our staff, contractors, members of the public or others that may come into contact with the in-station or out-station equipment.

12.8.2. Serviceability

12.8.2.1. The objectives are:

- Keep the signals in operation at all times and, where this is not possible, to minimise down time
- Ease of use and efficiency of network
- Contribute to network integrity
- Managing traffic flow & the passage of vulnerable highway users by the use of traffic signals contributing to network efficiency

12.8.2.2. The Departmental Annual Performance Indicator sets a target of 99% of signals operating for 99% of the time.

12.8.2.3. Our response and repair times are generally superior to those suggested as default in the 2011 Code of Practice for Management of Electronic Traffic Equipment and are as follows:

- Urgent faults and Emergencies are Category 1 and benefit from 2 hour response with 16 hour full fix time.
- Warning signs are placed where protracted failure anticipated or when planned maintenance being undertaken. We do not sign for short-term power failure.
- At certain critical junctions, temporary traffic management measures to be installed if signals are likely to be off in excess of one day
- Multiple red lamps on same approach 2 hours attendance / 16 hours full fix time, single red lamp 16 hours / 32 hours full fix time and other lamps up to 3 days.
- Faults – response ranging from Cat 1- 2 hours, Cat 2 - 4 hours, Cat 3 - 16 hours, Cat 4 - 48 hours.
- Signal lenses, regulatory signs and VMS signs should be cleaned once per year.

12.8.2.4. Historic RMS (Remote Monitoring System) is no longer suitable for new installations, communication or monitoring. A trial of Mobi units commenced during 2015/16. This option has continued to be adopted, new remote MOVA sites are now generally being monitored by UTC.

12.8.3. **Sustainability**

12.8.3.1. The objectives are:

- Support sustainable transport modes.
- Minimise congestion and thereby pollution.
- Support the local economy.

12.8.3.2. Traffic Signals and Controlled Crossings aid the permeability of the highway network for sustainable transportation modes and vulnerable highway users.

12.8.3.3. Managing flow reduces congestion and emissions benefiting the local and wider environment.

12.8.3.4. The installation of extra low voltage (ELV) traffic signals has produced savings in energy, installation and future maintenance as well as health and safety benefits. Reduced energy consumption has also contributed to a reduction of CO2 emissions.

12.8.3.5. Several ELV installations have now been installed.

12.8.3.6. The cost of energy is an essential element of expenditure which is not within our control. As the cost of energy rises there is a bigger impact on the HMF. The only mitigation available is the adoption of Extra Low Voltage (ELV) as the Norfolk Standard. It is used where possible within the Traffic Signal asset instead of Low Voltage (LV – 240v) systems which consume more electricity and therefore cost more.

12.8.3.7. ELV signals are now the adopted standard for all new installations. For modifications and upgrades, any additional cost to change from LV to ELV equipment is assessed on a site by site basis

12.8.3.8. A programme of retro fitting extra low voltage (ELV) signal aspects at suitable low voltage (LV) sites was completed 2012.

12.8.3.9. The conversion process consisted of replacing the individual aspects containing existing tungsten halogen lamps with a replacement aspect assembly using LED [light emitting diode] technology. The project on completion delivered 170 converted sites.

12.8.3.10. The total cost of this programme was £695,000. The projected savings were based on a reduction in energy costs (£52k per annum), a reduction in maintenance costs (£20k per annum) and a reduction in CO2.

12.8.3.11. As part of the conversion process, a new lamp switch card was fitted within each controller. This prevented carrying out the conversion on some controller types. Also the signal head body needed to be of a certain type to accept the replacement aspects, so only some installations were suitable for the work which was carried out at all suitable sites.

12.9. Lifecycle Cost Analysis

12.9.1. Routine

12.9.1.1. Currently we hold an inventory of traffic signals equipment.

12.9.1.2. We are still largely using historical data to justify our routine budget for the repairs.

12.9.1.3. We currently utilise the following strategy to maintain these assets.

- Minor or Safety repairs as necessary due to individual wear and tear based upon planned inspection or reactive response

12.9.1.4. **Highway Maintenance Expenditure (Routine Budget) Signals**

2014/15 – Signals	Original Budget	Actual Exp
Maintenance	£700,000	£536,000
Energy	£181,000	£141,000

2015/16 – Signals	Original Budget	Actual Exp
Maintenance	£795,000	£542,00
Energy	£171,000	£152,000

2016/17 – Signals	Original Budget	Actual Exp
Maintenance	£785,000	£515,336
Energy	£161,000	£141,446

2017/18 – Signals	Original Budget	Actual Exp
Maintenance	£585,753	£546,054
Energy	£145,000	£148,651

2018/19 – Signals	Original Budget
Maintenance	£586,500
Energy	£158,500

12.9.2. Structural Maintenance

12.9.2.1. Risk Register for Controller Failure

12.9.2.2. It is recommended in the 2011 Code of Practice for Management of Electronic Traffic Equipment that Authorities should develop local standards based on fitness for purpose to provide the level of service required, and assessment of the risk of this being compromised by failure of the signal or crossing.

12.9.2.3. The impact of failure will increase with traffic and pedestrian volume and the link in carriageway, cycle route or footway hierarchies

12.9.2.4. Traffic signal installations are generally considered to have a service life of about 15 years. Department for Transport rules oblige manufacturers to keep parts for each design of controller for 10 years after manufacture ceases. In practice they are available for longer than this. Manufacturers recommend changing controllers within or at ten years after they become obsolete because of the nature and rapid development of electronic components. Replacement is therefore regarded as necessary within 15 years as faults will become increasingly difficult to repair thereafter.

12.9.2.5. In addition to the controller the poles, heads, underground cables, ducting, inspection chambers, vehicle detector loops may all need replacing.

12.9.2.6. In 2007 a Risk Register for Controller Failure was used to identify and prioritises those controllers at most risk of failure through age and obsolescence and this assessment was used to develop the backlog replacement programme.

12.9.2.7. The key maintenance characteristics of controller age, current production status, number of similar controllers maintained under the contract and spares availability are key considerations.

12.9.2.8. A user risk rating derived from site characteristics such as speed limit, junction complexity and visibility is used to prioritise schemes with a similar maintenance risk.

12.9.2.9. Condition is also derived from safety/service inspections with those requiring treatment prioritised for replacement depending upon risk assessment system previously detailed.

12.9.2.10. Of further concern is the number of early sites that were not provided with a full network of ducts and chambers. Also, many early sites used clay or pitch fibre ducts that are now deteriorating. In the event of a major cable failure or in instances where there are no further spare cores available then the ability to draw new cables will be compromised and will inevitably increase down time.

12.9.2.11. Schemes are then developed around whole-life costing, but the funding available may mitigate this.

12.9.2.12. Controller age is currently the predominant factor when considering serviceability and likelihood of failure due to the inevitable problems of component deterioration, repairs support and spares availability.

12.9.2.13. Our service level is to have no traffic signal controllers more than 20 years old and this measure is part of our Asset Management Strategy performance measures see App H.

12.9.2.14. This service level will need to be reviewed in advance of 2019 to that it is still relevant due to improved technological robustness in the stock from the late-1990. The latest advances in controller design and technology mean these can be readily replaced.

12.9.2.15. Street furniture condition, poles, heads and other above ground equipment, as well as the risk of prolonged failure due to cabling issues and the anticipated additional risks to users of all modes will be considered in the review.

12.9.3. **Budget Optimisation**

12.9.3.1. To ensure Best Value, opportunities are identified where possible to carry out replacement/upgrade works in conjunction with other schemes. However current budget allocations dictate that any funding/contribution to such schemes reduces the ability to deliver the schemes identified by the Risk Register.

12.9.3.2. Prioritising replacement: based on the Risk Register for Controller Failure considering anticipated reliability against affordability within the available budget constraints was the chosen option.

12.9.3.3. A Project Board is reviewing the objectives, deliverables and methodology of the Traffic Signals Replacement Project.

12.9.4. **Ex-BV 165 Disabled Facilities at Pedestrian Crossings**

12.9.4.1. Although the BV165 national indicator ceased to be reportable in 2008 NCC has adopted it as a Local Performance Indicator to ensure the provision of disabled facilities is maintained.

12.9.4.2. Where sites are newly installed or existing sites are substantially altered they are installed to these standards. There is a local exception at Dereham Road / Old Palace Road in Norwich where the push button equipment is continually damaged by car transporters.

12.10. Service Levels

12.10.1. There are no statutory indicators identifying the condition of traffic signal assets.

12.10.2. The local indicators we monitor in relation to condition are-

12.10.2.1.
- 100% of traffic signals operational for 99% of time. This target was increased from a target 99% of traffic signals with the introduction of the new maintenance contract
- Controller age more than 20 years

12.10.3. Assuming completion of the backlog programme a Local Performance Indicator will need to be adopted thereafter to identify those controllers which are greater than 20 years old, this being identified as the maximum permissible age without undue risk of failure.

12.10.4.

Year	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
controller > 20 years	8	16	15	17	13	18	30	28	31	20

12.10.5. The indicators we monitor in relation to response (customer service)

- Signals Cat 1 - 2hr attend / 16hr full fix time compliance – target 100%
- Signals Cat 2 - 4hr attend /16hr full fix time compliance – target 100%

12.10.6. We meet the recommendations in the 2011 Code of Practice for Management of Electronic Traffic Equipment which represents best practice. This is a Good level of Service.

12.11. Risk

12.11.1. Related to Service Levels

12.11.1.1. Safety

12.11.1.1.1. Risk – Failure to comply with target Cat 1 (100%)

Impact = 1 x Likelihood = 1 = 1 Low risk

12.11.1.1.2. Risk – Failure to comply with target Cat 2 (100%)

Impact = 1 x Likelihood = 1 = 1 Low risk

12.11.1.2. Sustainability (Financial)

12.11.1.2.1. Risk – Insufficient Budget / Overspend

Budget based upon inventory, lifecycle planning and historical actual spend.

Impact = 1 (overspend up to £100,000) x Likelihood =2 = Risk 2 low risk

12.11.1.3. Serviceability

12.11.1.3.1. Risk – Controllers 20 years or older by 31/03/2018 11 no. = 2.8%

Impact = 2 x Likelihood = 2 = 4 Low risk

12.11.1.3.2. Risk – Failure to have the Number of traffic signals operational for 99% of time

Impact = 2 x Likelihood = 2 = 4 Low risk

12.11.1.3.3. Risk - The ability to deliver the required standards and liability

We have a proven highway inspection regime in place.

Impact = 5 (liability in 3rd party claim) x Likelihood = 1 = Risk 5 low risk.

12.12. Backlog

12.12.1. Members have approved the KPI number of controllers over 20 years as the service level.

12.12.2. Any negative movement against the service level will be considered a backlog and this demonstrated by the difference in the cost of carrying out the works.

13. UTC/PC SCOOT Systems - Operational Efficiency and Monitoring Systems - Lifecycle Management Plan

13.1. These assets, by making the most effective use of traffic signals, are designed to:

- Maximise the capacity of the network
- Aid permeability of network
- Support sustainable transport modes
- Improve travel and transport
- Help to make Norfolk a safe place

Our primary aim is to ensure that they are maintained, effective, up to date and fully operational.

13.2. Physical Parameters

13.2.1. This asset group includes the various systems hardware and software together with the instation and outstation data transmission equipment including BT circuits and MESH radio to maximise the effectiveness of the traffic signals network. The systems custodians are the ITS team.

13.2.2. The systems are:

UTC/PC SCOOT - Used to monitor/control and optimise traffic flow efficiency. Includes SCOOT software.

RMS - Used to monitor isolated sites.

13.2.3. The individual elements are used in differing locations as shown in the following table:

System	Hardware	Software	Location
UTC/ PC SCOOT	2x server PCs	V32.8-3	County Hall
RMS MOVA	1x server PC	V42.0 V11.04 V6.0	
MICRO SIMULATION	1x server PC	SCOOT LINK	

13.3. Lifecycle Operations

13.3.1. Creation and Acquisitions

13.3.1.1. Complete new systems are rarely introduced but enhanced/new facilities to existing systems are introduced as technology develops.

13.3.2. **Replacement or Renewal**

13.3.2.1. These systems have maintenance and/or software upgrade contracts in place allowing us to keep up to date with latest facilities and improvements.

13.3.2.2. Siemens advised NCC in 2017 that the Norfolk UTC servers should be replaced at the earliest opportunity as the XP and Server 2003 operating systems are no longer supported. Replacement of the UTC and SCOOT system server equipment will be refreshed during the 2018-19 financial year as part of North Wing refurbishment works. NCC's now default position on server infrastructure is to bring the hardware in-house on a 'virtualised' server environment. Siemens have been approached and discussions suggest they can accommodate this position. Benefits include:

- Likely revenue savings as hardware maintenance comes in house.
- Due to the virtualised server environment fewer severs are required to run all systems, hence reduced maintenance liabilities.
- ITS will come under the support of IMT utilising both the NCC data network and its security policies, protocols and expertise.
- Improved system access and software functionality providng greater service mobility through remote logins to UTC from corporate laptops either on NCC campus or over the corporate VPN (off site).

13.3.2.3. Some disadvantages which will require consideration and mitigation:

- Increased intermediary resource for fault management and fault rectification between third party supplier and NCC. This includes any networking / Firewall changes and hardware / system faults.
- Current IMT generic support levels are insufficient for these critical traffic light control systems. Improved SLA and support will need to be agreed between IMT and ITS. This will include bank holiday and critical weekend standby.
- Third party 24hr remote access to all applicable virtualised servers will be required to allow updates and fault investigation/rectification. Firewall rules will need managing to ensure continued connectivity and any future NCC firewall and Network changes will need to ensure ITS systems are considered as a priority.

13.3.3. **Upgrading**

13.3.3.1. UTC/SCOOT control strategy

Besides upgrading as technology develops, there are other issues:

13.3.3.1.1. - Maintaining and implementing new control strategies to ensure optimum network performance

13.3.3.1.2. • Maintaining and updating the UTC timetable

13.3.3.1.3. • New software releases contain enhancements such as a congestion management, improved modelling of pedestrian crossings, bus priority etc. which need to be evaluated and adopted as necessary

13.3.3.1.4. • UTC/SCOOT coverage - consideration needs to be given to whether installations would benefit from being under UTC/SCOOT control. The availability of UTMC outstations and ADSL comms opens up the opportunity for cost effective SCOOT control outside the major urban areas if necessary

13.3.3.1.5. • Review – evaluation of each UTC traffic signal controller and site complements the above issues to ensure that equipment is appropriate and is working as effectively as possible.

13.3.3.1.6. • Strategic Traffic Light Priority (STLP) has been made available on all SCOOT regions within Norwich, King's Lynn and Great Yarmouth, this enables late running buses to request/receive an extension or recall. From 2016 the VPN tunnel used for transmitting messages to the SCOOT server has some networking faults with the majority of tracking messages not being received within UTC, it is under continued investigation. Additionally there is some remedial work required to complete the network of virtual trigger positions.

13.3.3.1.7. • Some localised priority (at locations not within the SCOOT network) has been introduced enabling hurry calls to be implemented by signature profile detection.

13.3.3.2. Software

13.3.3.2.1. • Annual software updates are received as part of the maintenance support contracts. As software developments continue the manufacturer/suppliers are unable to support older operating system software/hardware and new equipment becomes essential.

13.3.3.2.2. • It is difficult to predict/budget for future upgrades as developments are mostly in the hands of the supplier. This tends to result in a 'reactive' response.

13.3.3.2.3. • The UTC/ PC SCOOT and RMS system are UTMC V2.0 compliant to future proof developments and ensure compatibility with other UTMC compliant equipment, making adding new systems and functionality possible. There are currently no new UTMC versions available that we need to consider upgrading to.

13.3.3.3. Disposal

13.3.3.3.1. The disposal of the UTC system is not an option while there continues to be a need to operate traffic signals under SCOOT control. Old Tele 12 PCs and servers will be disposed of under the WEEE Directive

13.4. Non Asset Options

13.4.1. Managing Demand

13.4.1.1. Complaints and observations that fall outside the scope of the daily ITS network management function are recorded under OCAAT and financed separately e.g. Capital financed projects.

13.5. Treatment Options

Do Minimum	'Reactive' - Do minimum to keep equipment's updated with latest facilities e.g. software upgrades. If existing equipment's cannot support new facilities, become obsolete, non-maintainable, or requires expansion to accommodate more equipment then hardware replacement becomes necessary.
Medium Life / Long Life	'Predict and Prevent' – Advanced knowledge of equipment life span, future developments, impending obsolescence and implementing replacement programmes have prevented major issues arising in the past.

13.6. Routine Maintenance Activities

13.6.1. UTC/PC SCOOT System

Annual software updates, software support and maintenance contracted with systems manufacturer Siemens. The UTC/PC SCOOT system has the latest software and enhanced facilities.

13.6.2. OPCIS and RMS Systems

13.6.2.1. OPCIS – This is Dynniq's Fault Management System which interfaces to the CDMF system for faults from UTC and RMS.

13.6.2.2. RMS - Annual software updates and maintenance contracts with systems manufacturer Siemens. The RMS has the latest software and enhanced facilities however this software is no longer being developed by Siemens and notice has been given on RMS support. As a result outstation communication systems require changing. Discussions are at an advanced stage with incumbent traffic signal equipment suppliers to implement suitable solutions.

13.6.3. BT cabinets - BT Lines

13.6.3.1. BT's responsibility to maintain.

13.6.3.2. No service standards only reactive maintenance, repair upon failure by BT.

13.6.3.3. All Analogue BT lines for TELE 12 outstations have been ceased and all BT infrastructure decommissioned after completion of the MESH Network installation.

13.6.3.4. The BT Net fibre connection carries UTC communications. This change was in line with ITS Comms review to consolidate communication. The Red Hat Linux CDMF Firewall also now protects the UTC system and the communication for UTMC signals installations benefits from an end communication via a stable and faster connection with a much higher SLA with BT of 4 hours. An alternative but equivalent circuit will be required before the relocation of the ITS Server and Control Room from the North Wing to ensure continued connectivity for all associated incoming and outgoing network traffic.

13.6.4. **Digital Communications Project**

13.6.5.1 Dynniq have completed the installation of a 'Mesh' network in Norwich, Kings Lynn and Great Yarmouth which has replaced analogue BT lines and provided ongoing revenue savings. This now allows for the decommissioning of old Siemens TLC12 communications equipment and associated hardware which will be completed during 2018

13.7. Operational Efficiency and monitoring systems – Objectives and Response

13.7.1. **Safety**

13.7.1.1. The objectives are:

- Ensure that equipment and systems do not harm our staff, Partners, contractors or others that may come into contact with the in-station equipment.

13.7.2. Controls are:

- Equipment room is included in PAT visual inspections.
- Smoke detector fitted within equipment room.
- Security – restricted, access pass on entrance door.
- Air conditioning to maintain optimum temperature.
- No drinks/food allowed within the equipment room

13.7.3. **Serviceability**

13.7.3.1. The objectives are to:

- Keep systems up to date and operational at all times and where this is not possible minimise down time
- Maintain service = minimising congestion, journey time, delay, pollution

13.7.3.2. Siemens UTC Maintenance Contract: 5 hour response to Urgent faults, 10 hour response for non-urgent faults. Contract hours – Mon to Fri 0800-1700. This meets current operational levels.

13.7.3.3. The equipment room within the ITS centre is supported by UPS, backup generator, 24/7 monitoring to ensure continuity of service.

13.7.4. **Sustainability**

13.7.4.1. The objectives are:

- Minimise delay, congestion, stops and pollution for all types of road user to protect and sustain the environment.
- To manage the road network and help movement around the network. This applies to vehicle traffic but equally applies to cyclists and pedestrians.
- Supports/improves sustainable travel and transport.
- To help make Norfolk a safe place to live and work.
- To assist in meeting Norfolk County Council's statutory duty, under the Traffic Management Act 2004.

13.8. Lifecycle Cost Analysis

13.8.1. **Routine**

13.8.1.1. We hold an inventory of UTC/ITS equipment.

13.8.1.2. **Highway Maintenance Expenditure (Routine Budget) Signals**

For 2014/15 budgets definitions were further refined to more accurately reflect specific systems support costs

2014/15 – ITS Systems	Actual Spend £74,000
2015/16 – ITS Systems	Actual Spend £65,000
2016/17 – ITS Systems	Actual Spend £49,000
2017/18 – ITS Systems	Actual Spend £49,000
2018/19 – ITS Systems	Forecast Budget £43,000

13.8.2. **Structural**

13.8.2.1. We have no routine programme for replacement of ageing hardware. .

13.8.2.2. The risk of hardware system failure increases with equipment age. Downtime in the event of failure will increase if spares become scarce. This may happen before the equipment ceases to function. However, Siemens typically give 2-3 years advance notice of pending equipment obsolescence. This advance notice is essential for financial planning.

13.8.2.3. Strategy will either be proactive e.g. upgrading equipment on a predetermined and regular programme, or reactive e.g. we can easily and quickly obtain replacement equipment in the event of major failure to keep downtime to an absolute minimum. Backup routines mean that reinstallation of systems data to the new hardware should be trouble free.

13.8.2.4. The existing UTC/SCOOT system is PC based, spares are readily available. The risk of system failure due to ageing equipment will be minimised upon the server refresh planned for implementation during 2018-19. There are two server PCs for the UTC/ PC SCOOT system. If one should fail the other (by operator intervention) can maintain service. Remote access to the UTC/PC SCOOT, RMS and Micro Simulation servers by Siemens allows for quick diagnostic and rectification of problems.

13.8.2.5. An additional server and accompanying software were provided as part of the upgrade to enable micro simulation based on real SCOOT data.

13.8.2.6. UTMC compliant Outstations will 'future proof' the UTC communications network against withdrawal of analogue lines by BT. All TC12 OTUs have been replaced.

13.9. Service Levels

13.9.1. There are no statutory indicators identifying the condition/maintenance of these system(s). However, industry feedback recommends that electronic equipment should be replaced after 5 years to minimise risk of potential failure

13.9.2. There is no Code of Practice relating to these system(s).

13.9.3. These systems enable 100% of on-street equipment's to be automatically monitored for faults. This functionality reduces the frequency needed for regular inspections.

13.10. Risk

13.10.1. Financial

13.10.1.1.
- Risk – Insufficient Budget / Overspend

Budget based upon inventory and historical actual spend.

Impact = 1 x Likelihood = 3 = 3 low risk

13.10.1.2. The UTC/RMS system is currently maintained by Siemens under a contract which is quoted and agreed each year. As Siemens no longer hold the traffic signals maintenance contract it is possible that Siemens may increase these costs – costs have not increased for 4 years. The contract scope will reduce when RMS is removed and this year's revenue costs are reduced as a result of TC12 decommissioning after the completion of the digital communications project.

13.10.1.3. In common with all other service, maintenance and support contracts, discussion are currently taking place with Siemens to identify further cost savings that can be delivered within the existing agreement.

13.10.2. **Operational**

13.10.2.1.
- Risk - The ability to deliver the required standards and liability

Impact = 5 x Likelihood = 2 = 10 medium risk

13.10.2.2. Siemens Poole has in the past heavily relied on Siemens Field Services to maintain equipment under this contract, specifically TC12 faults which have a 5 hour response. This will not be the case when the Siemens Field Services contract ends.

14. Telematics - CCTV Lifecycle Management Plan

14.1. These assets are used in collaboration with other traffic control systems to assist with monitoring of traffic flows, congestion and incidents to:

- Maximise the capacity of the network
- Identify network deficiencies
- Aid monitoring of the network
- Aid permeability of network
- Provide real time information on the network

The purpose of maintenance is to ensure that they are effective, up to date and fully operational.

14.2. Physical Parameters

14.2.1. This asset group includes all equipment and communications links in the CCTV systems maintained by the Intelligent Transport Systems (ITS) Team. The individual elements are used in differing locations as shown in the following table.

14.2.2.

Supplier	Item	Number	Location	Position
TYCO	Control PC	1	County Hall	
TYCO	Main matrix	1		
TYCO	PC monitor	1		
TYCO	Engineers monitor	1		
TYCO	19” Display monitor	4		
TYCO	47” Display monitor	4		
TYCO	50” Display monitor	1		
TYCO	Control panel	1		
TYCO	Control work station PC	2		
TYCO	Laptop PC	1		
TYCO	ADSL Router	2		
TYCO	Quad unit	1		
TYCO	Video codecs	14		
TYCO	Digital switch	1		
TYCO	Image capture server	1		

TYCO	3G Server	1	County Hall	
TYCO	RDC Software licence	22		
TYCO	De-multiplexer	1		
TYCO	Display work station PC	4		
TYCO	Hard drive TB recorder (RAID)	1		
TYCO	Mosaic server	1		
BT	ADSL circuits	2		
TYCO	Analogue PTZ Camera	13	Norwich	
TYCO	PTZ Camera column	13		
TYCO	Wireless camera	2		Lamp column mounted
TYCO	IP PTZ Camera	2	Norwich	Postwick Hub and Showground Junction
TYCO	IP PTZ Camera	2	Costessey Queens Hills (due late 2018)	Monitoring of Rising Bollards
TYCO	3G RDC Camera	22	County wide	Column mounted
TYCO	IP PTZ Camera	7	Kings Lynn	1 no. lamp
TYCO	Camera column	6		column mounted
TYCO	IP PTZ Camera	4	Gt. Yarmouth	
TYCO	Camera column	4		
TYCO	PTZ Camera	1	Saddlebow Bus Gate	Column mounted
TYCO	Camera column	1		
TYCO	PTZ Camera	1	Heacham	
TYCO	Camera Column	1		
TYCO	PTZ Camera	1	Dereham	

TYCO	Camera Column	1		
TYCO	PTZ Camera	1	West Runton	
TYCO	Camera Column	1		
TYCO	Lamp Column Mounted Radio Link	2	Diss	
TYCO	IP PTZ Camera	1		
TYCO	Cabinet & Router	1		
TYCO	IP PTZ Camera	1	Bradwell	Shares Traffic Signal router – CCTV mounted on 6m pole
BT	Analogue Fibre Video circuits	13	Norwich	
BT	ADSL circuits	5	King's Lynn	
BT	ADSL circuits	4	Gt. Yarmouth	
BT	ADSL circuits	5	Norwich	
BT	Video Link circuits	2	Norwich / King's Lynn	
BT	Control Link circuits	2		
NCC	Power sockets	54	County wide	
NCC	RDC Security Bracket	3	County wide	

14.3. Lifecycle Operations

14.3.1. Creation and Acquisitions

14.3.1.1. Assets are acquired by ITS through new developer funded schemes and other funding streams.

14.3.1.2. Completely new systems are rarely introduced but enhanced/new facilities are introduced to existing systems as technology develops. The Instation system should be replaced/renewed every five years. Server and PC infrastructure becomes obsolete quickly. Operating Systems become redundant as support is

dropped and ICT hardware becomes obsolete through Operating System incompatibility.

14.3.1.3. Additional cameras may be added to locations chosen to maximise coverage and to assist with network management including potential for monitoring conditions during emergencies, snow events, flooding etc.

14.3.1.4. A review with KLWNBC was undertaken exploring potential CCTV asset sharing but the costs were found to be prohibitive to NCC.

14.3.1.5. Any new CCTV assets will utilise wireless and/or internet solutions. In particular CCTV cameras, where possible for economical purposes, will share internet connectivity with other assets such as traffic signalised equipment through wireless or physical links.

14.3.1.6. Two New ADSL IP cameras are expected to be brought online this financial year. Located at the Queens Hills Bus Gates in Costessey to monitor the Rising Bollards at either end of the dedicated bus lane.

14.3.2. **Replacement or Renewal**

14.3.2.1. These systems have service contracts in place allowing us to maintain the existing asset. Many of the ITS camera stock are however obsolete as parts and spares are no longer available. Cameras are currently being run to failure and replacement is considered at this time. Some proactive replacement may be beneficial to ensure continued network coverage.

14.3.2.2. Kings Lynn cameras were upgraded in the previous financial year. The new cameras utilise IP Broadband communications directly (without any need for encoding). In Kings Lynn the new cameras have replaced old Kilostream analogue cameras. This investment offered a significant payback return of under three years and will provide modern more useful equipment. The recovered equipment from Kings Lynn has also enabled failed units in Norwich to be repaired, extending operational life in this financial year. cameras

14.3.2.3. The Tyco Server Operating System will be upgraded in the move the ITS department. Three servers are currently running Windows XP and two are running Windows Server 2003 Operating Systems

14.3.3. **Upgrading**

14.3.3.1. Manufacturer/suppliers are unable to support older operating system software/hardware as it becomes obsolete and new equipment will become essential. This is an absolute requirement due to the upcoming move of the ITS department, currently estimated for late 2018/early 2019.

14.3.3.2. The current analogue matrix is now obsolete. It is difficult to interface new technologies and does not provide the ability to share images easily. Gradual camera upgrading is removing the need for this obsolete equipment. It is not possible to relocate the existing BT Analogue fibre connections to the expected new ITS location. This will require the upgrade of 14 Analogue PTZ cameras in this financial year to enable the location move for ITS.

14.3.3.3. The Instation system was upgraded to Tyco's 'Mosaic' viewing software and installed in 2012 after investigations to assess the costs/benefits of upgrading the current systems to operate on a fully digital platform in 2011. This upgrade supported the aims and objectives of the Image Sharing initiative and allows full system integration of RDC cameras. Since this time, CCTV cameras in Kings Lynn and Great Yarmouth have been upgraded to IP, with the remaining Norwich cameras to be undertaken this financial year.

14.3.3.4. A Business Case exists to develop and deliver the 'County Wide Image Sharing' Project.

14.3.3.5. Discussions were held with the Kings Lynn and West Norfolk Borough Council whom have their own CCTV system. It was believed NCC and KLWNBC would jointly benefit from the sharing of video images. It does appear however that there is a limited appetite to share imagery, particularly as ITS based cameras in Kings Lynn are not deemed to be in locations of use to KLWNBC. The limited capability and scope for upgrading the existing system, together with interoperability issues, is also a factor.

14.3.3.6. The North Wing refurbishment works requires the replacement of physical servers. The default position of NCC is to use virtualised servers owned by NCC for use by the CCTV system's software. An alternative option to replace with dedicated servers remain depending on contractor discussions.

This continuing work will be benefited by the Great Yarmouth and Kings Lynn camera upgrades but will still require the replacement of Norwich City camera assets and the removal of much in-station hardware.

14.3.3.7. Image sharing with Norwich City Council has now ceased. This is because the existing and expensive legacy analogue system is in the process of being decommissioned An alternative IP solution should be achievable but may not be required due to the reduced manning of Norwich City Council's CCTV centre. If a solution is still deemed to be necessary a cost sharing exercise for the implementation of any project and for the ongoing revenue costs will need to be undertaken and agreed. This can be discussed once the Norwich City Council new CCTV system is also deployed.

14.3.3.8. A new communications network was installed throughout Norfolk's urban areas during 2014 and 2015 to reduce communications costs for traffic signal equipment. This network can also be utilised to carry other IP based assets such as CCTV with upgrade to segregate IP traffic It is intended to investigate the possibility to place some or all IP cameras on the IP mesh system. This will be dependent on the financially viability and the possibility to further reduce ongoing communication costs.

14.3.4. Disposal

14.3.4.1. Disposal becomes a consideration if new technology/systems become available offering significant benefits for the cost investment and would be the subject of a separate study. Upon any renewal of equipment the contractor is requested to hold old equipment in stock for parts or to dispose of it within industry standards.

14.3.4.2. Disposal of legacy CCTV columns will become a financial issue when they reach end-of-life. There is at present a 4 year structural testing regime (subject to change based on contractor recommendation) which shall identify any need such as removal or replacement.

14.4. Non Asset Options

14.4.1. Managing Demand

14.4.2. The demand for additional cameras is driven by the need to enhance network coverage to include areas with increasing congestion and to monitor new developments.

14.4.3. The major factor justifying the use of additional cameras is to assist system operators in their network monitoring role.

14.5. Compliance with the Traffic Management Act and monitoring of traffic offences may require additional cameras.

14.5.1. Amending Standards

14.5.2. The use and control of images presents data protection issues which are currently managed through regular review. This is a requirement for the GDPR act which comes in to force in May 2018

14.5.3. There are currently no specific issues of concern as video images are not routinely recorded or stored. This policy may be reviewed if it assists in the recovery of costs where assets are damaged for example, any recording will be subject to PIA and adherence to GDPR requirements

14.5.4. The existing policy sets out the requirements and procedures specific to ITS operations and practices to ensure legal requirements are met and to ensure that staff are fully conversant with their responsibilities. This will be reviewed with the move to the new ITS location to ensure Policy is complaint with GDPR

14.6. Treatment Options

Do Minimum	'Reactive' - Do minimum to keep equipment fully operational. If existing equipment cannot support new facilities, become obsolete, non-maintainable, or requires expansion to accommodate more equipment then hardware replacement becomes necessary.
Medium Life	'Predict and Prevent' – Advanced knowledge of equipment life span, future developments, impeding obsolescence and implementing replacement programmes have prevented major issues arising in the past.
Long Life	Traffic Management Act causing excessive traffic management costs for maintenance and repair. Business case required for alternative access method e.g. wind down units/hinged poles

14.7. Routine Maintenance Activities

14.7.1. Maintenance contracts are held with suppliers

14.7.2. A preventative maintenance inspection of equipment (visual check of columns), is carried out by the maintenance contractor annually. Camera heads are now inspected biannually following advice from Supplier/Maintainer.

14.7.3. Column structural testing were undertaken in 2014 and further testing will be completed /2018. Further testing will be carried out every 3 years or sooner at the advice of the testing contractor. The 2017– 2018 inspection was expanded to include Kings Lynn and Great Yarmouth based columns, not previously required due to the column age.

14.7.4. **Telematics - CCTV Activities**

Activity Type	Activity	Service Standard
Preventative	Operational monitoring of system and components	Availability - Consideration should be given to developing LPI
Condition Monitoring	Routine Inspection	Annual Inspection (except cameras)
	Electrical testing	Annual inspection
	CCTV column structural testing	Camera columns >30yrs inspection required in 2018 and re-inspection dates every 3 years.
Reactive	Repair of faults	Next day attendance for urgent faults

14.7.5. **BT Equipment/Circuits**

14.7.5.1. It is BT's responsibility to maintain phone line equipment.

14.7.5.2. BT Major Customer service standards apply.

14.7.5.3. BT dedicated circuits currently provided and maintained for the CCTV system at an annual cost of £22K which has reduced from £36K with the removal of Kings Lynn Analogue Fibre lines, -this is expected to be reduced if MESH communication is an option which could further reduce ongoing costs.

14.7.5.4. ADSL (Broadband) lines provided and maintained by BT for the CCTV system along with Vodafone Sim costs at an annual rental of £13K.

14.8. CCTV - Operational Efficiency and monitoring systems – Objectives and Response

14.8.1. Safety

14.8.2. The objectives are:

- Ensure that equipment and systems do not harm our staff, Partners, contractors, members of the public or others that may come into contact with the equipment.

14.8.3. Serviceability

14.8.4. The objectives are:

- To keep systems up to date and operational at all times and where this is not possible to minimise downtime.

14.8.5. TYCO Service Agreement: attend within 3 working days for faults.

Contract hours: Mon to Fri 08:45-17:15.

14.8.6. Sustainability

14.8.7. The objectives are:

- Assist in minimising delay, congestion and pollution for all types of road user
- Assist in monitoring the effect of changes to the network
- Monitoring the effectiveness of traffic control strategies

14.8.8. Structural Maintenance

14.8.9. There is no programme for replacement of ageing hardware, replacement of equipment can be undertaken on a ‘spend to save’ basis.

14.8.10. The risk of hardware system failure increases with equipment age. Downtime in the event of failure will increase if spares become scarce. This may happen before the equipment ceases to function.

14.8.11. In addition to the camera heads and instation electronics we are responsible for the maintenance of the camera mounting columns.

14.8.12. The original 9, 10 and 12 metre high UTC columns which were installed in 1979 were tested by an external assessor in 1997. In March 2010, August 2014 and 2018. Eight of the original nine columns and concrete pads were tested. Report shows both to be in good condition. In 2014, on the recommendation of the 2010 inspection, camera columns were given a sub-surface bitumastic coating to prevent excessive rusting at the most susceptible point. As further columns increase in age these will also be subject to regular structural testing. When it becomes unsustainable to continue structural testing alternative solutions will need to be considered. One of the solutions being utilised and considered for

future changes and new equipment is to utilise existing street lighting columns for our permanent cameras, provided they meet safety requirements and positional needs.

14.8.13. Discussions are required with the street lighting contractor to ascertain the frequency and level of testing power sockets, and to assess if such testing could be undertaken as an extension to the terms of the street lighting PFI contract.

14.8.14. Due to ageing BT communications infrastructure in Norwich, and the inability to repair the associated equipment cameras in Norwich can no longer be repaired. The recovered Kings Lynn equipment is being used to extend the life of cameras until replacement in this financial year to IP cameras to facilitate the move of ITS.

14.9. Lifecycle Cost Analysis

14.8.1. **Routine**

14.9.1. An inventory of CCTV equipment is held.

14.9.2. We are still largely using historical data to justify expenditure from the routine budget for repairs.

We currently utilise the following strategy to maintain these assets

- Minor or safety repairs are undertaken as necessary due to individual hardware 'wear and tear' based upon planned inspection or reactive response.

14.10. Highway Maintenance Expenditure (Routine Budget) CCTV

14.10.1

2014/2015	Actual Spend
CCTV	£90K

2015/2016	Actual Spend
CCTV	£105k

2016/2017	Actual Spend
CCTV	90k

2017/2018	Actual Spend
CCTV	95K

2018/2019	Original Budget
CCTV	77k

14.10.2. In order to manage costs, the hire of lifting platforms and traffic management associated with access to camera heads are not paid for as part of the existing maintenance contract. This cost can often be greater than the costs of repairs.

14.10.3. Drop-down hinged columns are now used for new schemes where existing street furniture cannot be utilised. This reduces Traffic Management costs. Where existing street furniture can be used significant installation costs are avoided.

14.11. Service Levels

14.11.1. There are no statutory indicators identifying the condition of CCTV assets.

14.11.2. Consideration should be given to developing a Local Performance Indicator (LPI) measuring service availability

14.12. Risk

14.12.1. RDC camera integration, -if an alternate supplier is sought to provide ongoing CCTV in the new ITS location, it may be likely that the RDC cameras cannot be fully supported or integrated as this is a TYCO manufactured product.

14.12.2. Ageing columns now subject to regular routine testing. When inspections advise so these columns will need remedial works, replacement or outright removal.

14.12.3. 3G airtime costs becoming more expensive with increasing RDC usage and possible increase in unit numbers.

14.12.4. **Financial**

14.12.4.1.
- Risk – Insufficient Budget / Overspend

Budget based upon inventory, lifecycle planning and historical actual spend.

- Impact = 1 x Likelihood = 2 = 2 low risk

14.12.5. **Operational**

14.12.5.1.
- Risk - The ability to deliver the required standards and liability

We have a proven highway inspection regime in place.

- Impact = 5 x Likelihood = 1 = 5 medium risk.

15. Telematics - Automatic Access Control Lifecycle Management Plan

15.1. This asset group currently comprises Automatic Rising Bollard-equipment, aiming to:

- Improve journey time reliability for public transport
- Aid permeability of the network
- Support sustainable transport modes

Our primary aim is to ensure that the equipment is effective, up to date and fully operational.

15.2. Physical Parameters

15.2.1. This asset group includes all equipment and communication links for Automatic Access Control (rising bollards) maintained by the Intelligent Transport Systems (ITS) team.

15.2.2. ITS policy requires CCTV to be provided at all automatic bollard installations (these are maintained in accordance with Telematics-CCTV Lifecycle Plan (2.14)). An exception has been made for A149 Stalham Fire Station, where remote monitoring of operation by RMS is considered sufficient.

15.2.3. The individual elements are used in differing locations as shown in the following table.

Supplier	Item	No.	Location	System
ATG	Bollards	1	Stalham	Fire Station access
	Key Fobs	27		
	Readers	1		
ATG	Bollards	4	Saddlebow, King's Lynn	Bus gate
	Transponders	166		
	Proximity Cards	101		
	Readers	2		
ATG	Bollards	4	Harding's Way, King's Lynn	Bus gate
	Transponders	27		
	Proximity Cards	102		
	Readers	4		

15.2.4. The system custodians are the ITS team.

15.3. Lifecycle Operations

15.3.1. Creation and Acquisitions

15.3.1.1. Creation, acquisition and upgrading are major works that create a new asset or works that upgrade or improve an existing asset beyond its current capacity or adds new facilities. These fall into 2 broad areas:

- County Council schemes
- Private developers

15.3.1.2. County Council schemes - Assets are generally acquired through Capital or other funding streams.

15.3.1.3. Developer schemes - Some assets are installed as a result of development of retail, industrial or residential land uses.

15.3.1.4. Growth of ITS asset stock is an issue for the Authority. The growth in stock increases the day to day maintenance burden on the staff and the contractor and also increases the energy costs of the service.

15.3.1.5. Instation equipment within ITS control and server rooms will be moved as part of County Hall North Wing refurbishment.

15.3.1.6. New Bus gates utilising ANPR technology are likely to be completed this year at Queens Hills in Costessey. The works are being completed for a consortium as a requirement for a housing development in the locality. ITS will adopt these assets upon completion and continue with their maintenance and administration of an ANPR database. This location will also include two cameras for network and fault monitoring.

15.3.2. Renewal/Replacement

15.3.2.1. The main issues for all systems are:

- Age and suitability of hardware
- Developments in software and hardware
- System expansion
- Changes and developments in communications technology
- Emerging technologies
- Continuing availability of Sietag equipment and transponders

At present it is considered that an annual review of this service area is sufficient to guide investment decisions.

15.3.2.2. As Automatic Access Control equipment ages their component parts go out of production and stocks of spares diminish. Older controllers require trained staff to maintain them and sustaining these skills within a workforce is a challenge. The IEE issued guidance that ideally signal controllers should be no more than 15 years old. In Norfolk we have set our standard age for signal controller replacement at 20 years.

15.3.3. **Upgrading**

15.3.3.1. There are no specific timescale for hardware equipment replacement. This is driven by faults and equipment failure. However, there will be a time when manufacturers/suppliers are unable to support older systems, as they become obsolete new equipment will then become essential.

15.3.3.2. New systems and equipment to be UTMC/RTIG compliant with open protocols to ensure compatibility and competitiveness of suppliers.

15.3.3.3. A new key fob system including 6 fobs was installed at Stalham in 2014 as some of the existing fobs were unserviceable and obsolete.

15.3.3.4. NCC Area office and Fire service were contacted in 2014 to confirm the equipment at Stalham was still deemed necessary.

15.3.4. **Disposal**

15.3.4.1. The disposal of the system(s) is not considered to be an issue at present. This will only become a consideration if new technology/systems become available offering significant benefits for the cost investment and would be subject of separate study.

15.3.4.2. The bollard installations at Reid Way / Bryggen Way, Kings Lynn were taken out of operation in 2008/09 due to changes in bus routes. Equipment has been removed from street except for a feeder pillar. Therefore issue with power supply & electrical safety checking requirement. The equipment will be decommissioned and removed by others.

15.4. Non Asset Options

15.4.1. **Managing Demand**

15.4.1.1. The demand for access control system equipment is driven primarily by a desire to be able to improve the service reliability provided by bus operators.

15.4.1.2. In future an assessment of the value of service reliability and monitoring this information against cost should be undertaken.

15.4.1.3. The cost of communications equipment necessary to monitor equipment and maintain it may become an issue.

15.4.1.4. The demand for other ITS systems is primarily driven by the need to manage the highway network resulting in:

- Better operating road networks with less disruption and less congestion
- Quicker and more reliable journey for all transport modes
- Less disturbance and pollution for communities

15.4.2. **Amending Standards**

15.4.2.1. Standards are developing and a key issue is interoperability of different manufacturer's equipment.

15.5. Treatment Options

Do Minimum	'Reactive' – Do minimum to keep equipment fully operational. If existing equipment cannot support new facilities, become obsolete, non-maintainable, or requires expansion to accommodate more equipment then hardware replacement becomes necessary.
Medium Life/ Long Life	'Predict and Prevent' – Advanced knowledge of equipment life span, future developments, impeding obsolescence and implementing replacement programmes have prevented major issues arising in the past.

15.6. Routine Maintenance Activities

15.6.1. Routine maintenance is the regular ongoing day to day work that is necessary to keep assets operating, including instances where portions of assets fail and need immediate repair to make operational again.

15.6.2. Reactive activities are by their nature unplanned and occur in response to sudden changes, whist other activities are carried out in a planned manner.

15.6.3. **Auto rising bollards Activities**

Activity Type	Activity	Service Standard
Preventative	Operational monitoring of system and components utilising CCTV	Continuous monitoring via visual displays and outputs including CCTV
Condition Monitoring	Routine Inspection	Bi Annual Inspection
	Remote Monitoring & CCTV	Continuous monitoring via visual displays and outputs
	Electrical testing	Annual Inspection. 5 yearly ELI test
Reactive	Repair of faults	In accordance with Maintenance Contracts

15.6.4. **BT Equipment/Circuits**

15.6.4.1. BT's responsibility to maintain.

15.6.4.2. BT Major Customer service standards apply.

15.7. Telematics - Automatic Access Control, Operational Efficiency and monitoring systems Objectives and Response

15.7.1. **Safety**

15.7.1.1. The objective is to:

- Ensure that equipment and systems do not harm staff, contractors, and members of the public or others that may come into contact with the in-station or outstation equipment.

15.7.2. **Serviceability**

15.7.2.1. The objective is:

- To keep systems up to date and operational at all times and, where this is not possible, minimise down time.

15.7.2.2. First line maintenance/fault assessment is undertaken by the signals contractor. Repairs are carried out by equipment supplier on Labour, Time & Materials basis. Charges are regularly reviewed to ensure on-going cost effectiveness of this method of service delivery.

15.7.2.3. During 2007/08 CCTV was installed adjacent to the Saddlebow Road bollards to improve operational monitoring and improve fault response times.

15.7.2.4. During 2011 CCTV was installed adjacent to the Harding's Way bollards to improve operational monitoring and improve fault response times.

15.7.2.5. During 2013 Fault rate increased at Hardings Way due to vandalism addressed by identifying and implementing operational change to bollard software.

15.7.2.6. During 2014 the same modification to enable bollards to reset following force down was implemented at Saddlebow Road

15.7.3. **Sustainability**

15.7.3.1. The objectives are to:

- Support sustainable transport modes
- Minimise congestion and pollution
- Improve journey time reliability for public transport
- Maximise bus patronage

15.7.4. **Structural Maintenance**

15.7.4.1. We currently have no programme for replacement of ageing Access Control hardware.

15.7.4.2. The risk of hardware system failure increases with equipment age. Downtime in the event of failure will increase if spares become scarce. This may happen before the equipment ceases to function.

15.7.4.3. We need to consider the development of a strategy to be either proactive e.g. upgrading equipment on a predetermined and regular programme or reactive e.g. we can easily and quickly obtain replacement equipment in the event of major failure to keep downtime to an absolute minimum.

15.7.4.4. Systems are increasingly dependent on transmission infrastructure for operational monitoring and are susceptible to faults beyond our control.

15.8. Lifecycle Cost Analysis

15.8.1. **Routine and Structural**

15.8.1.1. We hold an inventory of equipment on each system.

15.8.1.2. We utilise the following strategy to maintain these assets.

- Minor or safety repairs as necessary due to individual hardware wear and tear based upon planned inspection or reactive response.
- Those requiring more significant treatment identified from safety / routine / service inspections prioritised for replacement, depending upon likelihood of failure and severity of the defect, within existing budgets.

15.8.1.3. These costs are currently funded from the ITS routine maintenance budget

15.8.1.4. Developer funded schemes benefit from commuted sums payments which may contribute to future maintenance, although they are not currently ring fenced for this purpose.

15.8.2. **Highway Maintenance Expenditure (Routine Budget)**

2014/15	Original Budget	Actual Spend
Automatic bollards	£13,000	£13,000

2015/16	Original Budget	Actual Spend
Automatic bollards	£14,500	£7,200

2016/17	Original Budget	Actual Spend
Automatic bollards	£10,200	£11,331

2017/18	Original Budget	Actual Spend
Automatic bollards	£11,500	£14,772

2018/19	Original Budget
Automatic bollards	£16,000

(1) includes damage by third parties – some monies may be recovered where claims successful
(2) maintenance agreement put in place
(3) additional site installed in Kings Lynn during March 2011
(4) additional site to be installed in Costessey during 2018
(5) Continued procurement of transponders available from manufacturer
(6)

15.9. Service Levels

15.9.1. There are no statutory indicators identifying the condition of automatic rising bollard assets.

15.9.3. Maintenance agreements with the manufacturer are in place to cover planned preventative visits.

15.10. Risk

15.10.1. Financial

15.10.1.1.
- Risk – Insufficient Budget / Overspend

Budget based upon asset list, lifecycle planning and historical actual spend.

Impact = 1 x Likelihood = 2 = Risk 2 low risk

15.10.2. Operational

15.10.2.1.
- Risk – The ability to deliver the required standards and reliability

We have a proven highway inspection regime in place.

Impact = 5 x Likelihood = 1 = Risk 5 medium risk

16. # Telematics - Car Park Guidance and Information Systems Lifecycle Management Plan

16.1. This asset group currently comprises Car Park Guidance and Information System equipment to:

- Maximise the capacity of the network
- Aid permeability of the network
- Provide Real Time Travel Information to the public

Our primary aim is to ensure that the equipment is effective, up to date and fully operational.

16.2. ## Physical Parameters

16.2.1. This asset group includes all equipment and communications links for the Norwich Car Park Guidance and Information System maintained by the Intelligent Transport Systems (ITS) team.

16.2.2. The individual elements are used in differing locations as shown in the following table.

Supplier	Item	No.	Location	System
Swarco	VMS System PC	1	UTC Centre	Car Park Guidance & Information System (CPGI)
	Radio Modem	1		
	PGS software	1		
	DZKs	2	Norwich	
	Count controllers	6		
	VLS Signs	24		
	Full Colour Matrix VMS Signs	3		
Motts	Operator Adaptor PC	7	Car Parks	
	Operator Adaptor PC	1	County Hall	
	Spare Adapter PC	1		
Swarco	Base Radio Equipment	2	County Hall (Roof)	
	Modems	1		

16.2.3. The systems custodians are the ITS team.

16.3. Lifecycle Operations

16.3.1. Creation and Acquisitions

16.3.1.1. Creation/Acquisition/Upgrading are major works that create a new asset or works that upgrade or improve an existing asset beyond its existing capacity or adds new facilities. These fall into 2 broad areas:

- County Council schemes
- Private developers

16.3.1.2. County Council schemes: Assets are generally acquired through LTP2, Capital or other funding streams

16.3.1.3. Developer schemes: Some assets are installed as a result of development of retail, industrial or residential land uses.

16.3.1.4. Growth of the stock of ITS assets is an issue for the Authority. It increases maintenance costs and pressure on staff resource.

16.3.2. Real Time Information Systems

16.3.2.1. The Dambach / Mott MacDonald Car Parking Guidance and Information System/Common Data Viewer (CDMF) are used to provide and extract parking information from car parks and park and ride sites in Norwich. The system has been linked so that the information can be used strategically by:

- Driving on street variable message signs (VMS) to display available parking spaces
- Providing information on parking availability via the Travel Norfolk Website
- Links to CDMF to allow competition in sign provision.
- Links to CDMF to allow strategic use of data.
- Driver Information Signs at city edge. Highways & PTG purposes.
- Improved information to ITS system Operators
- Development of integrated strategies to assist in network control

16.3.3. Renewal/Replacement

16.3.3.1. The maintenance contractor has flagged components which are no longer in production and identified the limited spares as being a risk. The maintenance provider has notified us that the Processor boards in each sign are no longer manufactured and they (as the system supplier) would also not provide spares to any competitor if we were to employ another company to maintain the system.

16.3.3.2. The main issues for all systems are:

- Age and suitability of hardware
- Developments in software and hardware
- System expansion
- Changes and developments in communications technology
- Emerging technologies

At present it is considered that an annual review of this service area is sufficient to guide investment decisions.

16.3.3.2. During 2015 three signs were upgraded as part of the Transport For Norwich (TfN) City Centre Improvement works in the St Stephens area. These signs now utilise the Norwich Mesh communications network for data transmission.

16.3.3.3. During 2016 the TfN City Centre Improvement Scheme made changes to the Golden Ball Street, All Saints Green and Westlegate area. This scheme required the amendment of 8 signs, which were installed in 2017. 3 of this signs are full coloured RGB matrix signs with scope for utilisation for varied messaging and images as well as car park occupancy data.

16.3.3.4. In-station equipment within the ITS Control Room is required to be moved as part of County Hall refurbishment during 2018-19. This activity has cost implications of around £5k to be funded through the North Wing Refurbishment project. There are likely to be periods of downtime for VMS published data but any mitigations that can be put in place will be implemented to minimise this.

16.3.4. **Upgrading**

16.3.4.1. The upgrading of facilities would take place as a result of a scheme funded from improvements works.

16.3.4.2. The linking of legacy systems to allow strategic use of data is a key issue for highways and PTG systems.

16.3.4.3. There is no specific timescale for hardware equipment replacement. This is driven by faults and equipment failure. However, there will be a time when manufacturer/suppliers are unable to support older systems as they become obsolete and new equipment will then become essential.

16.3.4.4. New systems and equipment to be UTMC/RTIG compliant with open protocols to ensure compatibility and competitiveness of suppliers.

16.3.4.5. The Maintenance contractor has stated to mitigate the risk of the limited number of processor boards in the signs an option would be to replace the Controller and LED Display Boards, this will also allow for the choice of GPRS Communications.

16.3.5. **Disposal**

16.3.5.1. The disposal of the system(s) is not considered to be an issue at present. This will only become a consideration if new technology/systems become available offering significant benefits for the cost investment and would be subject of separate study.

16.3.5.2. Anglia Square, St. Stephens and Riverside Car Parks no longer provide real time data.

16.4. Non Asset Options

16.4.1. Managing Demand

16.4.1.1. The demand for car park guidance equipment is driven primarily by a desire to improve the availability and reliability of real time information in order to direct users to available spaces and to minimise queuing on the approaches to car parks. In future an assessment of the value of service reliability and monitoring this information against cost would be undertaken. The cost of communication and maintenance may become an issue.

16.4.1.2. The demand for other ITS systems is primarily driven by the need to manage the highway network resulting in:

- Better operating road networks with less disruption and less congestion
- Quicker and more reliable journey for all road users
- Less disturbance and pollution for communities
- Improved information to stakeholders

16.4.2. Amending Standards

16.4.2.1. Standards are developing and a key issue is interoperability of different manufacturer's equipment.

16.4.2.2. The Common Data Management Facility (CDMF) using Urban Traffic Management and Control (UTMC) portals with strategic use of data is a core part of the Highways services to become more customer focused.

16.4.2.3. Adopting Real Time Information Group (RTIG) standards will assist in the delivery of real time information for public transport users via on street signs and through systems such as SMS.

16.5. Treatment Options

Do Minimum	'Reactive' - Do minimum to keep equipment fully operational. If existing equipment cannot support new facilities, become obsolete, non-maintainable, or requires expansion to accommodate more equipment then hardware replacement becomes necessary.

Medium Life/ Long Life	'Predict and Prevent' – Advanced knowledge of equipment life span, future developments, impeding obsolescence and implementing replacement programmes have prevented major issues arising in the past.

16.6. Routine Maintenance Activities

16.6.1. Routine maintenance is the regular ongoing day to day work that is necessary to keep assets operating, including instances where portions of assets fail and need immediate repair to make operational again.

16.6.2. Reactive activities are by their nature unplanned and occur in response to sudden changes, whist other activities are carried in a planned manner.

16.6.3. Maintenance contracts are held with suppliers.

16.6.4. **Telematics - Car Park info & Guidance Activities**

Activity Type	Activity	Service Standard
Preventative	Operational monitoring of system and components	Continuous monitoring via visual displays and outputs
	Software updates	Latest versions installed upon availability or with system enhancements
Condition Monitoring	Routine Inspection	Annual Inspection N/A
	Electrical testing	Annual Inspection. 3 yearly ELI test
Reactive	Repair of faults	Next day attendance in accordance with Swarco maintenance contract

16.6.5. **BT Equipment/Circuits**

16.6.5.1. BT responsibility to maintain

16.6.5.2. BT Major Customer service standards apply

16.6.5.3. BT circuits currently provided and maintained:

- Car Park Operators responsible for their individual Broadband connection to the Mott MacDonald CDMF server at County Hall

- BT Net 10mbps connection form CDMF servers at County Hall. (This connection type is likely to change as a result of office relocation during 2018-2019, IMT to provide support and provision).

- BT Broadband circuit in the control room is used for GPRS Comms to Airport P and R Count Controllers which use Vodafone SIM Cards. (This connection type is likely to change as a result of office relocation during 2018-2019, IMT to provide support and provision).

16.6.6. **Radio Transmission system**

16.6.6.1. Public Mobile Radio (PMR) is used for the transmission of data to on street car parking VMS signs and to communicate with the Park and Ride counting equipment, its use being governed by Ofcom for which there is an annual fee.

16.7. Telematics - Car Park Guidance and Information Systems Operational Efficiency and monitoring systems Objectives and Response

16.7.1. **Safety**

16.7.1.1. The objective is to:

- Ensure that equipment and systems do not harm our staff, partners, contractors, members of the public or others that may come into contact with the in station or outstation equipment

16.7.2. **Serviceability**

16.7.2.1. The objective is to:

- Keep systems up to date and operational at all times and where this is not possible minimise down time

16.7.2.2. As a result of feedback from car park operators regarding system reliability and the impact of inaccurate data displayed on signs a standby rota to cover critical weekends and other significant parking periods is provided by ITS staff to receive calls from car park operators to ensure issues are dealt with as soon as possible.

16.7.2.3. Car Park Guidance System (PGS) in station & VMS Signs - maintenance contract is in place with Swarco (2018-2019 £10K).

16.7.2.4. CDMF - system development and support provided by Mott MacDonald (2017 – 2018 £2.8K).

16.7.2.5. ITS now hold a spare car park adaptor PC.(*Adaptor PC's are held at the car parks and interface with the car parking contractor's count system and send data to the instation to be 'pushed' to VMS signs, the CDMF system and the car park information webpage).* Spare PC's are held to enable faster return to normal service in the event of equipment failure, something experienced in

2014/2015 at two sites. These assets have a replacement cost implication of around £4k per unit.

16.7.3. **Sustainability**

16.7.3.1. The objectives are:

- To support sustainable transport modes
- Minimise congestion and pollution
- Information systems used to aid modal shift and minimise congestion
- Encourage most appropriate use of available parking spaces

16.8. Structural Maintenance

16.8.1. We currently have no programme for replacement of ageing hardware.

16.8.2. The risk of hardware system failure increases with equipment age. Downtime in the event of failure will increase if spares become scarce. This may happen before the equipment ceases to function. Future scheme upgrades to take place in 2017 will help to reduce at-risk equipment by two fifths.

16.8.3. We need to consider the development of a strategy to either be proactive e.g. upgrading equipment on a predetermined and regular programme or reactive e.g. we can easily and quickly obtain replacement equipment in the event of major failure to keep downtime to an absolute minimum.

16.8.4. Car Park adapter PCs share third party sites and are subject to the third parties conditions.

16.8.5. Systems are increasingly dependent on BT and radio transmission infrastructure for operational monitoring and control and are susceptible to faults beyond our control. Over the past three years, as part of scheme improvement works eleven signs have been moved to the Norwich MESH network. They are to be working well, future upgrades will likely be migrated to MESH radio communications.

16.9. Lifecycle Cost Analysis

16.9.1. **Routine and Structural**

16.9.1.1. We hold an inventory of equipment on each system

16.9.1.2. Some equipment currently benefits from manufacturer's warranty.

16.9.1.3. We currently utilise the following strategy to

- Minor or safety repairs as necessary due to individual hardware wear and tear based upon planned inspection or reactive response

maintain these assets.

- Those requiring more significant treatment identified safety / routine / service inspections from prioritised for replacement, depending upon likelihood of failure and severity of the defect, within existing budgets.

16.9.1.4. These costs are currently funded from 'routine' maintenance funds.

16.9.2. **Highway Maintenance Expenditure (Routine Budget) Telematics**

2014/15	Original Budget	Actual Spend
Car Park System	£10,000	£9,893

2015/16	Original Budget	Actual Spend
Car Park System	£13,000	£21,026

2016/17	Original Budget	Actual Spend
Car Park System	£15,000	£16,500

2017/18	Original Budget	Actual Spend
Car Park System	£15,000	£13,000

2018/19	Original Budget
Car Park System	£14,000

16.10. Service Levels

16.10.1. There are no statutory indicators identifying the condition of car park guidance and information systems. The Management of Electronic Traffic Equipment, A Code of Practice 2011 offers some general guidance.

16.11. Risk

16.11.1. **Financial**

16.11.1.1. Risk – Insufficient Budget / Overspend

- Budget based upon inventory, lifecycle planning and historical actual spend.

Impact 1 x Likelihood 5 = 5 Medium risk

16.11.2. **Operational**

Risk - The ability to deliver the required standards and liability

16.11.2.1.
- We have a proven highway inspection regime in place.

Impact 5 x Likelihood 1 = 5 medium risk.

17. Telematics - Common Data Management Facility / 'Osprey (CDMF)' Lifecycle Management Plan

17.1. This asset group currently comprises the CDMF equipment and Common Data Viewer(CDV) equipment to:

- Provide Real Time Travel Information to the public
- Improve information for system Operators
- Provide easily assessable data to other staff and departments
- Provide and display data from other systems

Our primary aim is to ensure that the equipment is effective, up to date and fully operational.

17.2. Physical Parameters

17.2.1. This asset group includes all equipment and communications links for the CDMF and CDV maintained by the Intelligent Transport Systems (ITS) team.

17.2.2. The individual elements are used in differing locations as shown in the following table.

Supplier	Item		Location	System
Motts	2 x Viewer HP Laptops (2017)		ITS Centre	Common Data Viewer (CDV)
BT	CISCO 2900 BTNet Router			CDMF (Osprey)
Motts	AdderView CATx1000			
Motts	HP TFT7600RKM Console			
Motts	HP Server Rack 10642G2			
Motts	HP ProCurve 1810G-24 Switch	Switch		
Motts	Netgear ProSafe 8 Port Gigabit switch	Switch		
Motts	HP Proliant DL380 G7 Server CZ2151054D	Database Server		
Motts	HP Proliant DL360 G6 Server CZJ00506MN	Firewall		
Motts	HP Proliant DL360 G7 Server CZJ20601F3	Web Server		
Motts	HP Proliant DL380 G6 Server CZ2000601AE	Application Server		

Motts	HP Proliant DL360 G7 Server	T & T Web		
Motts	HP Proliant DL360 G7 Server	T & T Database		
Motts	3 x Seagate 1TB Hard drive	T & T Backup		
Motts	3 x WD Elements 1TB Hard drive	Database Backup		

17.2.3. The system custodians are the ITS team.

17.3. Lifecycle Operations

17.3.1. Creation and Acquisitions

17.3.1.1. Creation, acquisition and upgrading are major works that create a new asset or works that upgrade or improve an existing asset beyond its existing capacity or adds new facilities.

17.3.1.2. The system is being developed in order to improve the availability and dissemination of real time information across the Authority and other stakeholders.

17.3.1.3. Growth of the stock of ITS assets is an issue for the Authority. The growth in stock increases the day to day maintenance burden on the staff and the contractor and also increases the energy costs of the service.

17.3.2. Real Time Information Systems

17.3.2.1. The Common Data Viewer (CDV) is linked to Mott MacDonald Common Data Management Facility (CDMF) which is linked to other systems and data providers to display real time information.

Currently linked systems include:

- Siemens Urban Traffic Control System
- Car Park Guidance and Information System
- ELGIN roadworks interface
- SMS Roadworks adapter
- Siemens RMS
- Tyco CCTV
- NCC GIS Service

17.3.2.2. The Common Data Viewer is used to display real time information from various systems. The system has been linked so that the information can be used strategically by:

- ITS system operators
- Other staff within the E.T.D Department
- Other Departments within the Authority
- Other stakeholders

17.3.2.3. The SCOOT/UTC system and Mott MacDonald CDMF are being used to provide real time congestion information. The systems are linked so that information can be used strategically.

- Links to CDMF to allow strategic use of data
- Driver Information Signs at city edge. Highways & PTG purposes.
- Improved information to ITS system Operators
- The BT Net fibre connection carries UTC communications. This change was completed in line with the ITS Communication Review to consolidate communications. The Red Hat Linux CDMF Firewall protects the UTC system and the communication for UTMC signals installations which are not part of the new mesh network. This communication benefits from a stable and fast connection with a high 4 hour Service Level Agreement with BT.

17.3.2.4. The CDMF continues to be developed to support the Department and to assist in delivering its duties under the Network Management Act and includes:

- ITS strategy manager
- Mobile VMS signs
- Queue detection with reactive signing
- Centralised fault management
- Asset Management
- Contractor performance monitoring
- CAUFY self-update
- Email facility
- UMS data management
- Real time information to Bus operators on road closures fed by data sets from Highways and TTS via the GIS Service.

17.3.3. **Renewal/Replacement**

17.3.3.1. The majority of the current system's hardware (6 servers) is between 5 and 8 years old. 2 of the server's utilise Redhat Operating Systems and are now out of support as of March 2017. Contractor advice is that server hardware requires replacement at a maximum age of between 5 and 6 years but ideally less. For this business critical system, funding has been given to replace these 6 servers as part of a North Wing refurbishment. To facilitate the move of the ITS Control room from the North Wing these costs are a necessary requirement. The incumbent maintenance contractor estimates the cost of replacing hardware, completing server builds, configuration, data migration and application software upgrades at £93k. It has been decided that the default position for NCC is that server hardware is to be brought in-house and provided by IMT in a 'virtualised' server environment and so the final external costs should be significantly lower.

17.3.3.2. The main issues for all systems are:

- Age and suitability of hardware
- Developments in software and hardware
- System expansion
- Changes and developments in communications technology
- Emerging technologies

17.3.3.3. At present it is considered that an annual review of this service area is sufficient to guide investment decisions.

17.3.3.4. The application and database servers were upgraded in March/April 2012 due to being identified as at risk on the previous year's version of this document. Since this time another hardware replacement cycle requirement has arisen. Servers and systems will be refreshed (and relocated) as part of the North Wing refurbishments works due before April 2019. Future funding will need to be made available for the next hardware and Operating System refresh – Suppliers recommend no more than 5 years.

17.3.3.5. Sybase ASE v15.0.3 is the software that managers the database behind CDMF. Motts McDonald has advised Norfolk County Council that in accordance with their ISO27001 accreditation they are required to inform us of any obsolescence aspects of the system. On 20/5/15 they advised NCC that Sybase ASE is at end of life. A 10K upgrade was implemented in 2016 -2017 as system critical functionality became at risk.

17.3.4. Upgrading

17.3.4.1. The linking of legacy systems to allow strategic use of data is a key issue for highways and PTG systems.

17.3.4.2. There is no specific timescale for upgrading equipment but future technological needs may drive the need to do so.

17.3.4.3. Any new systems and equipment to be UTMC/RTIG compliant with open protocols to ensure compatibility and competitiveness of suppliers.

17.3.5. Disposal

17.3.5.1. The disposal of the system(s) is not considered to be an issue at present. This will only become a consideration if new technology/systems become available offering significant benefits for the cost investment and would be subject of separate study.

17.4. Non Asset Options

17.4.1. Managing Demand

17.4.1.1. In future an assessment of the value of service reliability should be undertaken and this information monitored against cost. The cost of communications and maintenance may become issues.

17.4.1.2. The demand for other CDV applications is primarily driven by the need to manage the highway network resulting in:

- Better operating road networks with less disruption and less congestion
- Quicker and more reliable journey for all road users
- Less disturbance and pollution for communities
- Improved information to stakeholders
- Improved availability of real time data to ITS operators

17.4.2. **Amending Standards**

17.4.2.1. A key issue is to ensure interoperability of different manufacturer's equipment through UTMC protocol compliance

17.4.2.2. The change to allow linking to the Common Data Management Facility (CDMF) using Urban Traffic Management and Control (UTMC) portals with strategic use of data is a core part of the Highways and PTG services to become more customer focused.

17.4.2.3. Adopting Real Time Information Group (RTIG) standards will assist in the delivery of real time information for public transport users via on street signs and through systems such as SMS.

17.5. Treatment Options

Do Minimum	'Reactive' - Do minimum to keep equipment fully operational. If existing equipment cannot support new facilities, become obsolete, non-maintainable, or requires expansion to accommodate more equipment then hardware replacement becomes necessary.
Medium Life/ Long Life	'Predict and Prevent' – Advanced knowledge of equipment life span, future developments, impeding obsolescence and implementing replacement programmes have prevented major issues arising in the past.

17.6. Routine Maintenance Activities

17.6.1. Routine maintenance is the regular ongoing day to day work that is necessary to keep assets operating, including instances where portions of assets fail and need immediate repair to make operational again.

17.6.2. Reactive activities are by their nature unplanned and occur in response to sudden changes, whist other activities are carried in a planned manner.

17.6.3. **Common Data Viewer - Activities**

Activity Type	Activity	Service Standard	Codes of Practice
Preventative	Operational monitoring of system & components	Continuous monitoring via visual displays and outputs	N/A
	Software updates	Latest versions installed upon availability or with system enhancements	N/A
Condition Monitoring	Remote Monitoring	Hosted server & operational systems 24/7 by Motts	N/A
Reactive	Repair of faults	In accordance with Motts support services contract	N/A

17.6.3.1. Maintenance contracts are held with suppliers

17.6.4. **BT Equipment/Circuits**

17.6.4.1. BT's responsibility to maintain.

17.6.4.2. BT Major Customer service standards apply.

17.6.4.3. BT circuits currently provided and maintained:

- BTNet 10mbps (Up to 100mbps available for future expansion) fibre connection. 4 hour SLA.

17.6.4.4. Links via corporate intranet and externally through NCC firewall managed by BT on behalf of ICT.

17.7. Telematics - Common Data Management Facility (CDMF) Operational Efficiency and monitoring systems Objectives and Response

17.7.1. **Safety**

17.7.1.1. The objective is to:

Ensure that equipment and systems do not harm our staff, partners, contractors, members of the public or others that may come into contact with the instation or outstation equipment.

17.7.2. **Serviceability**

17.7.2.1. The objective is to:

- Keep systems up to date and operational at all times and where this is not possible minimise down time

17.7.2.2. CDMF - system development and support provided by Mott MacDonald.

17.7.3. **Sustainability**

17.7.3.1. The objectives are:

- To support sustainable transport modes
- Minimise congestion and pollution
- Use information systems to aid modal shift and minimise congestion
- Maximise bus patronage

17.8. Structural Maintenance

17.8.1. We currently have no specific programme for replacement of ageing hardware however contractor advice is to ensure this is done at least every 5 – 6 years (factors other than time can also be drivers for the need to replace). Funding to replace hardware needs to be secured to ensure continued service standards and to mitigate risk on fundamental ITS Infrastructure. Consideration should be given to provide revenue for this expected 5 year refresh cycle or other alternatives should be considered such as bringing server infrastructure under internal IMT support and maintenance.

17.8.2. The risk of hardware system failure increases with equipment age. Downtime in the event of failure will increase if spares become scarce. This may happen before the equipment ceases to function.

17.8.3. We need to consider the development of a strategy to be either proactive e.g. upgrading equipment on a predetermined and regular programme or reactive e.g. we can easily and quickly obtain replacement equipment in the event of major failure to keep downtime to an absolute minimum.

17.8.4. Car Park adapter PCs share third party sites and are subject to the third parties conditions.

17.8.5. Systems are increasingly dependent on BT and radio transmission infrastructure for operational control and monitoring and are susceptible to faults beyond our control however SLA’s are held with communication providers.

17.9. Lifecycle Cost Analysis

17.9.1. Routine and Structural

17.9.1.1. Currently we hold an inventory of equipment on each system.

17.9.1.2. We currently utilise the following strategy to maintain these assets.

- Minor or safety repairs as necessary due to individual hardware wear and tear based upon planned inspection or reactive response.
- Those requiring more significant treatment identified safety / routine / service inspections from prioritised for replacement, depending upon likelihood of failure and severity of the defect, within existing budgets.

17.9.1.3. These costs are currently funded from ‘routine’ maintenance funds.

17.9.2. Highway Maintenance Expenditure (Routine Budget) CDMF

2014/15	Original Budget	Actual Spend
CDMF	£59,000	£59,000

2015/16	Original Budget	Actual Spend
CDMF	£63,000	£63,000

2016/17	Original Budget	Actual Spend
CDMF	£55,000	£55,000

2017/18	Original Budget	Actual Spend
CDMF	£55,000	£40,000

2018/19	Original Budget
CDMF	£56,000

Includes upgrade and development costs and Fault/Asset Management enhancements.

17.10. Service Levels

17.10.1. There are no statutory indicators identifying the condition of CDMF and CDV assets.

17.10.2. A Local Performance Indicator (LPI) measuring service availability is under consideration.

17.11. Risk

17.11.1. Financial

17.11.1.1.

- Risk – Insufficient Budget / Overspend

Budget based upon inventory, lifecycle planning and historical actual spend.

Impact = 1 (overspend to £100k) x Likelihood =2 = 2 low risk

17.11.2. Operational

17.11.2.1.

- Risk - The ability to deliver the required standards and liability

We have a proven highway inspection regime in place.

Impact = 5 (liability in 3rd party claim) x Likelihood = 1 = 5 low risk

18. Norwich Bus Station Lifecycle Management Plan

18.1. Norwich Bus Station forms part of the major public transport initiative which aims to reduce travel by private car into Norwich City centre and encourage a modal shift towards more sustainable travel.

18.2. The asset group is situated in the city centre between Surrey St and Queens Road, and comprises a 3 storey Terminal building, two roof canopies, 12 operating bus bays, 2 emergency/special event bays and 5 lay over bus bays, paved pedestrian walkways, concrete vehicle surfaces, Information kiosk, CCTV equipment, lighting, bus shelters, safety barriers, automatic gates, passenger lift and some small areas of landscaping.

18.3. The site is owned by Norfolk County Council and opened in its current layout in August 2005.

18.4. From 6 September 2015 Norwich bus station and the Norwich Park and Ride sites have been leased to Konectbus on full repairing leases on a contractual 5 +3 year basis. Routine maintenance is within the lease. Advisory work and estimated cost provision for Konectbus is detailed in App G(x)

18.5. We have to undertake an annual insurance check for the Bus Station to ensure that the tenant holds buildings and contents insurance. We should do this every September.

18.6. Physical Parameters

18.6.1. Vehicle & Pedestrian Areas

18.6.1.1. The vehicle access roads, bus bays and layover bays are constructed from concrete, with thermoplastic road markings identifying the bay locations. These bay markings are not being maintained as Numbered bays have changed to letters and signing is with stands

18.6.1.2. There are raised pedestrian crossings constructed of brick weave paving to enable passengers to cross safely between the main public concourse and the two “islands” of bus bays. Ramp repairs were completed in May 2017 to correct subsidence

18.6.1.3. The pedestrian concourses and walkways are paved with flagstones.

18.6.1.4. The student accommodation in the disused Aviva buildings to the North of the bus station is under construction due to be completed in 2019. This involves access from the bus station through the north boundary and when re-let access from St Stephens through the old BHS building. The vacant plot at the bottom of Surrey Street has been sold and there is currently a planning application for a hotel.

18.6.2. **Closed Circuit Television (CCTV)**

18.6.2.1. Norwich bus station has a digital CCTV system. This operates on a stand-alone basis with all images monitored and recorded in the bus station manager's office within the Travel Centre. There is also a dial in facility to allow remote viewing should Konectbus wish to use this. The system comprises a number of cameras installed at strategic locations. Some of the cameras are fully operational with pan, tilt and zoom facilities, others are fixed cameras. Details of the equipment follows:

- 5 pan and tilt cameras
- 11 further fixed cameras
- 2 Bosch digital recorders
- 2 LCD Monitors

18.6.3. **Terminal Building**

18.6.3.1. The terminal building is a three storey brick and glass construction. Weather protection comes in part from the main canopy although the rear of the terminal building has a solid roof. The building houses offices and equipment for the operation of the bus station and provides customer facilities in the form of public seating, a catering outlet, toilet/baby changing facilities and a ticket/information desk.

18.6.3.2. The second storey is dedicated as office accommodation with a meeting room, a rest room for bus drivers or other staff and the bus station manager's office. The third storey contains the plant machinery that serves the Bus Station. The building has one lift to enable access between the ground and first floors. Floor plans of the Travel Centre building are attached at the end of this section.

18.6.3.3. The terminal building and pedestrian concourse areas are protected from the elements by a PTFE canopy roof. This stretched membrane roof requires annual tensioning and inspection in order to retain its integrity. The other roof structures are constructed from a different system, this does not require tensioning, but does require annual inspection and monitoring.

18.6.3.4. The facilities have to ensure the safety of all users, and act as the control room for the CCTV system. The buildings are alarmed and are staffed between 7am and 7pm Monday to Saturday, and 9am – 5pm on Sundays. The travel centre is closed on bank holidays.

18.6.4. **Barriers & Gates**

18.6.4.1. Pedestrians using the public concourse, walkways and bus bay islands are protected from vehicle movements by safety barriers and automatic gates at each of the boarding points. These operate via an induction loop, activated by the bus as it parks over/departs the induction loop surface.

18.6.4.2. The automatic gates are prone to frequent damage by buses using the facility as they can clip the power units, mounted on the gates as they approach. In the past the repair/replacement costs can be recouped via insurance, but more recently the gates are experiencing intermittent issues which not related to bus action. In 2016 Konectbus installed frames on the gates that protect the control boxes and impact damage has been significantly reduced.

18.6.4.3. If the automatic gates fail, no alternative gate is available so the access points are open and can be used as short cuts. Security Officers police key short cut points at peak times to maintain passenger safety.

18.6.4.4. The gates are presently considered to be an essential part of the safe operation of the bus station, and so must be retained. Obsolescence issues may necessitate a review of this during 2018-19

18.6.5. **Lighting**

18.6.5.1. The bus station is illuminated by a system of street lighting columns and has additional lighting to illuminate the canopy and columns on the bus “islands”. All systems are controlled from a control panel/box at the Travel Centre.

18.6.5.2.

Ref	Watt	Description	Manufacturer	Cat Nr
A	1 x 400 Metal Halide	Column mounted floodlight with wide flood distribution to up-light onto canopy	Holophane Hydrel 7200	7200Y400MT.24050HZ.WFL.YM.WH
B	1 x 70 Metal Halide	Ground recessed luminaire at base of columns	Holophane Hydrel M9420	M9420.AD.70MT6.24050HZ.S.M20
C	1 x 250 Metal Halide	Column mounted luminaire with aluminium reflector and asymmetric light distribution	Holophane Petxina	PET250HTEP.AY.C9

D	1 x 250 Metal Halide	As type ‘C’, but wall mounted.	Holophane Petxina	Luminaire – PET250HTEP.AY.C9 Wall bracket – HEL.WB.60.C9
E	1 x 70 Metal Halide	Column mounted luminaire with aluminium reflector and asymmetric light distribution	Holophane Petxina	PET70CDMT3.AY.C9
F	1 x 38 2D	High frequency luminaire with aluminium body and grill and opal diffuser.	Designplan Bic	BIC382DLXHFC04
G	1 x 26 PL	1000mm high single sided ground mounted bollard with root mounting spike and asymmetric internal reflector	Holophane Denver Bollard	Luminaire - DBL26PL4.RAY.SO. H100.C9.V1 Root spike – DBL.ROOT
I	3 x 1 L.E.D	Ground recessed luminaire with frosted glass cover and ground recessing sleeve.	Holophane LED 3 Series	Luminaire – LED3WH.45D.RD.FR Sleeve – LED.3GRS
J	1 x 70 Metal Halide	Wall mounted luminaire within centre hexagon with wall wash reflector	Holophane Muralux	MUR70HTT4.WW. 3S.C9
K	2 x 58 T8	High frequency batten luminaire with coloured sleeves mounted within glass block columns.	Contractor Choice	-

L	1 x 18 PL	Recessed brick light into path side of ramp wall.	Holophane Senator	SNR18PL2. FLG.C9.D
Type 1 Column/ Bracket	-	8M column with single head 76mm post top mounting	Holophane	PETB.8.1A. PT76. 8P1.C9
Type 2 Column/ Bracket	-	8M column with twin head short side arm bracket for 60mm entry	Holophane	PETB.8.1A. SSA60. 8P1.C9
Type 3 Column/ Bracket	-	Special column with high and low luminaire mountings	Holophane	

18.6.6. **Drainage**

18.6.6.1. The paved areas are drained via gullies into a separation tank under the concourse area which filters out oils before discharging into the highway surface water system. This separation unit requires annual servicing and emptying.

18.6.6.2. The manholes and gullies are set in separate concrete surrounds to prevent cracking permeating to the main bus area. These surrounds need biannual maintenance to check and re-seal the joints and to reseat as necessary.

18.6.7. **Shelters, Seating & Bins**

18.6.7.1. Shelters are provided at each of the 12 bus stands, and the two emergency stands. The shelters ‘Paragon’ supplied by Macemain & Amstead have RTI brackets and Tannoy points so that live passenger information can be provided. The Tannoy system is maintained by Barrcode, the initial supplier.

18.6.7.2. The bus shelters act as safe waiting place for customers prior to boarding the buses. They act as a control for boarding each bus in an orderly manner. The bus stands have been designed to meet DDA requirements at the boarding points.

18.6.7.3. Two ‘public’ seating units (3 seats on each) supplied by Macemain & Amstead are situated on the main concourse.

18.6.7.4. Bins for customer litter have been provided. These are emptied under contract as part of the operation of the bus station.

18.6.8. **Information Kiosk & Real Time information**

18.6.8.1. Electronic signage is provided at Norwich Bus Station the details are outlined in section 28 Real Time Information Assets.

18.6.9. **Telephone Point, Vending Machines and bike collection point**

18.6.9.1. The public telephone has been provided by British Telecom.

18.6.9.2. The food vending machine is stocked and maintained by the tenants of the cafeteria.

18.6.9.3. An automated Brompton bike collection point has been provided (Sept 2015) under licence to Bromptondock. All costs are the responsibility of the student accommodation block adjacent to the bus station.

18.6.10. **Landscaping**

18.6.10.1. Marginal areas of landscaping exist within the curtilage of the site. These are predominately between the pedestrian walk way and the site boundary on the southern side. They are designed to screen the site from neighbouring developments.

18.6.10.2. Landscaping to the boundary between the bus station and the new student accommodation has been removed as part of the development and has been replaced without cost to Norfolk County Council.

18.7. Lifecycle Options

18.7.1. **Creation or Acquisition**

18.7.1.1. Norwich Bus Station as it currently exists opened in August 2005.

18.7.1.2. All the fixtures were provided new at the opening of the site.

18.7.1.3. There is scope to increase the capacity of the bus station by reducing layover bays and formalising two stops on the southern side of the bus station.

18.7.1.4. Options for further acquisition are limited as the site is landlocked on all sides. The land to the west of the YMCA, has been sold by Norfolk County Council and student accommodation built there. The parcel of land to the east of the YMCA, has been sold and is subject to a planning application for a hotel.

18.7.2. **Upgrading**

18.7.2.1. Norwich bus station as provided by the County Council was newly built in 2005. Upgrading of the asset as a whole is not expected. Individual assets will be considered for upgrading dependent upon their maintenance record and need.

18.7.2.2. The security of the terminal building has been improved during 2012/13 by the provision of an extra fence and gate between the eastern corner of the terminal building and the boundary of the site.

18.7.2.3. CCTV

18.7.2.3.1. CCTV systems can be upgraded to enable automatic number plate recognition, infra-red images, or linking to a centralised monitoring system off site. Additional cameras could be added to further improve security. Camera based patronage monitoring systems could be deployed as could air quality measuring system

18.7.2.4. Terminal Buildings

18.7.2.4.1. The Travel Centre building could be expanded on the ground floor to increase the waiting area and provide an area for the display of publicity material or expansion to the café. This option is limited as the building is located on the main public concourse from where the busier bus services depart.

18.7.2.4.2. The toilet facilities within the Travel Centre were improved in 2007, installing a toilet in the baby changing room and reducing the female cubicles from three to two to improve size of cubicles. The interior of the building could be reconfigured to increase the space available to toilet facilities.

18.7.3. **Renewal & Replacement**

18.7.3.1. To assist with the identification of necessary renewal or replacement work an annual condition survey of carriageways and pavement is undertaken by our Asset Management Engineer. This provides an assessment of priority for works under the following criteria.

- Priority 1 – within 12 months (urgent)
- Priority 2 – within 24 months (Essential)
- Priority 3 – longer than 2 years (Necessary/Desirable)

18.7.3.2. To date the items identified as Priority 1 and connected with the fabric of the paved areas have been addressed through the structural maintenance fund.

18.7.3.3. Vehicle & Pedestrian Areas

18.7.3.3.1. The age of the bus station combined with the usage of the site determine the requirement for either replacing the paving or resurfacing the vehicle areas. The heaviest usage will be at the access lanes entry points from the main highway and the bus stand areas. Speed table ramp repairs at the pedestrian crossings were undertaken in May 2017

18.7.3.3.2. A number of manhole covers are in direct wheel tracks, these experience high levels of wear and consequently require frequent assessment and regular maintenance.

18.7.3.4. Landscaping

18.7.3.4.1. Schemes are considered for replacement if the landscaping reaches maturity of at least 10 years or if trees/plants are damaged or die.

18.7.3.5. Barriers & Gates

18.7.3.5.1. The repairs and maintenance for each barrier and gate is recorded. Items will be replaced if they are damaged beyond repair. Under contract terms the maintenance is the responsibility of Konectbus. Alternative equipment will be considered if the items are continually breaking down or becoming damaged to ensure “fit for purpose”. Should the intermittent breakdown problems continue, perhaps obsolescence should be considered. If they are deemed obsolete they would need replacing or if Health and Safety team agree to removal funding would need to be sought. Gate provision is being reviewed again on the basis that there may be a need to replace them. Repair is becoming problematic. There are no similar automatic gate arrangements that we can see in bus stations elsewhere in the country. There would be a large cost involved in replacement. The reasonableness of this would need to be assessed. Funds would probably need to be available in 2019/20 if replacement is the decision.

18.7.3.6. CCTV

18.7.3.6.1. Equipment is replaced if it is beyond repair and recommended for replacement by the servicing engineer. A CCTV system would normally have a 7 year life span. CCTV equipment was upgraded in 2009/10, and with a 7 year life expectancy should not need replacing until 2016/17. Review end 2017/18. Technology has moved on since these cameras were installed. Finding compatible replacement parts could prove problematic. This equipment is similar to that at the park and ride sites which are currently deemed in need of replacement due to obsolescence. Replacement may be necessary 2019/20 or the following year.

18.7.3.7. Shelters, Seats & Bins

18.7.3.7.1. Shelters have an expected life of 15/20years. They are currently in good condition, this will be monitored.

18.7.3.7.2. The outdoor seats have failed – partly due to misuse and partly due to design. These are being replaced during 2012/13. They are then expected to last 10years. New bins have been provided to increase recycling.

18.7.3.7.3. New combined litter and recycling bins have been provided (July 2015) they are expected to have a life expectancy of 10years years.

18.7.3.8. Toilets

18.7.3.8.1. Both the male and female toilets were upgraded in March/April 2014.

18.7.3.8.2. There is still insufficient toilet provision for the bus station patronage. The 2014 refurbishment does not now provide the correct level of service to customers. NPS have been commissioned to conduct a feasibility study on how to increase the toilet provision at Norwich bus station.

18.7.4. **Disposal**

18.7.4.1. The County Council owns the land, and could either source an alternative use for the land to maximise income or the alternative would be to sell the land. The terminal building is currently let to Konectbus on a full repairing lease.

18.7.4.2. Barriers & Gates

18.7.4.2.1. Safety barriers and gates could be offered for reinstallation either on the highway or on other council premises.

18.7.4.3. Shelters, Seats & Bins

18.7.4.3.1. Depending on the condition of the item these could be offered for reinstallation either on the highway or at other council premises.

18.7.4.4. Landscaping

18.7.4.4.1. The action to retain or remove the site landscaping will depend on the future use of the site. Any plant material removed during the life of the scheme will be taken by a licensed contractor to an authorised disposal point. If possible timber waste will be chipped and re-used as mulch.

18.8. Non Asset Options

18.8.1. Demand Management

18.8.1.1. The demand for a major bus interchange within Norwich city centre is underpinned by the County Council's transport strategy. All the park & ride services (except Costessey from Sept 2015 serves the UEA and NNUH only and Postwick from March 2017) utilise the facility, with the usage by commercial bus operators relying upon the availability of bus bays to meet the registered service timetables submitted by the operators. This equates to up to 1000 bus movements per day.

18.8.1.2. Regular meetings are held with the operators to review existing use of the bus station and to agree bay allocation for any new services.

18.8.1.3. Currently capacity problems arise if buses are delayed on route. There is significant demand by operators on the layover facilities. We work with the bus operators to resolve operational issues as they arise. Three additional bays were created in February 2009 for joint use as layover bays or operational bus stands adjacent to the opposite public walkway.

18.8.2. Amending Standards

18.8.2.1. At the current time the standards used for the construction of the sites are being used for maintenance purposes.

18.9. Lifecycle Treatment Options

Do Minimum	Routine maintenance is the regular on-going day to day work that is necessary to keep assets operating. This includes instances where portions of assets fail and need immediate repair to make operational again. At Norwich Bus Station the routine treatments are inspection regimes, routine cleaning, and reactive repair. Within current repairing lease arrangements
Medium Life	Some of the asset types on sites will require maintenance on a medium life cycle 5 to 10 years these are noted in the maintenance arrangements tables
Long Life	The expected life of the carriageway area is 40 years. An appropriate maintenance and inspection plan has been put in place.

18.10. Routine Maintenance Standards, Objectives and Response

18.10.1. The objectives of routine maintenance are to keep the asset operating effectively, safely and securely, and to prevent/postpone major maintenance.

18.10.2. Routine Short Term Costs – These are within the responsibilities of the repairing lease.

18.11. Lifecycle Cost Analysis

18.11.1. Lifecycle Cost Analysis is a process of comparing different cost streams over the same extended period of time, to determine the most appropriate strategy. With different strategies for managing (elements of) the asset, will come different levels of service, different cost streams and different residual risk options.

18.11.2. Whilst Norwich bus station was purpose built in August 2005 the asset still requires regular maintenance to prolong the life of the components and prevent early replacement or significant structural costs.

18.11.3. Many parts of the asset require a programme of annual routine maintenance to ensure that they continue to perform. This is currently the responsibility of our tenant.

18.11.4. **Medium Term Maintenance**

18.11.4.1. Our Asset Management Engineer completes an annual survey of the road and paved areas to inform the long term maintenance strategy. This can be seen in App G (ix). Any defects requiring more urgent action will be brought to the attention of our ‘travel’ team and the tenants.

18.11.4.2. The following maintenance profiles have been adopted to forward plan a review of the assets if no maintenance identified.

18.11.4.3.

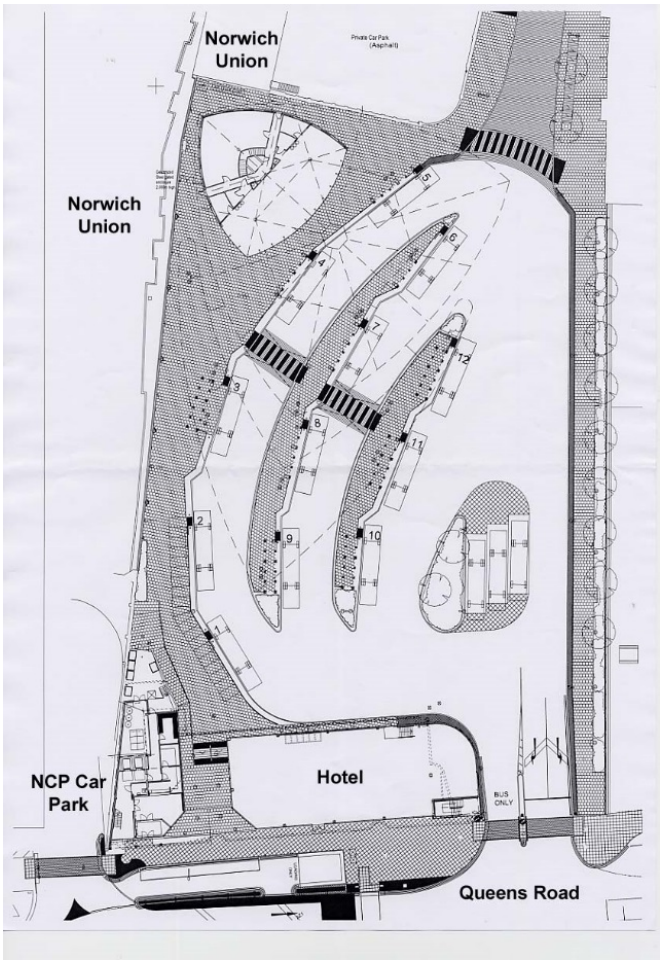
Boiler replacement	-	every 10 – 15 years
Toilet upgrade	-	every 8 years (Last time 2014)
Replace CCTV systems	-	every 7 years (not currently required, review in 2018)
Small scale repairs to concrete roads and paved areas	-	every 5 years (As identified in visits)
Bus Shelter replacement	-	every 15 years (Review 2020)
Painting of Steels	-	every 8 years (Last time 2015 so review 2023)

18.11.4.4. Possible forward Plan

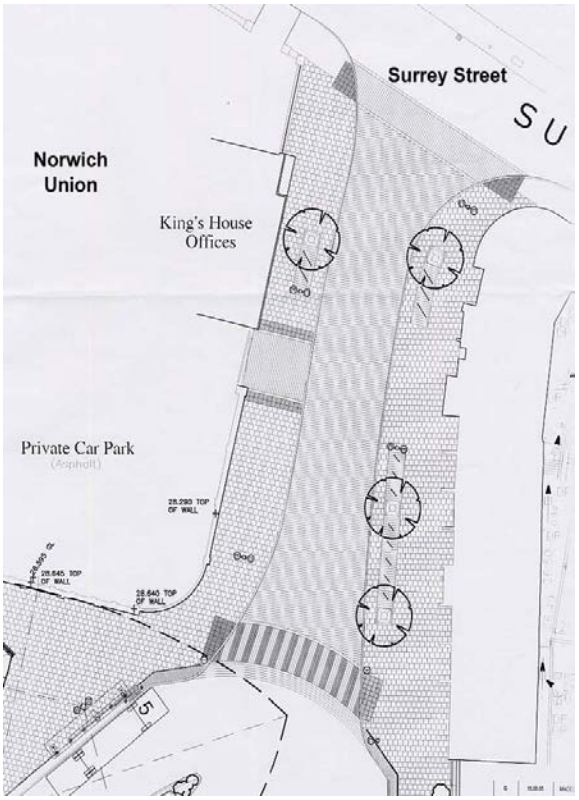
Review 2018	Replace CCTV
2019	Automatic bus gates£150,000
2020	Boiler
2020	Resurfacing works
2020	Bus Shelters £150,000
2023	External Painting£15,000

18.12. Site Plans

18.12.1. Norwich Bus Station – Overall site layout

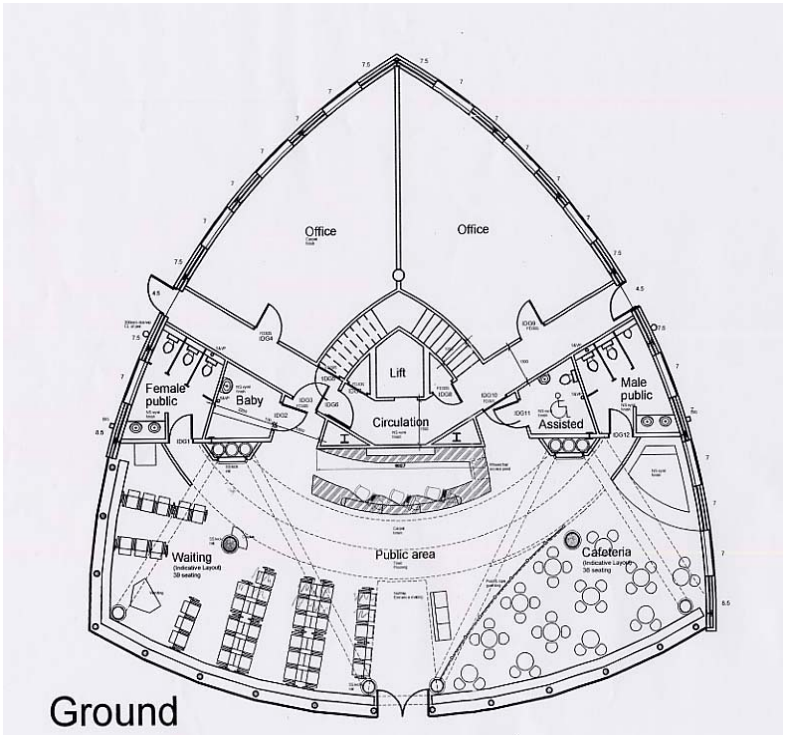


18.12.2. Norwich Bus Station – Surrey Street vehicle & pedestrian access

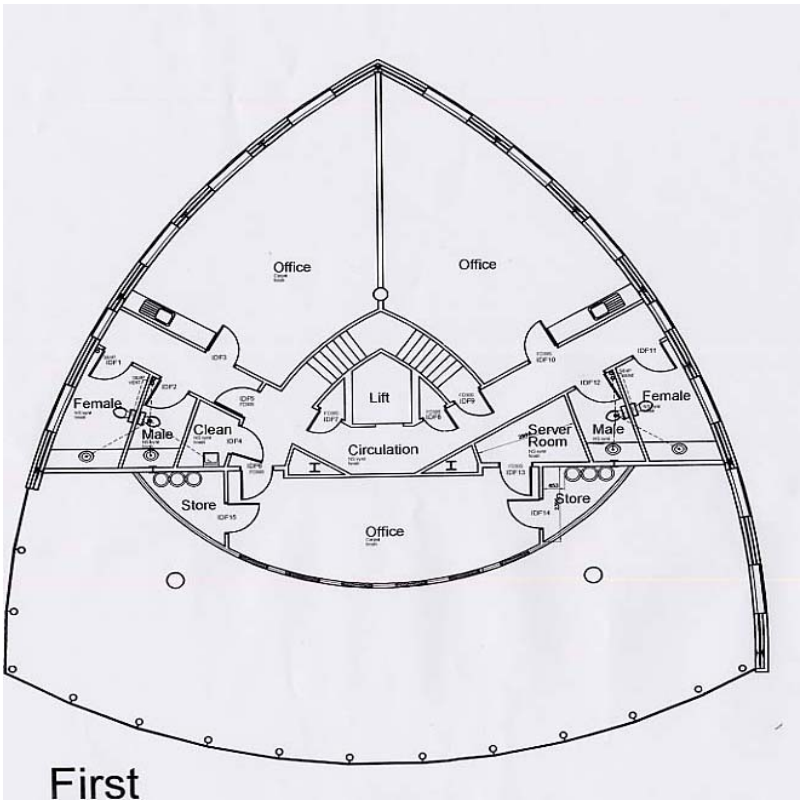


18.12.3. Norwich Bus Station – Ground Floor layout

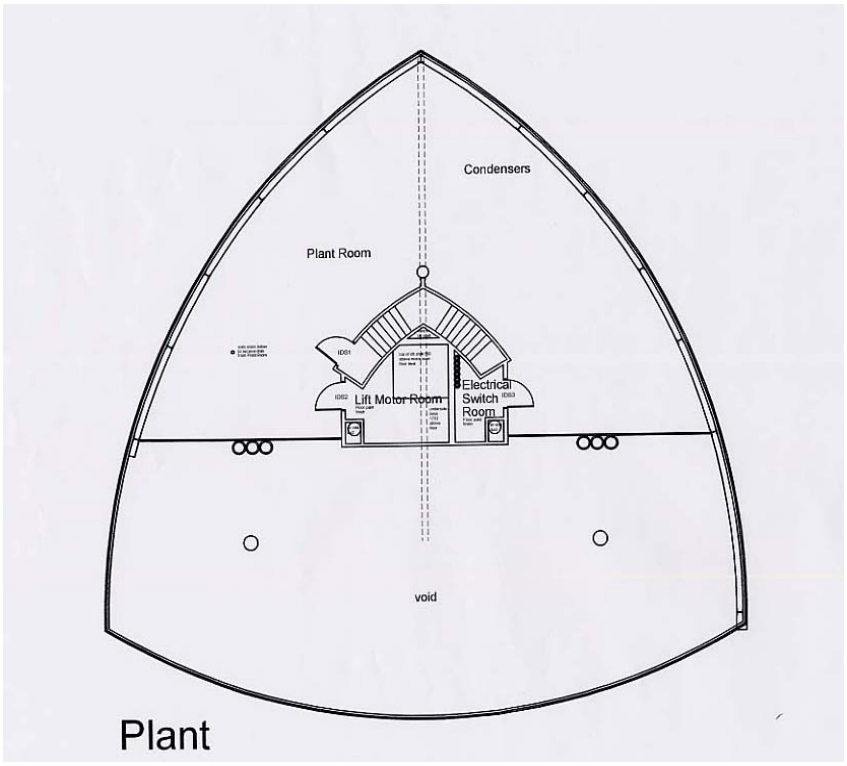
(Note: this shows the old layout of ladies toilets. There are now only two cubicles.)



18.12.4. Norwich Bus Station – First floor layout



18.12.5. Norwich Bus Station – Plant Room (Third floor)



18.13. Service Levels

18.13.1. There are no statutory indicators regarding the Bus Station.

18.13.2. We will consider whether any can be developed in the future.

18.13.3. We have inspection regimes in places and any recommendations for maintenance are investigated. This is a Good level of Service.

18.14. Risk

18.14.1. Risk – Unplanned closure/partial closure of site. Loss of service, revenue and patronage. Damage to reputation.

18.14.2. Impact = 3 (Loss up to £175,000 - £500,000) x Likelihood (Rare) =3 = Risk 3 Low risk

19. Norwich Park & Ride Lifecycle Management Plan

19.1. Park & Ride is a major transport initiative aiming to reduce the number of private vehicles entering Norwich city centre, to limit the amount of parking within the city centre and to encourage a modal shift towards more sustainable travel.

19.2. This asset grouping comprises six separate Park & Ride sites opened between 1994 and 2005. Thickthorn is leasehold. The other five are owned by Norfolk County Council but the Airport site has quite a few restrictive covenants, Harford has some too regarding leases to third parties for alternative uses than park and ride.

19.3. Each site comprises parking areas, pedestrian areas, bus access roads, bus and cycle shelters, and manual entry gates/barriers and automatic exit barriers. The sites also have street lighting columns, illuminated and non-illuminated signs, associated feeder pillars, and CCTV cameras. They also have commercial advertising displays, displays for waysides and travel information, holdall card help points, real-time information displays, Vehicle counters, Airport and Harford sites have Electric Vehicle Charging Points. Each site has a terminal building. The toilets are open to the public, but they are unstaffed. Some of the buildings are let to third parties. All sites contain areas of landscaping.

19.4. From 6 September 2015 the sites have been leased to Konectbus on full repairing leases on a contractual 5 +3 year basis. (Thickthorn cannot be sub-let and so is managed on our behalf by konectbus under a management agreement. Routine maintenance is within the lease and has not been detailed in this lifecycle plan. Advisory works and cost estimates are provided for Konectbus in App G (ix)

19.5. We have to undertake an annual insurance check for the Park and Ride to ensure that the contractor still has buildings and contents insurance. We should do this every September.

19.6. The highways asset team are also undertaking an annual survey to monitor the condition of the site. This informs any longer term maintenance requirements and provides a confirmation that our tenants are discharging their maintenance responsibilities.

19.7. Physical Parameters

19.7.1. Parking and Paved Areas

19.7.2. The layout and construction of the parking and paved areas at each Park & Ride site varies from site to site. Generally the parking areas are surfaced in asphalt, while the bus access roads are brick weave or asphalt and the pedestrian areas brick weave. The pedestrian areas in particular have a tendency to subside in prolonged inclement weather. The table following summarises the main points for each site.

19.7.3.

Site	No. Spaces
Sprowston	788
Postwick	525
Harford	1014 + 8 coach Spaces
Thickthorn	736
Costessey	1100
Airport	652

19.7.4. **Closed Circuit Television (CCTV)**

19.7.4.1. All Park & Ride sites have CCTV systems. These operate on a stand-alone basis with dial in remote access available for viewing live and recorded images. The servers are located securely within locked cabinets adjacent to the terminal buildings. These CCTV systems comprise a number of cameras installed at strategic locations. Some of the cameras are fully operational with pan, tilt and zoom facilities others are fixed cameras. Details of the equipment are shown the following table:

19.7.4.2.

Site	Type of cameras	Recorders	LCD Monitor
Airport Installed Dec 2007	6 digital pan, tilt and zoom and 1 fixed	1 digital recorder, multiplex & 1 incident	2
Sprowston Installed Dec 2009	2 digital fixed & 8 pan, tilt and zoom	1 multiplex & 1 incident	2
Postwick Installed Dec 2007	2 fixed and 7 digital pan, tilt and zoom	1 multiplex & 1 incident	2
Harford Installed Dec 2009	4 digital fixed & 6 pan, tilt and zoom	1 multiplex & 1 incident	2
Thickthorn Installed Mar 2010	3 fixed and 8 digital pan, tilt and zoom	1 digital recorder, multiplex & 1 incident	2
Costessey Installed Mar 2009	2 digital fixed & 8 digital pan, tilt and zoom	1 digital recorder, multiplex & 1 incident	2

19.7.5. **Terminal Buildings**

19.7.5.1. On 31st January 2011 all site offices were closed to the public. Konectbus have recommissioned the toilet facilities at all the buildings as of October 2015 for the convenience of customers. Where the buildings are not tenanted, the office areas are fully secure and remain inaccessible to the public.

19.7.6. **Shelters**

19.7.6.1. Sprowston and Costessey have 4 separate bus shelters. Harford and Thickthorn have one shelter at the drop off point and one larger shelter at the pick-up point.

19.7.7. **Barriers**

19.7.7.1. The vehicle entry and exit points are controlled using both automatic and manual barriers as well as metal gates. The number of barriers is dependent upon the design of each site. The barriers are prone to damage from vandalism, high winds and vehicles driving into them - often requiring replacement of major components on a regular basis. Konect bus have offered to replace the barriers with inset crocodile teeth entrance and exit control paid for by reduced maintenance costs

19.7.7.2.

Site	Exit barrier	Entry barrier
Airport	1 (A)	2 (M)
Sprowston	1 (A)	1(M)
Postwick	1 (A)	1(M)
Harford	2 (A)	1x Metal gate + 1 (M)
Thickthorn	1 (A)	Metal gate
Costessey	1 (A)	1(M)

(M) = Manual Barrier (A) = Automatic Barrier

19.7.8. **Lighting**

19.7.8.1. All sites are illuminated by a system of street lighting columns located within the site. All sites are fitted with local meters. During 2012 timer switches were introduced, which when complete will turn the lighting system off when sites are closed. Lighting requires routine maintenance and reactive response when lights are reported as faulty.

The street lighting system remains the responsibility of Norfolk County Council. TTS have a contract with AMEY which covers scouting, electrical and structural testing and reactive maintenance.

19.7.8.2.

Site	Columns (Steel)	Lamps	
		SOX	SON
Airport	102	94	8
Sprowston	62	-	62
Postwick	94	-	94
Harford	69	-	69
Thickthorn	81	-	81
Costessey	88	-	88

19.7.9. **Cycle Shelters**

19.7.9.1. There are no cycle shelters at Airport and Postwick as these were within the building which is now closed. There are 4 shelters at Costessey and Sprowston and one large and one small shelter at Thickthorn and Harford.

19.7.10. **Electric Car Charging Points**

19.7.10.1. Four spaces at Harford and four spaces at Airport dedicated to electric car charge points installed in 2011. Maintenance is completed by Chargemaster, since Source East closed in March 2017. The posts are old slow and one side no longer compatible to electric vehicles. Charge master and CPS say they will update these free of charge subject to 10 year licences.

19.7.11. **Drainage**

19.7.11.1. All sites have a positive drainage system installed, the outfall varying from site to site. Sprowston has two lagoons and Harford has one. Airport and Postwick sites have sumps and pumps. Pumps are inspected and managed by NCC's Bridges Team who invoices TTS for works upon completion. Konect do not maintain these but are required to report any problems and call out appointed contractors where problems are seen

19.7.12. **Landscaping**

19.7.12.1. Each site has varying areas of landscaping, comprising shrubs and small trees.

19.7.12.2.

Site	Area of Landscaping (m^2)
Sprowston	15,394
Postwick	23,150
Harford	21,825
Thickthorn	4,374
Costessey	23,645
Airport	12,320

19.8. ## Lifecycle Options

19.8.1. **Creation or Acquisition**

19.8.1.1. Park & Ride Sites were constructed and opened between 1994 and 2005 at locations determined from the Norwich Area Transportation Strategy.

19.8.1.2.

Site	Spaces	Opened
Sprowston	788	September 2003
Postwick	525	May 1998
Harford	1014 + 8 Coach spaces	February 2004
Thickthorn	736	March 2005
Costessey	1100	August 2001
Airport	652	September 1994

19.8.1.3. Only Thickthorn and Airport currently reach capacity. This occurs infrequently and is confined to known busy periods such as the pre-Christmas rush. In the future there is scope to increase the capacity of the sites either by using land within the existing boundaries, expansion to adjoining NCC land or through reallocation of spaces within existing sites. Konectbus increased parking spaces by 32 at Airport during 2016 to relieve pressure on space from the 150 contract parking spaces let

19.8.1.4. Postwick

The Postwick site could be enlarged to increase the capacity of the site to 1100 and will include 20 dedicated coach parking bays. The existing digital Postwick Park & Ride CCTV system would be expanded to cover the proposed new parking area as part of the build process. New real time parking information points would be used to direct traffic to the most appropriate part of the site to manage demand.

In November 2015 the opening of the Postwick hub has created a new entrance road to the site. This new entrance way will also serve the possible future expansion area of the Postwick site which is still under review.

The expansion of the business parks adjacent may lead to further opportunities for contract parking. From contract acquisition Konectbus have let contract car parking spaces to Aviva, from Jan 17 increased these to 225 and introduced a contracted bus service from site to Aviva premises in Broadland business park.

19.8.1.5. Airport

In the future, in connection with the delivery of the Northern Distributor Road (NDR), the Airport Park & Ride site may relocate. Potential alternative sites have already been identified off the A140. Construction of the NDR commenced in January 2016 and is expected to be completed by April 2018.

19.18.1.6. Sprowston

This site is being considered for sale for use as a school as part of housing development around it. If it happens it would be post NDR and customers would have the choice of Postwick or the new Airport site at A140 NDR junction, reasonable access provided by NDR.

19.18.1.7 Harford

The Northern side, currently accessed from the Mulbarton entrance is being considered for use as a waste recycling centre.

19.8.2. **Upgrading**

19.8.2.1. The Park & Ride sites provided by the County Council are relatively newly built. Upgrading of the asset group as a whole is therefore not expected. Individual assets will be considered for upgrading depending upon the availability of new technology and the age and lifespan of the asset.

19.8.2.2. The County Council is exploring options for maximising the use of the Park & Ride sites. Coach parking at Harford opened in Easter 2014, and while this has reduced car parking capacity it is proving popular with coach operators. Konectbus have taken on existing licences and leases and have the right to manage the assets to maximise revenues

19.8.2.3. To promote Park & Ride use, a revised signing strategy has been developed around the greater Norwich area and was completed on county roads in 2014. Further revisions to the signing on the Trunk Road network is required as the Costessey site now just services the hospital and UEA, and there is a need to direct traffic from the Dereham direction for the city centre to the Thickthorn site.

19.8.2.4. During 2014 new electronic signs providing passengers with Real time information and up to date messages about service disruption has been installed at the 6 sites. For more information on these signs see section 28 Real Time Information

19.8.2.5. CCTV

CCTV systems can be upgraded to enable automatic number plate recognition, infra-red images, digital recording or linking to a centralised monitoring system off site. Additional cameras may be added to further improve security. In 2013 the system was improved to allow remote viewing of images. Phone lines have been upgraded to broadband now Managed by Konectbus. The CCTV systems at sites use analogue Cameras. Technology has moved on to Digital. Parts are becoming difficult to find and so systems may need replacing or removing. In May 2018 Konectbus advised obsolescence issues mean the CCTV needs replacing.

19.8.2.6. Passenger and Cycle Shelters

The Costessey and Sprowston sites have a number of under-used bus shelters. These could be relocated to other sites to improve the cover provided at the main boarding points. The cycle shelter at Harford is poorly located and is therefore under-used. Cycle hoops have been added near the building to give this type of Park & Ride use a higher profile and encourage additional cyclists. Perspex see through panels in shelters need replacing. Consideration should be given to upgrading shelters at sites to the same standard as those at Norwich bus station and city centre stops. If funds are limited maybe we could start with Thickthorn and Harford.

19.8.2.7 Electric bus Technology

Because of the short nature of bus trips from park and ride sites and perhaps longer than usual stand time these might be useful to consider for charging infrastructure to support electric buses

19.8.3. **Renewal & Replacement**

19.8.3.1. To assist with the identification of necessary renewal or replacement work, an annual condition survey is undertaken by our Asset Management Engineer). This provides an assessment of priority for works under the following criteria:

- Priority 1 – within 12 months (Urgent)
- Priority 2 – within 24 months (Essential)
- Priority 3 – longer than 2 years (Necessary/Desirable)

19.8.3.2. Parking & Paved Areas

19.8.3.2.1. The age of the Park & Ride site combined with the usage of the site determines the requirement for either replacing the paving or resurfacing the car park areas. The surface of the older sites is starting to require joint sealing, and pot holes are forming at joints. The work required is itemised in the annual condition surveys undertaken by our Asset Engineer.

19.8.3.2.2. Surface course rutting has occurred in the bus lanes at Harford, Costessey and Thickthorn. Repairs were undertaken in March 2009. Repairs to the rutting identified at Sprowston were undertaken in November 2012. Ruts have begun re appearing at Sprowston (2015) and are being monitored by highways engineers

19.8.3.2.3. Konectbus advise that the bus standing point surface should be concrete as at Norwich bus station. Costings are being prepared for a concrete hardstanding at Thickthorn park and ride for 2018/19.

19.8.3.3. Landscaping

19.8.3.3.1. Landscaping at each site was provided to:

- Screen the site whilst minimising and mitigating the impact on the existing environment and supporting ecological connections
- Facilitate CCTV
- Achieve an effective maintenance regime

19.8.3.3.2. Due to reductions in funding, the landscaping schemes are looking un-kept and unchecked growth can quickly affect operation of the CCTV system. NCC has entered into an agreement with the probation service to enable the delivery of very low cost landscaping services. The work plan is agreed between TTS and the probation service on a quarterly basis. Konectbus have taken the option to continue this arrangement

under their tenancy. NCC have to act as intermediaries as Konectbus do not qualify as Community pay back clients

19.8.3.4. Barriers

19.8.3.4.1. The repairs and maintenance for each barrier is recorded. (Currently by Konectbus) Items will be replaced if they are damaged beyond repair, unsafe, or if it is not economically viable to continue to maintain. Konectbus (subject to quotes) have offered to replace barriers with crocodile teeth they would pay for this from expected reduced maintenance costs

19.8.3.5. CCTV

19.8.3.5.1. Equipment is replaced if it is beyond repair and recommended for replacement by the servicing engineer. The CCTV systems at the older sites were reviewed in 2004/5 and a replacement and upgrade programme to digital systems is in position to ensure we meet the requirements of the Data Protection Act 1988. New digital systems were installed at the Costessey, Harford and Sprowston sites in 2009 and the Thickthorn site in 2010. CCTV control and recording equipment has been relocated to cabinets outside Postwick Harford and Airport Sprowston buildings so they can be let. Quotations with ANPR have been obtained and a decision on how to proceed is awaited.

19.8.3.6. Disposal

19.8.3.6.1. The options available for the disposal of the land at each site depend on the ownership. The freehold sites could be transferred to other departments, let or sold. Disposal of the leasehold site would be conditional on the lease agreement. Currently all sites except Thickthorn are let to Konectbus from 6 September 2015 and Thickthorn under a management agreement. Arrangements are for 5 years with an option to extend to 8.

19.8.3.6.2.

Site	Ownership
Airport	Norfolk County Council – Covenants exist
Sprowston	Norfolk County Council
Postwick	Norfolk County Council – permission required if use other than park and ride
Harford	Norfolk County Council
Thickthorn	Leasehold (40 years from 2003)
Costessey	Norfolk County Council

19.8.3.7. Terminal Buildings

19.8.3.7.1. The toilet facilities in all site buildings are open to the public. Airport and Postwick site buildings are leased to tenants which Konectbus manage. The rest are currently unoccupied and are closed to the public. They all still require on-going inspection and routine maintenance to ensure that they remain in a serviceable condition as they contain the computer

equipment associated with the CCTV cameras. It is not possible to dispose of these buildings without relocating this equipment as detailed above

19.8.3.8. Shelters, Barriers, Gates, Poster Cases, Bins, Cycle Stands & CCTV Equipment

19.8.3.8.1. Depending on the condition of the asset these could be offered for sale, given to other departments, re-used at other sites or recycled.

19.8.3.9. Landscaping

19.8.3.9.1. The action to retain or remove the site landscaping would depend on the future use of the site. Any plant material removed during the life of the scheme will be taken by a licensed contractor to an authorised disposal point. If possible timber waste will be chipped and reused as mulch.

19.8.3.10. Other assets

19.8.3.10.1. Real Time information Displays, Holdall Help points, ITS SWARCO vehicle counting equipment, Sump pumps at Airport and Postwick sites are dealt with by other specialist parts of the Highways Group, such as ITS and Bridges.

19.9. Non-Asset Options

19.9.1. Demand Management

19.9.1.1. The usage of each Park & Ride site is monitored by the tenants as part of the KPIs for the contract. . Usage statistics are:

1. Total number of cars parked
2. Total passenger journeys
3. Energy reduction per site
4. Average passengers per operational day

19.9.1.2. The total number of vehicles using Norwich Park & Ride is affected by changes in parking charges at the Park & Ride sites, changes to parking charges in the city centre and provision of parking within the city centre. Passenger journeys are affected by charging structures, changes to customer base, promotional activities and charges on the local bus network. Energy consumption is tracked to monitor the reduction in lighting costs across the sites. The passengers-per-day average allows performance monitoring of promotions and more focused targeting of campaigns.

19.9.1.3. To manage demand across the sites at busy times, customers are directed to use alternative sites. Additional highway signs was provided in 2014/15/16 to encourage use of the Park & Ride sites. This signing package should include additional diversion signs for use when key sites are full. Signs may need reconsidering now NDR is open – for example directions to Sprowston when Airport site is full.

19.9.2. **Amending Standards**

19.9.2.1. At the current time the standards used for the construction of the sites are being used for maintenance purposes.

19.9.2.2.

	Lifecycle Treatment Options
Routine/Minimum	Routine maintenance is the regular ongoing day-to-day work that is necessary to keep assets operating, including instances where portions of assets fail and need immediate repair to make operational again. At the Park & Ride sites the routine treatments are regular cleansing, landscaping work and reactive repair. • Potholes • Road markings • Cleansing • Pruning • Street Lighting bulb renewal • Power costs Within current repairing lease arrangements
Medium Life	Some of the asset types on site will require maintenance on a medium life cycle of 5 to 10 years. • Patching and Joint Filling • Replacement of cameras • Repainting of Buildings
Long Life	The pavement and pedestrian areas will eventually require long life treatments. • Resurfacing • Street Light Column replacement

19.10. Routine Maintenance Activities, Objectives and Response

19.10.1. The objective of routine maintenance is to keep the asset operating effectively, safely and securely.

19.10.2. These responsibilities are within the lease arrangements with Konectbus.

19.11. Lifecycle Cost Analysis

19.11.1. Lifecycle Cost Analysis is a process of comparing different cost streams over the same extended period of time, to determine the most appropriate strategy. With different strategies for managing (elements

of) the asset, will come different levels of service, different cost streams and different residual risk options.

19.11.2. Routine Short Term Costs – These are within the responsibilities of the repairing lease, with the exception of street lighting and drainage pumps.

19.11.3. **Medium Term and Long Term Maintenance**

19.11.3.1. From 2014 Norfolk Property Services will survey only the buildings and site boundaries on an annual basis. As required while Konectbus manage the sites from September 2015

19.11.3.2. Assessment of the carriageway and footways is undertaken by the highways asset management team at Norfolk County Council who will fund the priority 1 works from the Structural Maintenance Capital Programme

19.11.3.3. There is an annual structural maintenance survey by highways which looks at non electrical highway type repairs required, to roadways and paved areas, resurfacing, patching (not pothole repair), kerbs gullies and paved areas. This can be seen in Appendix G(ix).

19.11.3.4. The following maintenance profiles have been adopted to forward plan a review of the assets if no maintenance identified.

19.11.3.5. .

Boiler repairs (Postwick)	Every 10 – 15 years (The boiler at Postwick is electric and broke just before the site went unmanned in January 2011. Presently there is no central heating available to the building. Investigations were being made to change to a Calor gas system at this time).
External & internal painting	Every 10 years (Last 2014)
Replace CCTV systems	Every 7 years or at obsolescence Thickthorn last replaced 2010, Harford and Sprowston 2009 and the remainder 2006 or before. Konectbus advise replacement of equipment at least on some sites is due now
Resurfacing works on access roads	Every 10-12 years
Bus Shelters	Every 10 years
Solar Panels	These were installed at Thickthorn Harford and Postwick in 2014. Inverter life is around 10 years so these may need replacing from 2024

Electric Vehicle Charging points at Airport and Harford	Currently maintained by chargemaster. They are obsolete now and a decision needs making on replacement or removal. Both Chargemaster and Charging Point Services have verbally offered to replace these at no cost subject to a 10 year licence.

19.12. Service Levels

19.12.1. There are no statutory indicators regarding Park & Ride facilities

19.12.2. We have inspection regimes in place which follow the frequency of the adjacent public highway and any recommendations for main repairs are reported to the Asset Manager. This is a good level of service.

19.13. Risk

19.13.1. **Financial / Operational**

19.13.1.1.

- Risk – Unplanned closure/partial closure of site. Loss of service, revenue and patronage. Damage to reputation.
- In 2017-18 and so far this year there has been a marked increase in unauthorised traveller encampments on sites. This is losing Konectbus revenue and affecting patronage. An Injunction against these is being progressed, probable cost £15k. An investigation of preventative infrastructure (bollards and at height barriers) shows this would cost in excess £250k across the sites and may still not prevent encampments.

Impact = 3 (Major) x Likelihood (Rare) =1 = Risk 3 low risk

19.13.1.2.

- Risk - The ability to deliver the required standards and liability

Impact = 4 (Major)x Likelihood (Rare) = 1 = Risk 4 low risk

19.14. Backlog

19.14.1. Members have approved the cost of listed schemes as the service level.

19.14.2. Any negative movement against the service level will be considered a backlog and this demonstrated by the difference in the cost of carrying out the treatments.

19.14.3. These are reported annually to members.

20. Highway Verges and 'Soft Estate' Lifecycle Management Plan

20.1. This asset grouping comprises highway verges and all of the cutting and planting arrangements, which take place on the 'soft estate'. This includes grass areas, landscaped areas, hedges, shrubs and trees.

20.2. These are viewed as important assets that contribute both to the quality of Life in Norfolk, its sustainability and its biodiversity and also help define the nature of its highway network. In addition to their value for landscape and biodiversity, trees in particular provide key ecosystem services – their role in sustainable urban drainage reduces the risk of flooding, they absorb harmful pollutants, they act as carbon sinks and provide shade. Tree lined streets have also been proven to increase property values.

20.3. These assets also provide a vital safety function being generally created and maintained in line with national standards for visibility. In rural settings they can also provide useful refuges for pedestrians and horse riders. In all environments they may act as a conduit for highway and utility apparatus, thereby limiting the disruption of road, cycleway and footway surfaces.

20.4. As they comprise of living flora and fauna they do not fall into the same patterns as other assets. Our work is to ensure that these areas of green infrastructure are maintained such that the areas continue to contribute to the landscape of Norfolk and do not compromise the safety of road users.

20.5. Physical Parameters

20.5.1. Grass cutting areas

20.5.1.1. The cutting regime is measured according to cut types within the contract i.e. urban 100 square metre and rural linear kilometre.

20.5.2. Roadside Nature Reserves grass cutting areas

20.5.2.1. Norfolk has an established network of 112 Roadside Nature Reserves (RNR). These areas are designated at a county level due to having nationally rare or threatened wildflowers / protected species present. Roadside verges are the last suitable habitat for many wildflower species due to modern land management practices and development. The limits of these areas are identified on site by posts. The sites are shown on our GIS.

20.5.3. Siding of verges

20.5.3.1. The verges adjacent to footways in Great Yarmouth are sided (trimmed to ensure that they do not encroach on the footway) on a three year rolling programme by the Borough Council under the Agency Agreement. In other areas this takes place on a needs basis.

District	Siding Lin.m
Great Yarmouth	273,576

20.5.4. **Trees**

20.5.4.1. There is no comprehensive record of the position and condition of trees that are within the highway and hence the responsibility of the Department of Community and Environmental Services. Neither is there a record of those privately owned trees within falling distance of the highway that can also impact upon its use.

20.5.4.2. We hold records of those trees planted in the highway under licence, which are the responsibilities of District or Parish Councils.

20.5.4.3. The Arboriculture and Landscape Team within Community and Environmental Services have a database that holds records of all tree professional tree inspections carried out by them since 2009. These records will demonstrate that the council is fulfilling its duty of care in relation to tree safety by complying with Norfolk County Council's Tree Safety Management Policy

20.5.4.4. Planting of new locations is dealt with under 'landscaped areas.'

20.5.4.5. Our agent Norwich City Council undertake tree surveys on an ongoing basis. They inspect quarter of the trees each year on the minor road network and on the major roads an annual safety inspection takes place. The totals April 2017 are:

Type	%	Nos.
Newly Planted	12	1317
Juvenile	6	683
Young Trees	13	1392
Semi-mature	16	1611
Mature	45	4869
Over mature	6	639
Veteran	0.01	2
Unspecified	3	376
	Total	10889

20.5.5. **Landscaped areas, hedges and shrubberies.**

20.5.5.1. Records of newly created landscape areas are held on plans within the Environment Team but not on a countywide GIS database.

20.5.6. **Noxious Weeds**

20.5.6.1. The location of these hazards is variable being dependent upon climate, soil conditions and adjoining land use.

20.6. Lifecycle Options

20.6.1. Creation and Acquisition

20.6.1.1. These fall into 3 broad areas:

- County Council schemes
- Private developers
- Legacy sites

20.6.1.2. County Council Schemes

20.6.1.2.1. Areas within the highway, which have been planted as part of mitigation works when the highway scheme was implemented. For example, this could be a new hedge, shrub and tree planting on an embankment or on adjacent land included within the road CPO, or a shrub bed put in to ‘narrow’ the road as part of a traffic management scheme.

20.6.1.2.2. Since the mid-1990s when a capital landscape scheme is implemented it will be maintained for 3 years as part of the implementation works and then a sum equivalent to 30% of the cost of the scheme is set aside for its future maintenance. This work is arranged by the Environment Team funded through the Asset and Capital Programme Team.

20.6.1.2.3. Any remaining newly created areas such as grass verges are managed by Area staff via the routine maintenance fund

20.6.1.3. Private Developers

20.6.1.3.1. Areas within the highway, which have been planted by developers to discharge their planning conditions. The Highways Developer Services Team in consultation with the Environment Team approves these. A commuted sum is required for their future maintenance through a section 38 agreement.

20.6.1.3.2. Area staff via the routine maintenance fund manages any remaining newly created areas such as grass verges.

20.6.1.4. Legacy Sites

20.6.1.4.1. These may be a long-standing part of the highway corridor, or they may have been acquired as part of older developments prior to mid-1990s.

20.6.1.4.2. They are managed by Area staff via the routine maintenance fund utilising specialist advice from Environment Team staff as appropriate.

20.6.2. Renewal and Replacement

20.6.2.1. These terms can be applied to tree lined avenues when management or repair under routine maintenance is no longer a viable or cost effective option.

20.6.2.2. Some tree-lined avenues, which have been significantly degraded due to loss of trees, have been identified by our arboricultural and woodland officers in other areas. Highway Engineers, Street scene Inspectors or Area Technicians may identify streets where tree roots are damaging the footway. Tree replacement is best undertaken alongside the renewal of the adjoining footway surfaces.

20.6.2.3. The life of the proposed treatment to the footway surface will determine the extent of the refurbishment of the planting scheme. For example the full reconstruction of the footway surface will mean the site will not be returned to in the foreseeable future, whilst a veneer treatment could mean a proposed return in approximately 10 years.

20.6.2.4. Those briefing footway refurbishment schemes should always refer those with adjoining trees to the arboricultural and woodland officers for comment on whether it is appropriate to carry out a tree planting scheme at the same time.

20.6.3. Upgrading

20.6.3.1. Upgrading is normally considered in conjunction with the renewal and tree replacement process. Tree species will be selected taking into account factors such as their form, their potential wildlife and landscape value, their ability to tolerate the conditions of the street environment, and their ability to withstand climate change. Where necessary, root barriers will be specified to reduce the likelihood of footway disruption.

20.6.4. Disposal

20.6.4.1. Disposal is usually in the form of removal of trees for safety reasons. The Tree Safety Management Policy requires the replacement of any trees that are removed. If the location is not deemed suitable for replanting, an alternative-planting site close to the felled tree will be considered in consultation with the arboricultural and woodland officers.

20.7. Non Asset Options

20.7.1. Managing Demand

20.7.1.1. Under section 96 of the Highways Act 1980, consent can be given to Parish / District Councils to plant, retain and maintain shrubs, plants or grass and trees.

20.7.1.2. Our current policy excludes individuals from planting trees on the highway, however, under section 142 of the Highways Act 1980, a licence may be granted to permit the occupier or owner of any premises adjoining the highway to plant, retain and maintain shrubs, plants or grass in the highway. Other individuals cannot be licensed.

20.8. **Treatment Options**

Do Minimum	• Annual schedule based grass cutting inc. RNRs • Safety based work
Medium Life	• Removal of isolated weak areas of planting scheme. • Odd renewals.
Long Life Treatment	• Remedial works removal/renewal of planting scheme • For legacy tree lined avenues this is normally carried out in conjunction with a renewal of adjoining footway surfaces. The extent of the planting scheme should reflect the expected life of the new footway surface.

20.9. **Routine Maintenance Standards, Objectives and Response**

20.9.1. Routine maintenance is the regular ongoing day to day work that is necessary to keep assets operating, including instances where portions of assets fail and need immediate repair to make operational again. Some are planned whilst other are reactive.

20.9.2. The routine works undertaken on the ‘soft estate’ have been sub-divided into work type, activities, the standards of which have been displayed in tabular form and are followed by details on objectives and response arrangements. The generic objectives for the ‘soft estate’ are as follows:

Safety	• Prevent obstruction to user visibility and traffic signs • Prevent falling trees and branches harming or affecting highway users • Prevent root growth affecting surface regularity
Serviceability	• Reduce the potential for service interruption • Provide a quality of user experience
Sustainability	• Help maintain and improve Norfolk’s landscape character • Help mitigate climate change effects and contribute to ecosystem services • Support habitat and biodiversity • Prevent root growth affecting surface regularity, structure and highway drains

20.10. **Grass Cutting Activities**

Activity Type	Activity	NCC Service Standard
Preventative	Rural grass cutting	A continuous “single swathe” of 1m & visibility cut’ typically in May/June followed by a second cut in July/ August.
		Highway verge incorporating access to ducts, drainage systems - Boundary to Boundary cuts. By exception, typically on improved sections of A and B road network. To be carried out as part of one of the standard cuts.
		Embankment and cutting slopes not normally cut
	Urban grass cutting	Verges – 5 cuts per year (Agency agreements may cut more)
	RNRs	RNR’s our managed by the Environment team and Norfolk Wildlife Trusts Contractor to bespoke arrangements
Condition Monitoring	Safety Inspections	As carriageway standards
	Audit checks	As schedule
Reactive	Reactive grass cutting	Visibility cuts – in addition to planned dependent on growth

20.10.1. **Grass Cutting - Objectives and Response**

20.10.1.1. Safety

20.10.1.1.1. Grass is cut for safety purposes to prevent the obstruction of visibility sight lines and traffic signs. In areas where there are no footways a cut verge provides a safe refuge for pedestrians on busy roads. It also prevents vegetation falling into the highway narrowing the available running surface. Long grass can also conceal debris, which can become a safety problem if left unattended.

20.10.1.2. Serviceability

20.10.1.2.1. Areas of highway that incorporate access to ducts, drainage systems etc. should be cut by exception to maintain accessibility to these systems. Cutting around the base of signs is carried out within areas cut.

20.10.1.2.2. In rural areas the finished cutting level should be between 150mm and 50mm. In urban areas there is a clear highway need, as distinct from any local amenity consideration, for grass to be kept shorter than about 150mm. The nominal finished cutting height should not exceeding 50mm.

20.10.1.2.3. As highway users are encouraged to stop at formal lay-bys and picnics areas, the grass at these locations should be cut to an urban standard.

20.10.1.2.4. Agreements exist with several Districts and Parishes (see following table March 2016), to cut areas of highway grass on our behalf. They are paid to cut to our standard and frequency, and can enhance the service at their own expense if they choose to do so.

Districts (3)	Breckland, Great Yarmouth, King's Lynn and West Norfolk	
Parishes (41)	East (9)	Acle, Brundall, Coltishall, Lingwood, Postwick, Rackheath, Reedham, Upton with Fishley, Wroxham,
	North (20)	Aylsham, Beeston Regis, Blakeney, Buxton with Lamas, Drayton, Felthorpe, Hempstead, Langham, Melton Constable, Old Catton, Reepham, Spixworth, Sprowston, Taverham, Thornage, Thorpe St Andrew, Trunch, Walsingham, Wells, Weybourne.
	South (11)	Costessey, Cringleford, Diss, Easton, Framingham Earl, Hingham, Mulbarton, Poringland, Scole, Tasburgh, Wicklewood,
	West (1)	Gt.Massingham.

20.10.1.2.5. On local specification matters some decisions can be made by the Area Manager to modify the cutting regime, but this must be through specific instructions and justifiable such as:

- Flexibility in applying urban/rural standards to take into account the character of the area, rather than solely be determined by speed limit considerations.
- Occasionally local decisions are made concerning the timing of cutting near shooting estates, to prevent damage to nesting/young birds

- Urban standards in rural areas where visibility causes an exceptional hazard i.e. as a result of a safety audit
- Rural standards within urban speed limits (30 or 40), where they have extended beyond the ‘built-up both sides’ environment
- The preceding grass cutting activity table details the frequency of cutting assuming average growth rates. In times of exceptional growth additional cutting may be required at the discretion of the Area Manager.

20.10.1.3. Sustainability

20.10.1.3.1. Norfolk has an established network of 112 Roadside Nature Reserves (RNR). These areas are designated at a county level due to having nationally rare or threatened wildflowers / protected species present.

20.10.1.3.2. Most local authorities have a similar scheme as part of meeting the duties to conserve biodiversity under the Natural Environment & Rural Communities (NERC) Act 2006, and are designated where safe to do so, following discussion with highways officers.

20.10.1.3.3. Norfolk’s RNR verges contain several plant species that are now very rare elsewhere in Norfolk, notably the last remaining populations of Sulphur Clover and Crested cow-wheat, as well as significant areas for Pyramidal Orchid and Pepper Saxifrage are found on roadside verges that are managed by NCC

20.10.1.3.4. The key factor in the management of these rare wildflower areas is that the verge is mown once a year when the flowers have seeded (August onwards) and the cuttings removed to prevent adding additional nutrient back into the soil.

20.10.1.3.5. Our RNR’s are managed by the Environment team and Norfolk Wildlife Trusts Contractor. These are omitted from our rural cutting regime.

20.10.1.3.6. Not mowing sections at all would lead to the growth of scrub and the encroachment of woody plants /weed species and loss of wildflowers, grassland and bare ground habitat. Resulting in a loss of biodiversity.

20.10.1.4. Response

20.10.1.4.1. These are detailed in the Highway Defect Risk Register App D (viii).

20.11. **Trees - Activities**

Activity Type	Activity	NCC Service Standard
Preventative	Planned tree maintenance	As identified from arboricultural inspections, need initiated from safety inspections
	Warn private owners of danger and give notice to take action	
Condition monitoring	Safety Inspections	As carriageway service standards in accordance with the Tree Safety Management Policy for Norfolk County Council adopted 29 October 2009 and revised in 2012 (version2). Special arrangements exist for trees affected by Chalara adjoining highway
	Highway Tree Inspection	Trees are inspected over and above the requirements of the Norfolk County Council Tree Safety Management Policy* Special arrangements exist for trees affected by Chalara
Reactive	Emergency tree work	Emergency tree work if highway endangered. Detailed inspection by our arboricultural and woodland officers if possible. Request to private owner if appropriate

20.11.1. **Trees - Objectives and Response**

20.11.1.1. Safety

20.11.1.1.1. Trees may become a hazard to highway users if they become unstable, decay or their branches encroach onto footways, carriageways or visibility splays. Roots can cause disruption to footway, carriageway surfaces and highway drains. Lower branches can obscure highway signs.

20.11.1.1.2. Highway Inspections are carried out in accordance with Norfolk County Council's Tree safety management policy which was adopted 29 October 2009 and revised in 2012 (version2). Where a potential hazard is identified, the

arboricultural and woodland officers in the Environment Team should be asked to carry out a more detailed inspection and specify remedial work if required. Highway inspectors are also expected to look for potentially dangerous trees that are within falling distance of the highway when carrying out their routine highway inspections.

20.11.1.1.3. Details and actions required are given in the Information Management System (IMS).

20.11.1.1.4. Overhanging branches can cause difficulties for highway users:

- On carriageways attention should be paid to overhanging branches, especially on those bus routes used by double-deckers. Where overhanging branches are lower than 5.2m, action to have them cut back is considered, depending on an assessment of the location and risk.
- On footways, share-use and cycle ways attention should be paid to overhanging vegetation where it is lower than 2.4m. Action to have them cut back is considered, depending on an assessment of the location and risk.

20.11.1.1.5. Generally trees on PROW will be considered to be highway trees and inspected in accordance with the highway tree inspection protocol. There will be significantly fewer highway trees on PROW due to the fact they are not as wide, without the recognised verges which are commonly the location of highway trees. Any tree requiring attention on land adjacent to the PROW will be brought to the attention of the landowner in the first instance. All work to trees adjacent to the highway carried out to keep the highway safe should be recharged.

20.11.1.1.6. Street scene Inspectors must also ensure that signs, signals and sight-lines are not obscured and tripping hazards removed.

20.11.1.2. Serviceability

20.11.1.2.1. Work is ordered through the Routine Maintenance Contract. Tree surgery is carried out by suitably qualified and insured contractors who are on Norfolk County Council's "List of Tree Surgeons" held and maintained by the arboricultural and woodland officers in the Environment Team.

20.11.1.2.2. Before tree surgery work is ordered, checks will be made with the relevant District Council to ascertain if any tree is covered by a Tree Preservation Order or is in a Conservation Area. Where trees are covered by a TPO, permission to carry out tree surgery must be sought from the Tree or Landscape Officer in the District Council. Where trees are within Conservation Areas, notice of the intent to carry out tree surgery (6 weeks) must be given to the District Council.

20.11.1.2.3. Remedial action may require an approach to appropriate landowners and/or service of Notice in accordance with Section 154 of the Highways Act 1980.

20.11.1.2.4. The 'Goods and Services' Agreement with Great Yarmouth Borough Council also includes trees, for the old Borough Area only; the Borough Council undertakes routine inspections and maintenance, but any decision to fell rests with the County.

20.11.1.2.5. Trees can be planted in the highway by either Parish or District Councils; however, formal consent must be obtained from Norfolk County Council as the Highway Authority. Under this agreement the Parish/District enter into a licence with NCC making them liable for future maintenance and eventual removal and reinstatement of the verge if necessary.

20.11.1.3. Sustainability

20.11.1.3.1.

- New planting is encouraged on rural roads where this does not compromise safety or existing landscape or wildlife value. Current guidance states that there should be no new planting within 3m of the edge of the carriageway. Whilst this is a general guide it is more appropriate to relate this standard to the adopted route hierarchy for the County:
- On principal routes a 3.5m verge should be retained. To allow for growth, new trees should be planted a minimum of 4.5m from the carriageway edge. Where main distributor routes are brought up to a modern standard the above distance should apply.
- On other main distributor routes, no new planting should be closer than 3.5 m from the carriageway edge.
- On designated access routes the current 3m standard should apply.
- On unclassified routes it may be possible to permit tree planting closer to the carriageway for environmental reasons, provided road safety is not compromised and the Area Manager agrees.

20.11.1.3.2. Many existing trees are closer to the carriageway edge than these standards. There should not be a presumption to remove these trees, however, as most principal and main distributor routes do not meet modern standards in highway terms. Where individual trees are perceived to be a risk to road users, this risk should be assessed on a case by case basis with regard to road class, alignment, visibility, accident record etc. together with the tree’s environmental value before any decision is taken to fell the tree.

20.11.1.3.3. When planting is undertaken by the adjoining landowner at the back of the highway on his or her own land, he or she has the responsibility for the future maintenance.

20.11.1.3.4. According to the Tree Safety Management Policy, where a tree has had to be removed a replacement tree should be planted in its place. Where this is not achievable due to lack of space or where the site is deemed inappropriate, a nearby site would be acceptable in agreement with the arboricultural and woodland officers. However occasionally no suitable site is available.

20.11.1.3.5. Tree owners have a statutory duty to replace trees in Conservation Areas or those that are covered by a Tree Preservation Order.

20.11.1.3.6. The selection of appropriate species, site preparation and construction, and the adoption of up to date planting methods that minimise root damage, will help to ensure that replacement planting does not cause future problems to the highway. Advice regarding any replanting should be sought from the Department's arboricultural and woodland officers in the Environment Team.

20.11.1.3.7. Opportunities should be taken to revitalise tree-lined avenues as part of adjoining structural maintenance footway schemes. Replacement planting is best undertaken at this time, it provides the best opportunity to provide an inclusive street design and consultations with residents, together with improved after-care. Such projects should be promoted in association with advice from the Department's arboricultural and woodland officers.

20.11.1.3.8. Mature trees are especially vulnerable to excavation or disturbance in the vicinity of their rooting zones. Root damage can make a tree unstable or allow invasion by decay organisms, which can make a tree liable to fail. It is therefore necessary for works below trees to conform to current guidelines to minimise root damage.

20.11.1.3.9. The NJUG 4 "Guidelines for the planning, installation and maintenance of utility services in proximity to trees" are detailed in the Highway Corridor document. They describe working practices to minimise root damage when working near trees. Compliance with the NJUG guidelines must be a requirement of all contracts let by the NCC.

20.11.1.4. Response

20.11.1.4.1. These are detailed in the Highway Defect Risk Register App D (viii).

20.12. Landscaped areas Hedges and Shrubberies Activities

Activity Type	Activity	NCC Service Standard
Preventative	Planned trimming of vegetation or pruning specific to landscape planting. Warn private owners of danger and give notice to take action	As identified from safety inspections, arboricultural advice needs to be sought for landscape areas. As far as possible void bird-nesting season 1st March – 31st July A few landscape areas are directly maintained by Environment Team
Condition monitoring	Safety Inspections	As carriageway service standards

Reactive	Emergency trimming , pruning work	Emergency works if highway safety endangered. Detailed inspection by our arboricultural and woodland officers if appropriate / possible. Request to private owner if appropriate

20.12.1. **Hedges, Shrubberies and Landscaped areas - Objectives and Response**

20.12.1.1. Safety

20.12.1.1.1. The objective for trimming hedges and shrub areas is to maintain safety standards, at locations where vegetation is overhanging the highway. This can cause visibility to be impaired (e.g. bends, central reservations, junctions), inadequate clearance of overhanging vegetation (a minimum of 5.2 metres headroom), the obscuring of highway signs or the restriction in the width of a footway or other available pedestrian refuge or route.

20.12.1.2. Serviceability

20.12.1.2.1. Where hedges are the responsibility of the Highway Authority, trimming of seasonal growth should be carried out once a year on rural roads. Where there are special requirements in visibility areas or across central reserves, or adjacent to footways cutting should be undertaken when required.

20.12.1.2.2. Shrub areas for which the Council are responsible should be maintained until established and thereafter pruned for visibility only, unless they become overgrown, narrowing the available highway. Specialist advice should be sought from the landscape staff in the first instance.

20.12.1.2.3. Owners of private hedges, trees or vegetation causing difficulties should be contacted in accordance with IMS procedure SP03-01-P04 ‘Control or removal of Obstructions on the Highway’.

20.12.1.3. Sustainability

20.12.1.3.1. Any action taken must be in accordance with the requirements of the EC Nesting Birds Directive, Wildlife and Countryside Act 1981, which includes protection for birds, their nests and other relevant legislation. Significant nature conservation benefits will result from this practice. Any trimming should, as far as possible, be done in late winter, to avoid the bird-nesting season 1st March to 31st July and to allow birds and mammals the maximum opportunity to take advantage of any fruits or seed present.

20.12.1.4. Response

20.12.1.4.1. These are detailed in the Highway Defect Risk Register App D (viii).

20.13. Footway siding activities

Activity Type	Activity	NCC Service Standard
Preventative	Planned siding programme	Gt Yarmouth Goods and Services Agreement Footways programmed to be sided when growth significantly restricts width of footway as detailed in Highway Defect Risk Register
Condition Monitoring	Safety Inspections	As carriageway/footway standards
Reactive	Reactive siding	Footways programmed to be sided when growth significantly restricts width of footway as detailed in Highway Defect Risk Register

20.13.1. **Footway Siding – Objectives and Response**

20.13.1.1. Safety

20.13.1.1.1. Encroachment of vegetation over footways can restrict clear passage for pedestrians creating a hazard. It can also conceal defects and contribute to the deterioration of the surface.

20.13.1.2. Serviceability

20.13.1.2.1. Siding is the cutting back or edging of mainly grass adjacent to the highway mainly footways. It is carried out in urban areas, including villages to prevent encroachment of vegetation over the surface.

20.13.1.2.2. This work is carried out on a need basis. In Great Yarmouth the verges adjacent to footways are sided on a three-year rolling programme by the Borough Council under the Agency Agreement.

20.14. Noxious Weeds – Activities

Activity Type	Activity	Service Standard
Preventative	Cutting over a sustained period – see detailed procedure SP-03-04-G01	Dependent upon weed type, cost and actions by adjoining landowner
Condition monitoring	Safety inspections	As carriageway standards
Reactive	Control measures specific to type of injurious weed – see detailed procedure SP-03-04-G01	Dependent upon weed type, cost and actions by adjoining landowner

20.15. **Weed Growth – Activities**

Activity Type	Activity	NCC Service Standard
Preventative	Planned treatment from schedules identified by Area staff	Two treatments per year
Condition monitoring	Safety inspections	As carriageway standards
Reactive	Spot treatment by hand or weed-killer	Dependent upon weed type, cost and actions by adjoining landowner

20.15.1. **Weeds - Objectives and Response**

20.15.1.1. Safety

20.15.1.1.1. The County Council, as Highway Authority, must comply with requirements of the Weeds Act 1959 to control injurious weeds growing within the highway, which threaten to spread to agricultural land. The County Council also has responsibilities to prevent the growth of scheduled plants under the Wildlife and Countryside Act 1981. Details, and action required, are given in IMS Guidance SP03-04-G01 ‘Injurious Weeds’.

20.15.1.2. Serviceability

20.15.1.2.1. The growth of weeds in footways and cycle routes, hardened verges, central reserves and along kerb lines may cause structural damage, and the general perception of such growth is that it is untidy. In some circumstances weeds have been considered to have implications for pedestrian safety. Weed growth is also a source of significant community interest and service requests.

20.15.1.2.2. It may be necessary to use chemical sprays to eliminate weeds and control their growth around posts carrying signs, along guard-rails, on the edges of kerbs and on footways. They may also be used to control the growth of grass on the strip adjoining the edge of the carriageway and on central reservations.

20.15.1.3. Sustainability

20.15.1.3.1. The use of herbicides/pesticides should be minimised as far as practical and persistent residual chemicals should not be used.

20.15.1.3.2. Where total weed killers are required for paved areas they should be used annually for effective results. Noxious weeds should be dealt with on an ad hoc basis as detailed in procedures. All weed spraying should be carried out in accordance with The Control of Pesticides Regulations 1986. Only approved chemicals may be used, as listed in the "Blue Book" entitled Pesticides Approved Under the Control of Pesticides Regulations 1986 (ISBN Code 0 11 242 782 0)

20.15.1.3.3. For further advice on highway verge and soft estate environmental issues, refer to the *'Highway Corridor Environmental Best Practice Guide issued in 2005* and policy database. These are currently being reviewed.

20.16. Lifecycle Cost Analysis

20.16.1. We currently utilise the following strategy to maintain these assets.

Grass	-	Cut on planned basis to set frequency
Siding	-	On needs basis identified from safety inspection
Trees	-	Replaced as necessary due to individual condition identified from safety inspection and specified by an arboriculturist
Landscaped areas, hedges and shrub areas	-	Replaced as necessary due to individual condition identified from safety inspection and specified by an arboriculturist
Noxious Weeds	-	Attended as necessary due to Control measures specific to type of injurious weed identified from safety inspection with advice from Environment Team if necessary

20.16.2. Apart from the highway tree stock managed by the agency in Norwich we do not hold detailed inventory records.

20.17. **Routine Works Budget**

2014/15	Actual Spend	
	County	City
Verges, Hedges, Trees	£887,317	£64,067
Grass	£940,514	£220,000
Weeds	£274,812	£30,000
County Landscape	£49,467	N/A
Total	£2,152,110	£314,067
Grand Total	£2,466,177	

2015/16	Actual Spend	
	County	City
Verges, Hedges, Trees	£793,653	£64,231
Grass	£916,816	£220,000
Weeds	£286,063	£30,000
County Landscape	£47,085	N/A
Total	£2,043,617	£314,231
Grand Total	£2,357,848	

2016-17	Actual Spend	
	County	City
Verges, Hedges, Trees	£803,962	£68,812
Grass	£773,873	£200,000
Weeds	£292,949	£30,000
County Landscape	£39,258	N/A
Total	£1,910,042	£298,812
Grand Total	£2,208,854	

2017-18	Actual Spend	
	County	City
Verges, Hedges, Trees	£703,764	£64,184
Grass	£973,300	£220,000
Weeds	£293,024	£30,000
County Landscape	£93,002	
Total	£ 2,063,090	£314,184
Grand Total	£2,377,274	

2018-19	Original Budget	
	County	City
Verges, Hedges, Trees	£615,000	£65,000
Grass	£1,012,950	£220,000
Weeds	£313,650	£30,000
County Landscape	£93,000	
Total	£2,034,600	£315,000
Grand Total	£2,349,600	

20.18. Service Levels

20.18.1. There are no statutory indicators identifying the condition of elements of the ‘soft estate’. We will consider whether any local performance indicators would be suitable.

21. Public Rights of Way and Access – Lifecycle Management Plan

21.1. Public Rights of Way are a type of highway that comprises linear routes of various statuses as recorded on the Definitive Map and Statement. The public has a right to pass and re-pass along them on foot, on a bicycle, on a horse, on a carriage or mechanical vehicle depending on the route status. The County Council's Rights of Way Improvement Plan provides the basis for the long term management of the network.

21.2. From 21 May 2012 Highways Maintenance team took responsibility for the inspection and maintenance of some 3200km PROW (complete PROW network minus those which are coincident with Norfolk Trails). Environment & team retains responsibility for the maintenance and development of some 700km of PROW on Norfolk Trails.

21.3. The Public Right of Open Access has existed in Norfolk since November 2005. The right applies to 9000ha of land mapped conclusively as Open Country or Registered Common and dedicated land.

21.4. This part of the transport network supports the rural economy largely through facilitating leisure and tourism. It also contributes to the reduction of congestion and climate change impacts whilst at the same time improving public physical and mental health through recreation in the countryside and biodiversity networks.

21.5. Physical Parameters

21.5.1. Surfaces

21.5.1.1. The surface condition of public rights of way should enable use by the public at the level of the minimum-recorded right. The following lengths are based upon Countryside Access Management System records 2014.

Public Right		Length (km)
1	Footpath	2700
2	Bridleway	590
3	Restricted Byway	480
4	Byway Open to All Traffic	54
Total		3824

21.5.1.2. Widths may vary, being based either on the Definitive Statement, historical evidence or the Highways Act 1990. The latter provides default widths in the absence of any other in respect to agricultural land. For cross field paths the minimum width for a footpath is 1m, bridleway is 2m and restricted byway 3 metres. For field edge routes 1.5m for a footpath and 3m for a bridleway.

21.5.1.3. Field edge Restricted Byways and Byways Open to All Traffic are maintained to a minimum width of 5m or to a width determined by historical evidence.

21.5.1.4. There is no requirement to treat vegetation to permit public access across the 9000ha of Access Land.

21.5.2. Structures

21.5.2.1. Bridges range in style from railway sleepers across ditches to engineered footbridges and ‘bridle-bridges’, and length, from 3m to 25m, and include fords and boardwalks.

21.5.2.2. Signposts identifying the route status and direction are provided as a statutory requirement where paths leave a metalled road.

21.5.2.3. Additional way-marking is provided where it is deemed necessary.

21.5.2.4. Landholders are permitted to maintain recorded gates and stiles for livestock control. The least restrictive option is encouraged. The County Council maintains gates in some situations and also operates a rolling programme of barrier removal.

21.5.2.5. These figures are based upon Countryside Access Management System records 2014.

Structure		Numbers (approx.)
1	Bridges	1300
2	Signposts	6800
3	Way-marks	1000s
4	Stiles	1650
5	Gates	1750

21.5.2.6. Norfolk County Council has powers to make bylaws, appoint wardens, erect notices and provide a means of access to assist in the management of Access Land.

21.6. Lifecycle Options

21.6.1. Creation and Acquisition

21.6.1.1. Routes are seldom created. When they are it is usually through landholder dedication or ‘claims’ through 20 years use. Dedication can also give rise to new Access Land. This authority has powers of compulsory dedication of Public Paths including payment of compensation.

21.6.2. **Renewal or Replacement**

21.6.2.1. Signpost replacement to offset theft and vandalism, and general deterioration, is continuous. Landholders are responsible for maintaining side and overhead vegetation and re-instating the route after ploughing.

21.6.2.2. Streetscene Inspectors inspect all timber ligger bridges up to 5m in overall length including those with standalone handrails. The only exception being on liggers where the handrail is an integral part of the structure (i.e. attached) which will be inspected by the County Council Bridges Team. All other bridges (regardless of length) are inspected by the Bridges Team.

21.6.2.3. Landholders are usually responsible for maintaining gates and stiles. Generally, the County Council has responsibility for bridges over natural watercourses.

21.6.2.4. Various legal processes allow for public paths to be created, extinguished or diverted, and legally recognised. As present there are around 30 Legal Orders waiting to be determined.

21.6.3. **Upgrading**

21.6.3.1. Landholders may irrevocably lift general restrictions on activities permitted on Access Land.

21.6.4. **Disposal**

21.6.4.1. Routes are seldom extinguished. When they are it is usually to allow development to take place. The Cycle Tracks Act 1984 provides for footpaths to be re-classified as cycle-ways, this has the effect of removing them from the Definitive Map and Statement.

21.6.4.2. The Open Access Conclusive Map is to be reviewed by Natural England every ten years. Land that changes character or is removed from the Commons Register in the meantime will be removed.

21.7. Non Asset Options

21.7.1. **Managing Demand**

21.7.1.1. It is unlikely that Access Land parcels will be individually signed.

21.8. Treatment Options

21.8.1. There is scope to manage paths to different standards in accordance with varying needs. Urban routes could be surfaced, signed and lit for utility use. More rural paths could be maintained for recreational use.

21.9. Routine Maintenance

21.9.1. Activities

Activity Type	Activity	NCC Service Standard
Preventative	Planned inspections carried out by Streetscene Inspectors enabling rectification of defects. Countryside Access Officers respond to customer requests for service	To allow public use consistent with path status. Defects identified in accordance with PROW defect risk register
Condition Monitoring	Planned Inspections	Urban – Annually Rural – Every 5 years (from Dec 12)
	Attain feedback from users, and Parish Councils, to provide working knowledge	To allow public use consistent with path status.
Reactive	Reports from the public logged for attention	Immediate attention High Medium or Low priority

21.9.1.1. A preventative, condition monitoring, or reactive work policy is not required for Access Land.

21.10. Objectives and Response

21.10.1. Safety

21.10.1.1. Public Rights of Way provide off-road routes where walkers, riders and cyclists can avoid traffic.

21.10.2. Serviceability

21.10.2.1. Use of such routes could be extended from a leisure base to include utility trips to increase the value of the network to the rural economy.

21.10.3. Sustainability

21.10.3.1. When highways known as Public Rights of Way are treated as part of the wider transport network they contribute to the reduction of congestion and climate change impacts while improving public health.

21.11. Lifecycle Cost Analysis

21.11.1. We currently utilise the following strategy to maintain these assets

21.11.2.

Vegetation	-	Reactive cutting regime based on requests for service
Signposts, way-markers, surface, bridge	-	Replaced as necessary due to wear and tear from planned inspection or reactive to complaint

21.11.3. No condition data is held regarding the elements used to support the use of PROW and as such lifecycle cost analysis is limited.

21.11.4. **Revenue Budget**

21.11.4.1.

2012/13 Actual	2013-14 Actual	2014-15 Actual	2015-16 Actual	2016-17 Actual	2017-18 Actual	2018-19 Original
£112,799	£140,793	£180,703	£170,712	£201,611	£113,125	£164,000

21.12. Service Levels

21.12.1. A Best Value Performance Indicator (BVPI) of a 7% random sample of total PROW network completed annually from 2007/08. This indicates the % of the total length of footpaths and other rights of way that are easy to use by members of the public.

21.12.2.

	2007/8	2008/9	2009/10	2010/11	2011/12	2012/13
Target	79%	79%	79%	79%	70%	Discontinued
Actual	79.1%	78.8%	76.8%	78.9%	72.5%	

22. Access Development – Lifecycle Management Plan

22.1. Norfolk County Council develops, maintains and promotes public access to the countryside and market towns using the Public Rights of Way and country lanes network. Permissive routes have also been established on land owned by the County Council such as disused railway lines and on County Farms land and also by agreement with private landowners. The management of the right of way is now deliver through the depots and the countryside access officers. The promotion and development of the network is largely now delivered through the Norfolk Trails initiative. This supplementary management of the transport network supports the rural economy, the health and well-being of Norfolk's population and in some cases forms a major piece of Green Infrastructure with significant commuter traffic.

22.2. Work is progressing on adding to the cycling and walking Green Infrastructure network though an initiative to convert more disused railways for this purpose. A feasibility study is being funded by the County Council looking at the disused railway network as a whole and undertaking detailed studies on three former railways. This along with promotional activities such as the DfT funded Pushing Ahead will play a part in facilitating modal shift from car to cycling and walking journeys.

22.3. The County Council's Rights of Way Improvement Plan 2007 – 17 (ROWIP) provides the basis for the medium term management of the network including Norfolk Trails.

22.4. The ROWIP Strategic Review was published in July 2015 and is available on request. The review is informing a new Norfolk Access Improvement Plan to be in place by the end of 2018.

22.5. We are currently procuring the Norfolk Trails Handbook which will provide guidance for suitable countryside furniture and an approach to access. The Norfolk trails Handbook has been completed and provides guidance on approach to managing long distance trails and the installation of infrastructure for countryside access.

22.6. Physical Parameters

22.6.1. Surfaces

22.6.1.1. Hard and soft surfaces are provided at our discretion to suit the target audience. Public safety, liability, and daily maintenance combined with a mixed funding approach for major maintenance and development direct management decisions.

Type of Permissive Access		Length (Approx.)	Examples
1	Owned route	50 km	Marriott's Way (most) Paston Way (part) Weavers' Way (part)
2	Agreed route	3.5 km	Fen Rivers Way (part)
3	Owned area	12 Ha	Wiveton Down Burlingham Woods

22.6.2. **Structures**

22.6.2.1. The County Council has responsibility to ensure that all structures (including bridges) which are situated on County Council owned land, are maintained in a safe condition. The aim is to facilitate types of use that are permitted, yet prevent illegal use and trespass.

Asset	Number (Approx.)
Bridges	40
Gates	40
Steps	20
Seats	20
Total	**120**

22.6.2.2. Significant lengths of Trails routes are based on disused railway lines so bridges and culverts are generally substantial brick built constructions.

22.6.2.3. In several locations, significant flights of steps give access to the track-bed from bank top. In some locations ramps have been constructed to allow access for people with disabilities and wheelchair users.

22.6.3. **Promotion**

22.6.3.1. Promotion is now focused on Norfolk Trails and their associated network. Increased use of this network is encouraged by working with stakeholders (communities, businesses and the health sector). The main information and promotional tool is web based. As mentioned above, the DfT funded Pushing Ahead project is promoting modal shift to cycling and walking in the Greater Norwich and Great Yarmouth areas.

Asset	Number
Boards	More than 350
Website	3
Leaflets	Under review

22.7. Lifecycle Options

22.7.1. Creation and Acquisition

22.7.1.1. Improving the connectivity of existing routes is called for and there are modal shift opportunities to create linking Green Infrastructure. The Recycling the Railways Project will provide opportunities for creating further Green Infrastructure networked links.

22.7.1.2. Providing further public access on the current county estate is always an option but without connectivity to communities, train and bus routes there would be little benefit. Purchasing land for Green Infrastructure routes is possible but would depend upon a mixed funding approach. There are opportunities to encourage developers to create new countryside access links within the Growth Areas. Consideration will need to be given to how the maintenance of any additional access routes will be funded on an ongoing basis.

22.7.2. Renewal or Replacement

22.7.2.1. Surfaces and structures are renewed or replaced based on continual monitoring or reports from the public. These are logged for attention as follows:

- Immediate - if it has health and safety implications.
- High - if it affects a Norfolk Trail spinal route.
- Medium - if it affects a Norfolk Trail associated route.
- Low - if it affects only an isolated generally unused path or one that runs alongside another path.

22.7.3. Upgrading or Disposal

22.7.3.1. Permissive routes and promotion are usually designed with local consultation and to fulfil a specific demand when mixed funds are available. Therefore, they are not usually disposed of, unless there is a significant change of use or a better alternative arises. Upgrading the county owned permissive routes is a cyclical process dependant on mixed funding.

22.8. Non Asset Options

22.8.1. Managing Demand

22.8.1.1. Provision is in response to local community, economic development opportunities, green Infrastructure needs and the health and well-being of Norfolk people and visitors.

22.8.2. Amending Standards

22.8.2.1. Norfolk Trails are managed to a set of Quality Standards, with a theme to become more inclusive. The Quality Standards, influenced by developing good practice will inform renewal or replacement.

22.9. Treatment Options

22.9.1. Surfaces, structures, and information must be maintained so they are safe and serve their purpose.

22.10. Access Development - Routine Maintenance - Activities

22.10.1.

Activity Type	Activity	Service Standard
Preventative	Renewal and replacement	To allow and inform safe public use as permitted
Condition Monitoring	Continuous inspection to provide working knowledge	To allow and inform safe public use as permitted
Reactive	Reports from the public logged for attention	Immediate attention High Medium or Low priority

22.11. Access Development - Routine Maintenance - Objectives and Response

22.11.1. Safety

22.11.1.1. Promotion and permissions provide off-road routes, where walkers, riders, and cyclists, including substantial commuting traffic can be kept separate from motorised traffic and also encourage further modal shift.

22.11.1.2. Norfolk trails now has a number of volunteers who carry out site inspections and report back to the team on any issues they have identified. Information on how to carry out inspections is held on the website so anyone can have access to reporting procedures. The value of volunteering on Norfolk Trails is increasing annually

22.11.2. **Serviceability**

22.11.2.1. Route and information provision covers both leisure and utility trips and will need to respond to major housing developments.

22.11.2.2. Promotional materials (site boards and leaflets) are being replaced by web based information. Non-digital material will only be replaced following an analysis of need and then dependant on a mixed funding project.

22.11.3. **Sustainability**

22.11.3.1. Marketing of 'Norfolk Trails' opportunities by right and permission, as part of the wider transport network, enable modal shift. As such they contribute to the reduction of congestion and climate change impacts while improving public health and well-being and supporting local business to become both economically and environmentally more sustainable.

22.12. Lifecycle Cost Analysis

22.12.1. We are currently moving towards a planned maintenance system supported by a mixed funding model to manage the assets.

22.12.2. **Infrastructure**

22.12.2.1. We are moving towards comprehensive condition data of all infrastructures to enable lifecycle cost analysis.

22.12.2.2.

Vegetation	-	Planned cutting regimes across all Norfolk Trails a cutting contract has been procured with an annual value of £45k
Signposts, seats, surface, bridge etc.	-	Replaced as necessary due to wear and tear from audit data and on-going regular inspections.

22.13. Works Budget

2013/14 Actual	2014/15 Actual	2015/16 Actual	2016-17 Actual	2017-18 Actual	2018-19 Budget
£91,571	£84,850	£82,942	£77,000		

22.14. Service Levels

22.14.1. Norfolk Trail Quality Standards are based on the above national guidelines.

22.14.2. There are no statutory indicators regarding 'access development'. We will consider whether any local performance indicators would be suitable.

23. Level Crossings - Lifecycle Management Plan

23.1. These assets are designed to:

- Separate Highway and Railway users in order to ensure the safety of travellers and facilitate movement.

These assets are the primary responsibility of the Rail Authority who fund works within the level crossings. The exception to that rule being A1122 Denver - Downham Market Bypass. This is still the responsibility of the Rail Authority but the Highway Authority funds road works within the level crossings.

Our aims are to ensure that the:

- Support facilities in the Highway such as associated signs being legible, visible and effective.
- The level crossing is maintained by the Rail Authority in a safe manner for highway users.

23.2. Physical Parameters

23.2.1. Level Crossings

23.2.2. There are 61 level crossings in Norfolk. The number of level crossings is drawn from inventory items held on the Highways Management System (April 15).

23.3. Lifecycle Options

23.3.1. Creation and Acquisition

23.3.1.1. These fall into 2 broad areas:

- Highway Authority
- Rail Authority

23.3.1.2. County Council Schemes:

23.3.1.2.1. Where they have been placed within the highway normally as part of

- A new road, such as a bypass

23.3.1.2.2. In this case the Highway Authority could make a one-off payment for future maintenance within the level crossing or an agreement to fund road works within the level crossing as determined by the Rail Authority.

23.3.1.3. Rail Authority Schemes:

23.3.1.3.1. Where they have been placed within the highway normally as part of

- A new railway

23.3.1.3.2. In this case the Railway Authority is responsible for future maintenance within the level crossing.

23.3.1.3.3. The Area offices maintain these via the highway maintenance fund in all cases.

23.3.2. **Renewal or Replacement**

23.3.2.1. Upon any actual damage or degradation to the highway surface within the level crossing or to a traffic sign, its replacement should be considered within the framework of the both road and rail policies and traffic signs regulations and general directions.

23.3.2.2. Renewals can be necessitated by changes in legislation policy and technical guidance.

23.3.3. **Upgrading**

23.3.3.1. Upgrading is normally considered in conjunction with the renewal and replacement process.

23.3.4. **Disposal**

23.3.4.1. This is normally considered in association with renewal and replacement.

23.4. Non Asset Options

23.4.1. **Managing Demand**

23.4.1.1. New assets should only be installed at those locations approved by the planning process.

23.4.1.2. The method for assessing requests, undertaking works and recharging costs are detailed in the Technical Group procedure Manual Section 7 Traffic Management.

23.4.2. **Amending Standards**

23.4.2.1. Local policies may revise (this would generally be in an ‘improvement’ framework) the criteria given in the traffic signs regulations and general directions regarding destination, regulatory and warning signs.

23.5. Treatment Options

Do Minimum	Annual routine cleansing of signage
Medium Life	Replace faulty clips. Straighten posts. Pothole repairs within the level crossing by the rail authority
Long Life Treatment	Replace signs (consider post condition at same time). Renewal of road surface within the level crossing by the Rail Authority

23.5.1. **Non-illuminated Traffic Signs & Bollards – Routine Maintenance Activities - See Lifecycle Plan 5.0**

23.5.1.1. In addition the Rail Authority will carry out their own inspection according to their maintenance regime and may request work of the Highway Authority such as the trimming of hedges obscuring traffic signs.

23.5.2. **Roads – Routine Maintenance Activities - See Lifecycle Plan 2.0**

23.5.3. **Non- illuminated Traffic Signs & Bollards – Objectives and Response - See Lifecycle Plan 5.0**

23.5.4. **Roads – Objectives and Response – See Lifecycle Plan 2.0**

23.5.4.1. Works within the level crossing should always be carried out by the Rail Authority.

23.5.4.2. Requirements for road and street works at or near level crossings is detailed within Appendix 'C' of the Code of Practice for the Co-ordination of Street and Works for Road Purposes and Related Matters, New Roads and Street Works Act 1991.

23.5.4.3. Any planned work near, over or on Network Rail assets requires the consent of Network Rail.

23.6. Lifecycle Plan

23.6.1. There is no plan for this asset.

23.7. Lifecycle Cost Analysis

23.7.1. **Routine**

23.7.1.1. We currently utilise the following strategy to maintain these assets.

Signs, posts and bollards	- As necessary but at least annually. - Replaced as necessary due to individual wear and tear.
Road within level crossing	- Inform the rail Authority of the need for works.

23.7.1.2. We do not hold condition data on the individual signs and bollards. They are inspected upon safety inspections and those requiring treatment prioritised for replacement depending upon the severity of the defect of the location.

23.7.2. **Structural**

23.7.2.1. In 2010-11 we funded the re-construction of the road within the level crossing at Denver A1122 Downham Market Bypass. This was in accordance with the legal agreement signed when the Highways Authority built the road.

23.7.2.2. This was an exceptional item we expect not to incur for another 20 years.

23.8. Service Levels

23.8.1. There are no statutory indicators identifying the condition of signs and bollards. We will consider whether a local standard can be developed in the future.

23.9. Risk

23.9.1. **Financial**

23.9.1.1.
- Risk – Insufficient Budget / Overspend

The Highways Budgets are sufficient to deal with any issues arising with this asset type

Impact = 1 (overspend up to £100,000) x Likelihood (Unlikely) =1

= Risk 1 low risk

23.9.2. **Operational**

23.9.2.1.
- Risk - The ability to deliver the required standards and liability

We have a proven highway inspection regime in place.

Impact = 5 (liability in 3rd party claim) x Likelihood (Rare) = 1 = Risk 5 low risk.

24.

Automatic Traffic Counters (ATC) & Automatic Cycle Counters (ACC) Lifecycle Management Plan

24.1. This asset grouping comprises all ATC & ACC sites that are owned by the County Council as the Highways Authority.

24.2. ## Physical Parameters

24.2.1. The following table shows the ATC & ACC assets owned by Norfolk County Council within each District

24.2.2.

District name	No. of ATC's	Value	No. of ACC's	Value	District value
N. Norfolk	8	£26736	0	£0	£26736
W. Norfolk	8	£26736	0	£0	£26736
Breckland	11	£36762	0	£0	£36762
Norwich City	3	£10026	16	£40672	£50698
Broadland	8	£26736	3	£7626	£34362
Gt Yarmouth	6	£20052	0	£0	£20052
S. Norfolk	13	£43446	0	0	£43446
Total	57	£190494	19	£48298	£238792

24.2.3. We have at present, due to site reduction, the following surplus of stock:

24.2.4.

No.	Type	Replacement Value
11	ATC's	£12100
37	ATC Cabinets	£26233

24.2.5. The following table shows the replacement value of each component of an ATC/ACC site.

24.2.6.

Item Description	Replacement Value
4 Loop traffic counter	£1,100
Cycle Counter	£800
4 Loop inductive install	£1,500
Cycle loop install	£1,000
ATC Cabinet and solar panel	£709
Crossover Cable	£10
Battery	£23
Replacement solar panel	£270

24.2.7. Total replacement cost of ATC site = £3242.00

24.2.8. Total replacement cost of ACC site = £2542.00

24.3. Lifecycle Options

24.3.1. Creation and Acquisitions

24.3.1.1. Creation and acquisition is the result of a number of means

- Transport monitoring group – £12,000

24.3.1.2. Growth of the stock increases the maintenance cost of the service, but with no increase in energy costs as the sites are either powered by solar cells or rechargeable batteries

24.3.1.3. Over the past year the number of ACC sites has increased by 46%

24.3.2. Renewal & Replacement

24.3.2.1. Individual elements are reviewed on a case by case basis and loops are replaced when the section of road is resurfaced and costs charged to the contractor.

24.3.3. Upgrading

24.3.3.1. The opportunity to upgrade the technology is reviewed on an annual basis.

24.4. Non Asset Options

24.4.1. At the end of a project, the ATC and all equipment is returned to our store for future use. The loops are safe to be left in position.

24.4.2. To remove an individual site from the network the contractor charges £495 per site.

24.4.3. Where applicable the contractor will also charge for traffic management on necessary sites. It is considered that 20 sites in the network would require some form of traffic management.

24.5. Managing Demand

24.5.1. New sites are generally requested in order to monitor new schemes such as bypasses and cycle paths.

24.6. Lifecycle Treatment Options

24.6.1.

Do Minimum	These activities are the routine maintenance tasks carried out to ensure safety, also to maintain standards and ensure data integrity for the users. • Download of data and electrical inspection of ATC • Repair accident damage • Structural inspection of cabinet and inductive loops
Long Life	It is assumed that the cabinet and ATC are repairable with removable and replaceable components and will only be totally upgraded when new technology is deemed more suitable.

24.7. Routine Maintenance Activities

24.7.1. **Frequency of Maintenance**

24.7.1.1. An annual inspection to be carried out at all sites and a report supplied in electronic format.

24.7.1.2.

Activity Type	Service standard
Inspection	A visual inspection of cabinet, solar panel, cables and inductive loops. Counter to be downloaded and battery levels to be checked. Trim back plant growth and foliage from around cabinet
Clean	The solar panel is cleaned as necessary in accordance with the manufacturer's recommendations.
Structural Inspection	Visual structural inspection of cabinet, foundation base and inductive loops at the quarterly inspection
Electrical inspection	A visual electrical inspection shall be carried out and any faults shall be corrected. The back-up battery is to be checked (and the age/condition recorded) and replaced where necessary. Crossover cable to be inspected for signs of corrosion and replaced where necessary.
Electrical Test	As required an electrical inspection and test will be carried out on any site where data is incomplete or unusual. ATC to be checked and if damaged to be returned to the manufacturer for repair.
Excluded Items	Damage from such factors as road works are excluded from routine maintenance. In such circumstances the contractor responsible is identified and invoiced for the cost of repair and/or replacement of the site. Where costs are not recoverable it is the responsibility of the client to pay for repairs.
Complete Replacement	Complete replacement of a site is excluded and is a non-routine bill of quantities item. Any non-routine item replaced due to vandalism shall be at the item cost plus labour and will be charged to the client.
Additional Work	Non-routine bill of quantity items can be added or removed at any time with the agreement of both parties.

24.8. Objectives and Response

24.8.1. Safety

24.8.1.1. The objectives are:

- Identify risks to users
- Separation of potential traffic conflicts
- Keep all sites safely accessible at all times in relation to road use and traffic speeds
- Ensure all staff responsible for installation and maintenance are supplied with appropriate personal protective equipment.

24.8.1.2. A 4-hour response will be required to attend any incident as specified by Norfolk County Council within normal contractual hours. This would normally be the result of a road traffic accident, cabinet overturned or any other dangerous occurrence.

24.8.1.3. Vegetation that could potentially cover the solar panel on any ATC cabinet will be removed on each annual site visit.

24.8.2. Serviceability

24.8.2.1. The objectives are:

- Contribute to the ease of use
- Contribute to network integrity by augmenting and supplementing the Asset inventory data

24.8.2.2. An annual visit will be carried out at each site (see 24.7.1.).

24.8.2.3. All inspection reports are in a standard format and are available in electronic form.

24.8.2.4. Normal response for any other reported faults will be 5 working days.

24.8.2.5. We will remove graffiti which is considered to be racist or otherwise offensive on any of our counting sites. We will do so as soon as reasonably practicable, depending on its nature and location

24.8.3. Sustainability

24.8.3.1. The objectives are:

- Support sustainable transport modes
- Contribute to economic development
- Contribute to casualty reduction schemes
- Add valuable data to the Asset Inventory, contributing to network integrity

24.9. Lifecycle Cost Analysis

24.9.1. Routine

24.9.1.1. We maintain an inventory of ATC sites on the Traffic Surveys ATC database.

24.9.1.2. It is considered that an ATC site is a permanent site. Inductive loops are replaced as and when the road is resurfaced and costs are charged to the contractor. All counters are fitted with non-serviceable / replaceable components and any minor damage to the cabinet is noted on the bi-monthly inspection and repaired within 5 working days. Owing to the current surplus of ATC's we would be likely to replace any failing counter with one from this surplus stock.

24.9.1.3. There is a maintenance record for each site describing condition of the ATC.

24.9.1.4. The total cost is currently £12k per annum (April to March). This figure is subject to the agreed budget for each project.

24.10. Service Levels

24.10.1. We have standards relating to defect response and maintenance visits and consider this as forming the basis of a service level system together with an associated stock inventory.

24.11. Risk

24.11.1. Financial

24.11.1.1. Risk - Insufficient Budget / Overspend

24.11.1.2. Risk - Reduced funding from current contracts

24.11.2. Operational

24.11.2.1. Risk – The ability to deliver the required standards and liability

24.11.2.2. We have a proven inspection regime in place.

24.11.2.3. Impact = 5 (liability in a 3rd party claim) x Likelihood (Rare) =1 x 5 = low risk.

25. Safety Camera Lifecycle Management Plan

25.1. This asset grouping comprises all Safety Camera assets that are owned by the County Council as the Highway Authority but fall under operational control of the Norfolk Safety Camera Partnership SLA and Board.

25.2. Physical Parameters

25.2.1. The following table shows the Safety Camera assets owned by Norfolk County Council. It represents an asset which has not grown significantly over the last few years.

Fixed Safety Camera Housings (Digital)	6
Fixed Average Speed Camera System (Digital)	1

25.3. Lifecycle Options

25.3.1. Creation and Acquisitions

25.3.1.1. Creation and Acquisition is the result of one of three means:

- Legacy sites (used as trials)
- Norfolk & Suffolk Safety Camera Partnership identification
- Schemes designed for safety improvements

25.3.1.2. Growth of the stock increases the maintenance costs to the service.

25.3.1.3. Stock has decreased in the last 12 months as the Safety Camera Partnership invested in new digital camera technology.

25.3.2. Renewal or replacement

25.3.2.1. Individual elements are normally replaced as required.

25.3.3. Upgrading

25.3.3.1. This is considered upon changing operational, business, maintenance need or technological redundancy.

25.4. Non Asset Options

25.4.1. The Safety Camera Partnership are taking on more asset responsibility by managing the yearly calibration/servicing of units as required and ordering new cameras with Norfolk County Council providing technical support to this process.

25.4.2. **Managing Demand**

25.4.2.1. The Norfolk Safety Camera Partnership are expanding stock in 18/19 by adding 1 additional fixed site and 1 average speed camera system. However further increases could occur if identified as remedial treatment following an accident investigation and prevention (AIP) report, new sites may be installed as a Local Safety Scheme (LSS) intervention.

25.4.2.2. Norfolk's highway network comprises mainly long rural lengths, therefore the Safety Camera Partnership have promoted the use of mobile camera vans which has limited the expansion of fixed camera housing stock outside urban areas.

25.5. Lifecycle Treatment Options

Do Minimum	These activities are the routine maintenance tasks carried out to ensure safety and maintain standards for users. • Repair accident/vandal damage • Road Marking installation and refreshing
Long Life	Replace and upgrade as they become life-expired.

25.6. Safety Cameras - Routine Maintenance Activities

25.6.1. Routine work is funded from the Network Management revenue budget.

Most fixed camera stock is Truvelo D-Cam type which use imbedded carriageway sensors. These require replacement by a specialist contractor following surface dressing or resurfacing work which should be charged to the appropriate maintenance scheme. Re-installation of sensors to be arranged through the Network Management (Analysis & Safety) Team. Maintenance activities may also affect or obliterate 'secondary check' road markings associated with a camera installation. These will also require reinstatement where affected.

Routine maintenance activity which may affect camera operation should be notified to the Network Management (Analysis & Safety) Team for liaison with the Safety Camera Partnership.

A new installation may be funded from the Norfolk & Suffolk Safety Camera Partnership or Local Safety Schemes budget if identified as an accident reduction intervention.

25.6.2. **Frequency of maintenance**

Activity Type	Activity	Service standard
Preventative	Inspection	A visual Inspection of secondary check marks is undertaken as part of the road inspection regime, frequency depends upon the individual roads route hierarchy.
Non Routine Maintenance	Complete replacement	Complete replacement of a Safety Camera Housing is a non-routine bill of quantities item. Any non-routine item replaced under vandalism shall be at the item cost with the labour included under routine maintenance.
	Additional Work	Following a vandalism report, immediate inspection and short term repairs are undertaken to ensure the site remains safe using an approved contractor.
	Traffic Management (TM)	TM is implemented under the current contract in place with Lafarge Tarmac. Any additional traffic management invoices above a basic level are to be supported by evidence and pre-agreed with the Network Safety Project Engineer.

25.7. Safety Cameras – Objectives and Response

25.7.1. **Safety**

25.7.1.1. The objective is to:

- Reduce casualties that result from speed related road traffic collisions.
- Provide evidence to aid in the enforcement of speed limits.

25.7.1.2. A 2-hour response will be required to any incident as specified by Norfolk County Council within contract hours or as an out-of-hours call-out. This would normally be the result of a road traffic accident, exposed wires or any other dangerous occurrence.

25.7.1.3. Vegetation potentially obscuring Safety Cameras should be recorded during routine inspections and treated accordingly. Additional reporting streams from Safety Camera Partnership operatives.

25.7.2. **Serviceability**

25.7.2.1. The objective is to:

- Contribute to ease of use.
- Contribute to network integrity.

25.7.2.2. Normal response for any reported fault will be five working days.

25.7.2.3. Norfolk County Council will remove graffiti placed on any of its highway assets, which is considered to be racist or otherwise offensive. We will do so as soon as reasonably practicable, depending on its nature and location, but within 10 days of being observed or reported.

25.7.3. **Sustainability**

25.7.3.1. The objective is to:

- Reduce casualties that result from speed related road traffic collisions.
- Contribute to reducing the cost to society as a result of a road traffic collision.

25.7.3.2. For further advice on visual intrusion from road side assets, refer to the *'Highway Corridor'* document and policy database.

25.8. Lifecycle Cost Analysis

25.8.1. **Routine**

25.8.1.1. Currently we hold an inventory of Safety Cameras/Housings. We replace posts and housings as necessary due to individual wear and tear/RTA.

25.8.1.2. **Routine Budget**

2013/2014	**Actual Spend**
Routine works	£27,000
Total	£27,000

2014/2015	**Actual Spend**
Routine works	£27,000
Total	£27,000

2015/2016	**Actual Spend**
Routine works	£30,000
Total	£30,000

2016/2017	**Actual Spend**
Routine works	**£35,000**
Total	**£35,000**

2017/2018	Actual Spend
Routine works	**£25,000**
Total	**£25,000**

2019/2019	Planned Budget
Routine works	**£25,000**
Total	**£25,000**

25.9. **Service Levels**

25.9.1. We have standards relating to defect response and maintenance visits.

25.10. **Risk**

25.10.1. **Financial**

25.10.1.1. Risk – Insufficient Budget / Overspend

25.10.1.2. Our budget based upon analysis of previous annual maintenance expenditure. Impact = 1 (overspend up to £100,000) x Likelihood = 2 (unlikely) = 2 low risk

25.10.2. **Operational**

25.10.2.1. Risk – Withdrawal of Police Authority/Government support

25.10.2.2. The current business model is viable and self-sustaining. Impact = 3 (withdrawal of support) x Likelihood = 1 (unlikely) = 3 low risk.

26. On Street Pay and Display Machines - Lifecycle Management Plan

26.1. This asset grouping comprises all On Street Pay and display machines assets that are owned by the County Council as the Highway Authority but fall under operational control of Norwich City Council Highway Agency Management committee.

26.2. Physical Parameters

26.2.1. The following table shows the On Street Pay and display machines assets owned by Norfolk county Council. It represents an asset which has not grown significantly over the last few years.

Fixed On Street Pay and display machines	71

26.3. Lifecycle Options

26.3.1. Creation and Acquisitions

26.3.1.1. Creation and Acquisition is the result of one of three means:

- Tendering on the start-up of On Street Enforcement of CPE
- Highway Agency Agreement
- To contribute to the income stream for the On Street accounts
- New highway scheme

26.3.1.2.

26.3.2. Renewal or replacement

26.3.2.1. The original Pay & display machines were purchased in 2000. As machines have been identified as reaching the end of serviceability their viability is reviewed and may be replaced, upgraded or removed depending upon assessment. Technological advances means that a like for like replacement is unlikely and some form of upgrade with improved functionality or reduced maintenance is the more likely outcome.

26.3.3. Upgrading

26.3.3.1. In 2014-15 It was agreed at the NHAC management meeting that the city council would purchase new On street pay & display machines out of the operational budgets in the year 2014-15, 25 machines were upgraded from the larger ‘Stellio’ model to the more compact ‘Strada’ model. A further 26 machines were updated in 2015/16, with the final stage of the machine upgrades taking place in 2017/18. From 2017/18 a depreciation fund will be in place which will ensure in 10 years that there will be adequate funding to update the next generation of On street pay machines as required.

26.4. Non Asset Options

26.4.1. There is an option to go non-machine based with the introduction of mobile telephone technology (pay by phone), but this would be resisted by those who cannot use mobile phones or those who do not own one.

26.5. Managing Demand

26.5.1. At present the Norwich Highway Agency committee consider new applications for additional sites and for reduction of sites for 'On -street Pay and display machines'.

26.6. Lifecycle Treatment Options

Do Minimum	These activities are the routine maintenance tasks carried out to ensure income, safety and maintain standards for users: • Repair accident/vandal damage. • Replace broken parts
Long Life	Replace and upgrade as they become life-expired

26.7. Signs - Routine Maintenance Activities

26.7.1. Maintenance carried out under the Highway Agency agreement.

26.8. Objectives and Response

26.8.1. **Safety**

26.8.1.1. The objectives are to:

- Be located so as not to cause injury
- Be safe to use

26.8.2. **Serviceability**

26.8.2.1. The objectives are to:

- Contribute to ease of use
- Contribute to income for the on street account

26.8.2.2. Normal routine maintenance response for any other reported fault will be within the working day. Service engineer will be next day.

26.8.2.3. Norwich City Council will remove graffiti placed on any of its highway assets, which is considered to be racist or otherwise offensive immediately. We will do so as soon as reasonably practicable, depending on its nature and location, but within 10 days of being observed or reported.

26.8.3. **Sustainability**

26.8.3.1. The objectives are to:

- Collect income for on street parking in Norwich
- Maintain the short stay parking facility and to encourage parking in off street car parks

26.9. Lifecycle Cost Analysis

26.9.1. **Routine**

26.9.1.1. Currently we utilise the following strategy to maintain these assets.

Cabinets - Replace as necessary due to individual wear and tear/vandalism.

Energy There are no energy costs as the machines are solar powered.

26.9.2. **Routine Budget (for 72 machines)**

2013/14	**Actual Spend**
Routine works	£33,364
Communication	£15,264
Total	£48,628

2014/15	**Actual Spend**
Routine works	£29,392
Communication	£11,904
Total	£41,296

2015/16	**Actual Spend**
Routine works	£20,667
Communication	£13,140
Total	£ 33,807

2016/17	**Actual Spend**
Routine works	£28,416
Communication	£11,155
Total	£39, 571

2017/18	**Actual Spend**
Routine works	£25,456
Communication	£12,780
Total	£38,236

2018/19	**Original Budget**
Routine Works	£34,000
Communication	£12,780
Total	£46,780

26.10. Service Levels

26.10.1. We have next day response and bi-annual maintenance visits.

26.11. Risk

26.11.1. Financial

26.11.1.1. If a machine is not in operation, there will be no income.

26.11.2. Risk – Insufficient Budget / Overspend if the account for on street goes in to deficit

26.11.3. Budget based upon analysis of previous annual maintenance expenditure

26.11.4. Impact = 1 (overspend up to £100,000) x Likelihood = 2 (unlikely) = 2 low risk

26.12. Operational

26.12.1. Risk – vandalism/RTC/break-in, loss of income, need to replace units.

26.12.2. Current business model is viable and self-sustaining as all parts are included

26.12.3. Impact = 3 (withdrawal of support) x Likelihood = 1 (unlikely) = 3 low risk

27. Electronic Information Kiosks - Lifecycle Management Plan

27.1. Physical Parameters

27.1.1. This asset grouping comprises of 1 electronic information kiosk located at Thetford bus station.

27.1.2. Kiosks are allocated to each transport interchange depending upon the role of the site. If the function changes the kiosks may be removed.

Site	Number of machines	Installation date
Thetford Bus Station	1	May 2015
Total	1	

27.1.3. The value of each kiosk is as follows:

Thetford Bus Station - £17,850
Total - £17,850

27.1.4. The replacement value of each kiosk is as follows:

Thetford Bus Station - £17,850
Total - £17,850

27.2. Lifecycle Options

27.2.1. Creation or Acquisition

27.2.1.1. Kiosks were purchased from Region Services Limited (RSL) following a competitive tender and have been installed for varying lengths of time by location. There is the option for expansion in the number of kiosks based on funding availability and assessment indicating there would be benefits from further units. These would be procured through competitive tendering. Please note Region Serviced Limited (RSL) are now trading as 21st Century Passenger Systems Ltd.

27.2.2. Upgrading

27.2.2.1. The information kiosks are capable of being upgraded with new functionality and there has already been some upgrading of software during the lifecycle of these kiosks. No hardware updates have been made to date, but this has not been ruled out for the future.

27.2.3. Renewal / Replacement

27.2.3.1. Renewals and replacements are the major options when routine maintenance alone cannot sustain the asset. The lifecycle plan should support the optimal time for a specific option.

27.2.3.2. Each kiosk was covered by a manufacturer's warranty for 1 year. After the 1 year warranty, annual maintenance contracts have been established for each kiosk.

27.2.4. **Disposal**

27.2.4.1. Seven (7) kiosks were removed and disposed of during 2015/16.

27.3. Non Asset Options

27.3.1. There are currently no non asset options planned.

27.4. Lifecycle Treatment Options

27.4.1. The current plan is to run the kiosks until they are no longer economically viable to maintain and/or parts become obsolete to the point that they can no longer be maintained. Availability of budgets to support continued maintenance is also an important consideration in terms of lifecycle treatment.

27.5. Routine Maintenance Standards, Objectives and Response

27.5.1. All information kiosks are covered by a comprehensive maintenance contract. They are monitored remotely by both 21st Century Passenger Systems Ltd and NCC. The routine works undertaken to the kiosks have been sub-divided into activities, the standards of which have been displayed in tabular form and are followed by details on objectives and response arrangements.

27.5.2. Reactive activities are by their nature unplanned and occur in response to sudden changes.

Activity Type	Activity	Service Standard
Preventative	The kiosks will be monitored	The kiosk maintenance contractor is responsible for maintaining the equipment. In this case, it is 21st Century Passenger Systems Ltd
Condition monitoring	As above	As above
Reactive	Minor failures will be repaired by maintenance contractor	Major problems will be repaired by the maintenance contractor

27.6. Electronic Information Kiosks – Objectives and Response

27.6.1. Safety

27.6.1.1. The kiosks are powered by electricity. Manual checks will be made to ensure the machines are operational and secured to their base unit.

27.6.2. Serviceability

27.6.2.1. The kiosks are provided as the means by which public transport information can be provided to customers. The machines are maintained in working order.

27.6.2.2. The kiosks are located in outdoor locations, and the condition of the machines over time is being monitored to identify at the earliest opportunity any preventative measures that may be required. All machines are covered by Closed Circuit Television (CCTV) to reduce instances of vandalism and malicious damage.

27.7. Lifecycle Cost Analysis

27.7.1. The kiosks are to receive regular maintenance during the period up to 10 years of age, which is the life span envisaged for the machines (or until a decision is made to remove kiosks due to budgetary considerations).

27.8. Service Levels

27.8.1. There are no statutory indicators identifying the condition of ‘electronic information kiosk’ assets.

27.9. Risk

27.9.1. Risk - Insufficient Budget / Overspend

Impact = 2 (minor) x Likelihood (unlikely) =2 x 2 = 4 = low risk.

27.9.2. Risk - Reduced funding from current contracts

Impact = 2 (minor) x Likelihood (unlikely) =2 x 2 = 4 = low risk.

29. Norfolk Bus Stops Lifecycle Management Plan

29.1. These assets indicate the location of bus stopping points and safe appropriate waiting areas to passengers, also providing timetable and other travel information. They promote bus travel as an alternative to the private car and enable access to public transport for less mobile or disabled travellers through Disability Discrimination Act (DDA) compliant boarding points.

29.2. Physical Parameters

29.2.1. Data is taken from a survey conducted in 2010 and updated in February 2015).

29.2.2. Norfolk County Council has logged a total of 6,460 defined bus stopping places. Each of these has a unique reference number (ATCOcode) and a six figure grid reference.

- Of these, one third (2,128) are not marked on site.
- Of the remaining 4332, which are marked, just under half (2248) are fully DDA compliant and have a flag.
- 1094 are marked only with a bus shelter.
- 610 are marked only with a timetable case.
- The remaining 4027 are marked only with a flag.

29.2.3. Since 2015, the asset register has not been continuously updated, however a new ‘cloud’ based bus stop management application has been purchased to aid in collating this information through stakeholders (NCC, bus operators). This application will also offer the change to crowd source asset data by allowing parish/town councils and members of the public access.

29.2.4. A DDA compliant stop is one with a hardstanding area as shown on Standard Detail SD1100_22E, shown in section 5.29.7.1.

29.2.5. Flags are designed in accordance with the TSRGD and are provided by the Norfolk County Council travel information team.

29.2.6. Shelters are the responsibility of the relevant Parish/Town or District/City Council. The only exception is Norwich Bus Station and Park & Ride which Norfolk County Council have responsibility for.

29.3. Lifecycle Options

29.3.1. Creation or Acquisition

29.3.1.1. New Bus Stops are created in one of two ways:

- Provision of new marked stop (comprising as a minimum a flag).
- Provision of new defined stopping point (not marked on site).

29.3.1.2. For the purposes of the TAMP only marked stops will be considered, as these result in assets maintained by the County Council.

29.3.1.3. New marked bus stops are provided:

- As part of new residential development including from S106/S278 agreements.
- Following service changes instigated by the operator.
- Following a request from a town/parish council.

29.3.1.4. In all cases, an assessment process is followed to ensure that the route is viable and that the location is supported by the Parish Council, Highway Engineer, Local Member and bus operator.

29.3.2. **Upgrading**

29.3.2.1. The aim is to provide a network of marked accessible stops throughout the county to:

- Enable all customers to access services
- Promote the viability of public transport.

29.3.2.2. Hardstanding

29.3.2.2.1. The County Council is obligated by the Disability Discrimination Act 2000 to improve access to public services for all passengers. That requires the County Council to upgrade bus stops to provide DDA compliant facilities, as shown on SD1100_22E.

29.3.2.2.2. Upgrades have previously been undertaken along whole routes and approximately half of the marked bus stops around the County are now upgraded.

29.3.2.2.3. Reductions in funding mean that whole route upgrading is no longer possible. Upgrading is now undertaken on site by site basis following requests from passengers, parish/town councils or bus operators. All requests are assessed to ensure that the stop is viable and that the location is supported by the relevant stakeholders.

29.3.2.3. Posts

29.3.2.3.1. Flag posts are provided where there is not suitable existing street furniture to hang the flag. It is estimated that currently 1/3 of flags are on separate posts.

29.3.2.3.2. The type of flag post varies across the county reflecting the location, status of the route or following policy changes. For example within conservation areas the posts are black; within the North Norfolk Coast area wooden posts have been provided. During a period from 2000 – 2005 a particular brand of post (the citystop) was used extensively as part of route upgrades, and there are still a number of concrete posts on the network.

29.3.2.3.3. 150 posts along key radial routes into Norwich have been upgraded to an integrated post as part of the Better Bus Area project 2013-2014.

29.3.2.4. Flags

29.3.2.4.1. Flags are upgraded by the travel information team on a rolling area wide basis as new designs/sign materials are brought online.

29.3.2.4.2. A new flag is being rolled out which is easier to clean and has a 10 year fade life.

29.3.3. **Renewal / Replacement**

29.3.3.1. Hard-standings

29.3.3.1.1. Hard-standings are considered to be part of the footway asset and are assessed, maintained and renewed in accordance with lifecycle plan 2.3.

29.3.3.2. Flags

29.3.3.2.1. Flags are renewed or replaced by the travel information team on a rolling area wide basis via the upgrade program, or on an individual basis following a report of damage/loss. A new flag costs £25.

29.3.3.3. Posts

29.3.3.3.1. If damaged and considered unsafe the Area Offices will replace standard CHS (Circular Hollow Section) steel flag posts from the Highway Maintenance Fund.

29.3.3.3.2. If damaged and considered unsafe the Area Office will remove non-standard flag posts using the Highway Maintenance Fund.

29.3.3.3.3. The non-CHS steel posts used throughout the county are now in need of replacement. These would be replaced by CHS steel posts.

29.3.3.3.4.

Type of post	**Number**	**Cost**
Wooden (North Norfolk coast area only)	100 (estimated)	£180 per post
Concrete	300(estimated)	£180 per post

29.3.3.3.5. Funding for upgrading the remaining wooden and concrete posts will be sought from the capital improvements programme.

29.3.3.3.6. The new posts provided through the BBA project will also require replacement should they become damaged.

29.3.3.3.7.

Type of post	Number	Cost
Integrated with socket mount (supplier to be confirmed following tender process)	150	£400 per post

29.3.4. **Disposal**

29.3.4.1. Bus Stops are only removed if they become redundant. In the first instance flags and any associated post would be removed. This costs approximately £70 per post.

29.3.4.2. Only in exceptional circumstances would the hardstanding area be removed.

29.4. Non Asset Options

29.4.1. **Demand Management**

29.4.1.1. Approximately half of the marked stops are DDA compliant, and a third of the defined stops are not marked at all. This means that the demand for bus stop upgrades outstrips the resources available in each financial year.

29.4.1.2. Many stops around the County still require passengers to wait in grassed areas or cross areas of grass to board or alight from the bus. This is not popular with customers and presents a barrier to use for some.

29.4.1.3. With housing growth and increased awareness of alternative modes of transport to the private car, bus patronage is likely to increase. This, in turn will increase the number of requests for improved or new stops.

29.4.1.4. New marked stops or upgrades to existing stops are only provided at locations agreed by the Parish/Town Council, bus operator, highway engineer and Infrastructure Officer.

29.5. **Routine Maintenance Standards, Objectives and Response**

29.5.1. The aim is to provide a network of marked stops across the County. Maintaining this asset increases customer confidence in the service further promoting use of public transport. The infrastructure communicates important information to passengers and keeping this visible is important to the overall customer satisfaction.

29.5.2.

	Treatment	Objectives	Cost
Do minimum	Clean flags.	Prolongs the usable life of flags.	Only undertaken following complaint. Cost is as required.
	Maintain Asset register.	Accurate records allows infrastructure to be managed.	
	Replace non-standard posts when damaged.	Maintains continuity of network.	£300-£350 per post
	Replace flags when faded on damaged.	Maintains continuity of network.	£25 per flag
Mid-range	Replace/straighten non-standard posts for aesthetic reasons.	Maintains customer confidence in service.	£100 - £350 per post
Maximum	Flags and posts inspected by highway inspectors and routine maintenance such as hedge cutting, cleaning, standard post replacement is included within Highway Maintenance work.	Maintains customer confidence in service.	£10,000 contribution to Highways Maintenance budget covering the expected 1500 posts and 3691 flags.

29.5.3. **Paved Areas**

29.5.3.1. These are included within the footway maintenance plans. See section Lifecycle Plan 3.0.

29.6. Lifecycle Cost Analysis

29.6.1. Limited annual maintenance is required for flags and posts. The lifespan of flags can be prolonged by cleaning the faces but this would only be undertaken if there was a complaint raised regarding the visibility of the stop.

29.6.2. Where budget allows or there is a safety issue, flag posts will be standardised by replacing old concrete and wooden infrastructure. This enables damaged/unsafe posts to be replaced easily by Area Offices.

29.6.3. Where stylised non-standard posts are provided they will be added to the asset register so that maintenance can be undertaken as required. The costs associated with this maintenance will be considered before such posts are approved for installation.

29.6.4. The majority of 'City Stops' are now removed and any residual cases are removed using a bus stop capital budget.

This posts are considered to be part of the footway asset and are assessed, maintained and renewed in accordance with lifecycle plan 2.5.

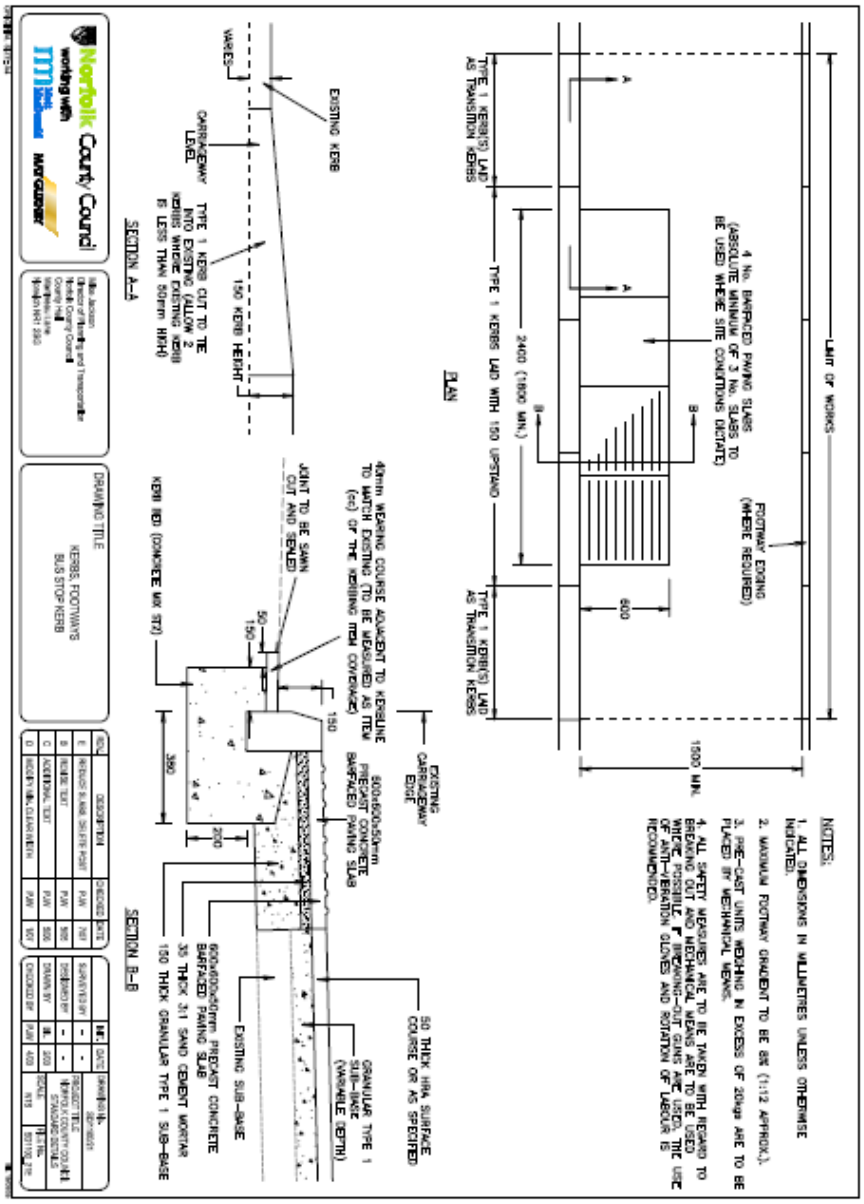
29.6.5.

Year	Work	Contractor	Cost
2017/18	Updating of asset register	Internal	Staff Resources
	Replacement of wooden posts. Renewal of other damaged non-standard posts as required.	Ops	£15000
	Replacement of concrete posts. Renewal of other damaged non-standard posts as required.	Ops	£15000
	On-going maintenance and cyclic replacement of posts	Ops	£5000

29.7. **Asset Plans**

29.7.1. **DDA Compliant Bus Stop**

29.7.2.



29.8. **Service Levels**

29.8.1. There are no statutory indicators regarding bus infrastructure.

29.8.2. We will consider whether if any internal targets can be developed in the future.

29.8.3. We have inspection regimes in place. We have a record of the assets and are using this to determine replacement works. We respond to requests from customers for improvement works. We are actively seeking new materials to reduce maintenance liabilities and extend the product life. This is a good level of Service.

29.9. **Risk**

29.9.1. Risk – Inaccurate information to passengers/Passengers unable to access services. Loss of patronage. Damage to reputation. People unable to reach vital community services. Environmental impact through lack of modal shift away from private car.

29.9.2. Impact = (Loss up to £100,000 - £500,000) x Likelihood (Rare) = 1 = Risk 2

29.9.3. Mitigation = Maintaining the asset register, regular inspections, timely updating/replacement of the infrastructure and continuing DDA upgrade program are the most effective mitigation measures

30. Cromer Bus Station Lifecycle Management Plan

30.1. Cromer Bus Station is key to the successful delivery of public transport services within this important Market Town. There is insufficient capacity on the streets and footways of Cromer to accommodate scheduled bus services so it is vital that an off street central bus interchange facility is provided to enable effective service delivery and safety for all road users.

30.2. This asset grouping is contained within one site in Cromer town centre and comprises two operating bus bays, paved pedestrian walkways, asphalt vehicular surfaces, street lighting, bus shelters, concrete planters, an electronic information kiosk and a redundant building which is scheduled for demolition.

30.3. Norfolk County Council leases the site from Ortona Ltd, and reopened the site in June 2011. Works to make further improvements to the layout were completed in October 2015. There is no provision for layover within the site.

30.4. Physical Parameters

30.4.1. Vehicle and Pedestrian Areas

30.4.1.1. The vehicle areas are constructed from asphalt, with thermoplastic road markings identifying the bay locations.

30.4.1.2. The pedestrian walkways are situated around the western and southern boundaries of the site and are paved with baggeridge blue bricks. A plan showing the site layout is attached in section 30.9.1.

30.4.2. Shelters

30.4.2.1. A large L-shaped bus shelter is provided at the south-western corner of the site. The shelter is constructed from mild steel powder coated in 'Pearl Night Blue' RAL 5026 with polycarbonate panels. It was manufactured by Able Engineering of Kings Lynn. A copy of the shelter detail is attached in section 30.9.3.

30.4.2.2. A second shelter on the new bus island has been provided by Cromer Town Council and is constructed from steel support posts, stainless steel stone filled gabions, clear polycarbonate roofing and oak bench seating.

30.4.3. Benches

30.4.3.1. Five wooden benches are situated around the western and southern boundaries.

30.4.4. Kiosk

30.4.4.1. The information kiosk is programmed for removal in March 2016. It will not be replaced.

30.4.5. **Planters**

30.4.5.1. The planting area in the new island section is the responsibility of Cromer in Bloom.

30.4.6. **Lighting**

30.4.6.1. The bus station is illuminated by two street lighting columns. All systems are controlled from a 'Haldo' 610 feeder pillar (no1) situated within the bus station. The street lighting diagram is attached in section 30.9.2.

30.4.6.2.

Ref	Watt	Description
1	150W SON-TPP	10m Stainton galvanised tubular steel column with 1.5m bracket arm. ARTL Arc90 luminaire. Curved glass lens (G3) standard optic (SNN) NEMA socket (one part photocell)
2	150W SON-TPP	10m Stainton galvanised tubular steel column with 1.5m bracket arm. ARTL Arc90 luminaire. Curved glass lens (G3) standard optic (SNN) NEMA socket (one part photocell)

30.4.7. **Litter Bins**

30.4.7.1. These have been provided by Cromer Town Council and remain their asset. They are responsible for maintaining and emptying these bins.

30.5. Lifecycle Options

30.5.1. **Creation/Acquisition**

30.5.1.1. The bus station is newly renovated and cannot be further expanded.

30.5.1.2. As only two bays can be provided within the site, the additional stop on Cadogan Road is expected to be required for the foreseeable future. This is a busy stop with a relatively narrow footway for the pedestrian demand. Requests have been made for seating and a shelter. The new shelter in the bus station faces outwards to Cadogan road and does provide a sheltered seating option for passengers (although on the wrong side of the road).

30.5.2. **Upgrading**

30.5.2.1. Cromer bus station as provided by the County Council was opened in June 2011.

30.5.2.2. The renovation work did not include any works to the vehicular areas which are surfaced in Asphalt. Depending on the depth and specification of this pavement it may be necessary to upgrade to a reinforced concrete surface

30.5.2.3. CCTV

30.5.2.3.1. A CCTV unit has been installed to allow for better management and may provide passengers with a greater sense of security. The equipment is as follows

Camera 1	Bosch VG5 600 PTZ Autodome with 36x zoom.
Camera 2	Bosch VDN5085 Fixed external Dome
Post	Altron twim swan neck pole mount on 5m Altron pole.
Monitor	8” Gantz Monitor, 1024x768
Video Recorder	Bosch 650 1TB hard drive,
Cabinet	Altron Vandel resistant rack mount cabinet, with heater, thermostat and shelf

This equipment was upgraded upgraded in May 2017 to allow integration into and monitoring by the King’s Lynn and West Norfolk Borough Council systems.

30.5.3. **Renewal/Replacement**

30.5.3.1.
- To date, no major maintenance problems have been identified with the external areas of the site.

30.5.3.2. To assist with the identification of necessary renewal or replacement work an annual condition survey is undertaken by our Asset Management Engineer. This provides an assessment of priority for works under the following criteria.

- Priority 1 – within 12 months (Urgent)
- Priority 2 – within 24 months (Essential)
- Priority 3 – longer than 2 years (Necessary/Desirable)

30.5.3.3. Vehicle & Pedestrian Areas

30.5.3.3.1. The age of materials combined with the usage of the site will determine the requirement for either replacing the paving or resurfacing the vehicle areas. Slow moving buses produce a significant twisting force on the carriageway which can result in damage.

30.5.3.4. Shelters

30.5.3.4.1. The corner shelter was provided new in June 2011. Replacement/renewal is unlikely for the next 15 years. The second shelter was provided new in October 2015.

30.5.3.5. Benches

30.5.3.5.1. The existing wooden benches were refurbished as part of Phase 1. It is likely that further replacement/refurbishment work will be needed every 10 years.

30.5.3.6. Planting area

30.5.3.6.1. The landscaping is provided and maintained by Cromer in Bloom.

30.5.3.7. Lighting

30.5.3.7.1. Lighting columns were installed new in June 2011. They will require an electrical test after 6 years and structural test after 12 years, which will determine their need for replacement.

30.5.3.8. CCTV

30.5.3.8.1. The CCTV camera, post and comms were installed in February 2014. From 2017 they will be maintained by King's Lynn and West Norfolk Borough Council with costs covered by NCC. Same equipment and Monitoring arrangement as at Thetford bus station. CCTV equipment is usually considered for replacement at 7 years of age.

30.5.4. **Disposal**

30.5.4.1. The County Council signed a 99 year lease on the site with Ortona Ltd in December 2010. Payment was made in full. If the lease is ended by the County Council before 20 years have elapsed, Ortona will refund some of the monies paid. On ending the lease the site would revert to the freeholders, Ortona. The freeholders can end the lease without notice if the site has not been used as a bus station for 5 years.

30.5.4.2. Vehicular and Pedestrian Areas

30.5.4.2.1. It has been proven through the planning process that applications for re-development of this site to exclude provision of public transport facilities will not be viewed favourably by the District Council. Options for alternative uses of this site are limited unless public transport services could be relocated elsewhere within the Town Centre.

30.5.4.3. Shelters and Benches

30.5.4.3.1. If in good condition, the bus shelters and benches could be offered for reinstallation to Town or Parish Councils. If unsuitable for reuse, the materials would be recycled as far as possible.

30.5.4.4. Kiosk

30.5.4.4.1. The kiosk was removed in 2016. It will not be replaced.

30.5.4.5. CCTV

30.5.4.5.1. If in good condition, the camera could be reinstalled at another interchange or at a traffic junction. The equipment being replaced in 2017 will be held in reserve for repair to Norwich bus station and park and ride equipment.

30.6. Non Asset Options

30.6.1. Demand Management

30.6.1.1. The demand for a bus interchange within Cromer town centre is underpinned by the County Council's transport strategy to promote the use of public transport. Usage by commercial bus operators relies upon the availability of bus bays to meet the registered service timetables submitted by the operators. This equates to approximately 145 bus movements per day, 69 of which use Cromer Bus Station.

30.6.2. Future Proofing

30.6.2.1. The stands are constructed with DDA compliant boarding points. Lighting columns are provided with standard 150W bulbs. We would look to move to LED technology in the future.

30.7. Lifecycle Treatment Options

30.7.1.

Routine / Minimum	Routine maintenance is the regular ongoing day to day work that is necessary to keep assets operating. This includes instances where portions of assets fail and need immediate repair to make operational again. At Cromer Bus Interchange the routine treatments are inspection regimes, routine cleaning, and reactive repair.
Medium Life	Some of the asset types on the site will require renewal/replacement on a medium life cycle 5 to 10 years. These are noted in the following maintenance arrangement tables.
Long Life	The expected life of the parking areas is 40 years. An appropriate maintenance and inspection plan has been put in place.

30.8. Routine Maintenance Standards, Objectives and Response

30.8.1. The objectives of routine maintenance are to keep the asset operating effectively, safely and securely, and to prevent/postpone major maintenance.

30.8.2. If damage occurred which resulted in the item being unsafe, action will be taken within the normal highway operations response times.

30.8.3. If damage occurred to the building that resulted in it being unsecured, action will be taken within 24hrs of notification.

30.8.4.

Asset	Activity	Detail
Vehicular and Pedestrian Areas	Inspection	Inspections are undertaken by Highway Inspectors in line with highway standards. When defects reach intervention level works are programmed and undertaken by Highways Operations.
	Condition Monitoring	A full inspection is made on an annual basis by our Asset Management Engineer. Areas needing attention are prioritised
	Cleaning	Sweeping and Litter picking is undertaken by Cromer Town Council.
	Reactive	Defects reported by Members of the Public, Bus Operators, are passed to Highway Engineer for assessment. Should works be required these are undertaken as for inspections. Timescales vary depending on the severity of the defect.
Shelters and Benches	Inspection	Shelters are inspected during cleaning
	Cleaning	The County Council has entered an agreement with Cromer Town Council for shelter cleaning. This cleaning process allows any additional work to be identified and reported to TTS. This agreement also includes cleaning and re-varnishing of the benches.
	Reactive	Defects are reported by Members of the Public, Bus Operators, direct to TTS. Safety issues are reported to Highway Engineer for remedial action. Replacement parts are ordered from manufacturer by TTS. Timescales vary depending on the severity of the defect.
Lighting	Inspection	The lighting units are included within the TTS street lighting asset plan. This includes an inspection and cleaning regime.
	Condition Monitoring	The lighting units will require an electrical test after 6 years and structural survey after 12 years.
	Cleaning	The lighting units are included within the TTS street lighting asset plan. This includes an inspection and cleaning regime.

	Reactive	Defect/damage is reported by members of the Public and bus operators direct to TTS. Matters of safety are rectified within the timescales identified in the maintenance contract. Light bulbs will need replacement when failure is reported.

30.9. Lifecycle Cost Analysis

30.9.1. Lifecycle Cost Analysis is a process of comparing different cost streams over the same extended period of time, to determine the most appropriate strategy. With different strategies for managing elements of the asset will come different levels of service, different cost streams and different residual risk options.

30.9.2. Routine works are funded from our TSS revenue budget.

30.9.3. It will be necessary to fund the various refurbishment works to maintain the facility to the standard. Items such as road surface relining, replacement of light bulbs and cleaning of shelters and signs.

30.9.4.

Asset	**Routine**	**Medium Term**
Vehicular and Pedestrian Areas	£500	£10K patching, concrete repairs etc.
Shelters and Signs	£400	£35K for replacement
Benches	£500	£7K for replacement
TIC	n/a	n/a
Lighting	£100 for bulbs, cleaning etc.	£5K for replacement
Total Annual Cost	£1500	£57K

30.9.5. Medium Term Maintenance Timescale

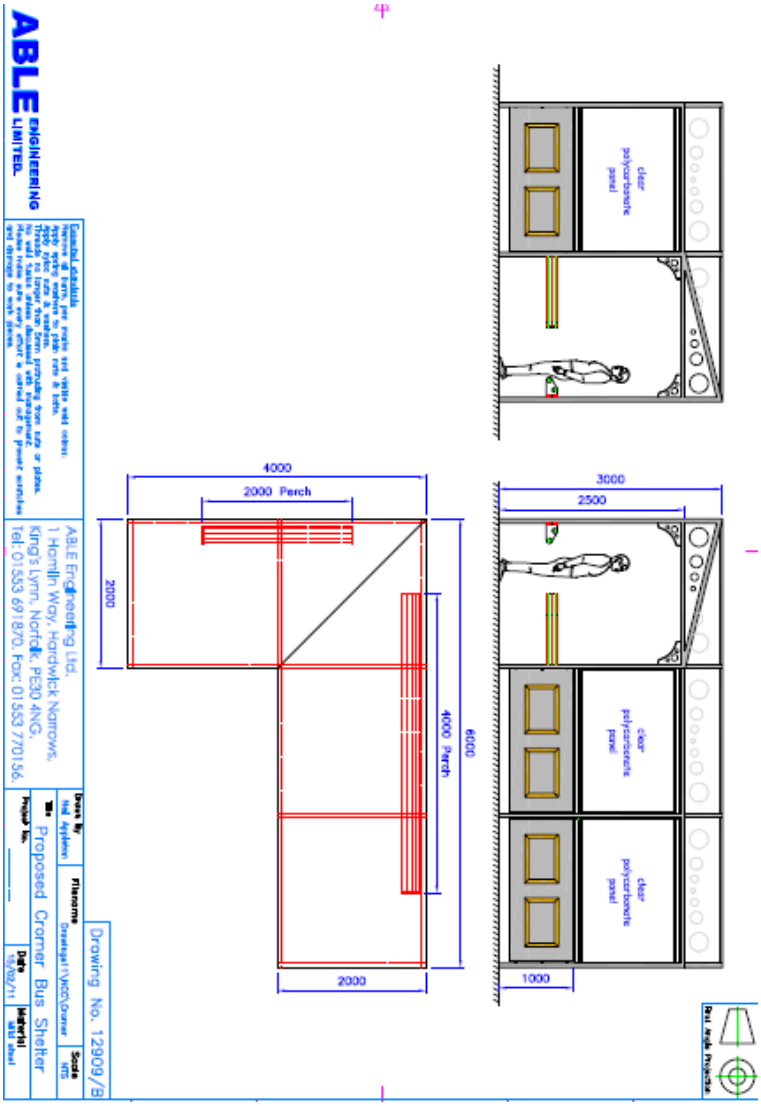
30.9.5.1. Our Asset Management Engineer completes an annual survey of the road and paved areas to inform the long term maintenance strategy. This can be seen in App G (ix). Any defects requiring more urgent action will be brought to the attention of ‘Travel’.

30.9.5.2.

Asset	**Work**	**Timescale**
Shelters	Replacement	15 years (next 2026)
Benches	Replacement	10 years (next 2021)
Lighting	LED bulbs	3 years (2016)
	Structural Test	12 years (2023)
	Electrical Test	6 years (2017)
	Replacement	25 years (2036)
Road markings	Refresh	5 years (next 2016)
Signs	Replacement	10 years (next 2021)
CCTV	To be upgraded	2017 (next 2024)

Site Plans

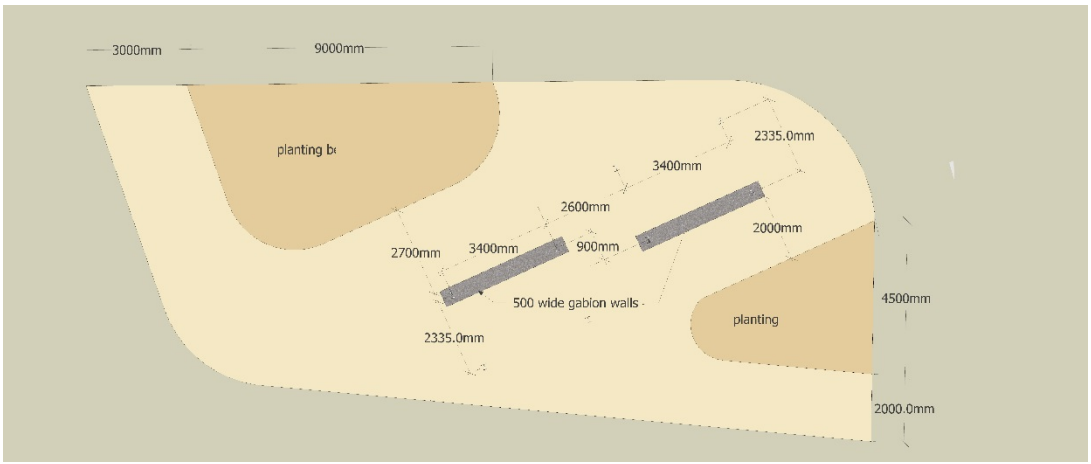
30.9.6. Cromer Bus Station – Shelter Layout

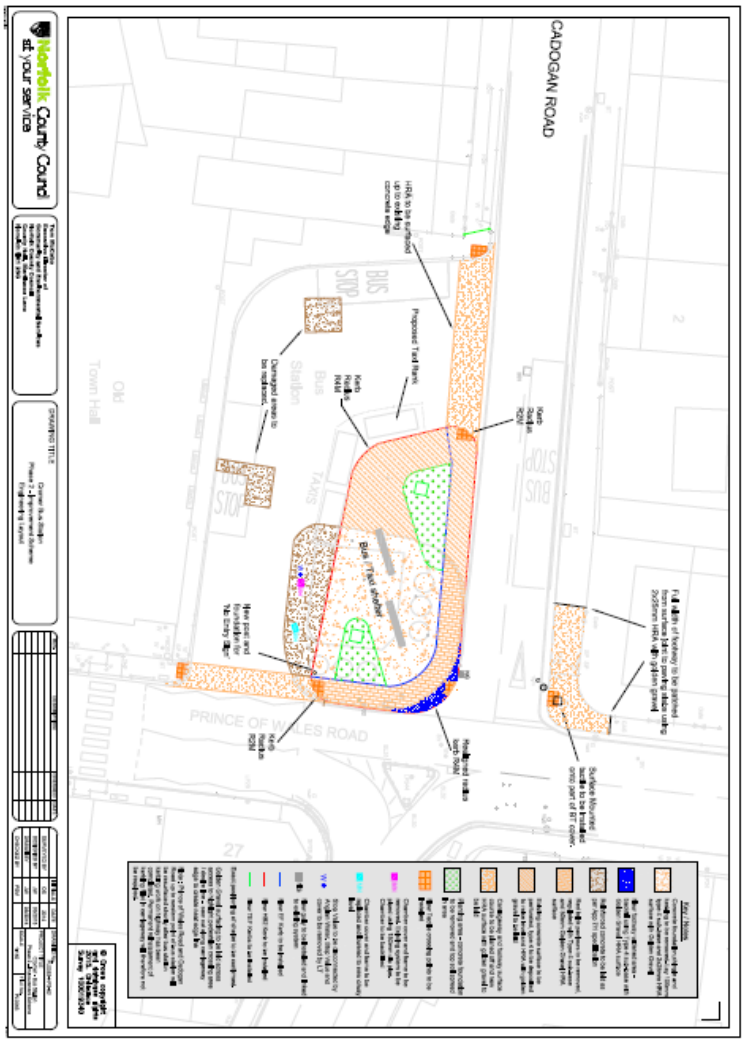


Shelter details (new shelter on island)

30.9.7.

30.9.8.





30.9.9. Service Levels

30.9.9.1. There are no statutory indicators regarding the Bus Interchange.

30.9.9.2. We will consider whether any can be developed in the future.

30.9.9.3. We have inspection regimes in place and any recommendations for priority works are allocated funding. This is a good level of service.

30.10. **Risk**

30.10.1. **Risk – Unplanned closure/partial closure of site. Loss of service, revenue and patronage. Damage to reputation.**

30.10.2. Impact = (Loss of £100,000 - £500,000) x Likelihood (Rare)1 = Risk 2

30.10.3. Mitigation = Regular inspections and timely preventative maintenance are the most effective mitigation measures to reduce the likelihood of an unplanned closure.

31. Thetford Bus Interchange Lifecycle Management Plan

31.1. Thetford Bus Interchange is a newly developed asset and replaces bus interchange facilities in a Breckland District Council owned car park. A separate off highway interchange is key to the successful delivery of public transport services within this historic Town. The existing town centre layout cannot accommodate scheduled bus services so it is vital that an off street central bus interchange facility is provided to enable effective service delivery and safety for all road users.

31.2. This asset grouping comprises three adjacent sites within the Town centre. The largest site is the interchange and includes, five operating bus bays, with bus shelters, a toilet block, cycle parking, seating, planting areas all around a reinforced concrete concourse. The site is lit, covered by CCTV and an information kiosk with bus timetable information is provided for customers. The postal address is Thetford Bus Interchange, St Nicholas Street, THETFORD, IP24 1BH.

31.3. The second site, adjacent to the first provides short stay car parking for bus station users. There are dedicated disabled bays, short stay bays and taxi parking. Parking is not charged, but there is a 20 min max stay and customers must display a ticket (available at the machine).

31.4. The final site is a 4 bed brick and flint cottage with double garage and small courtyard garden adjacent to stand A. This property is not required for the operation of the bus interchange and has been declared surplus by the department of CES. The property is currently awaiting disposal. It is vacant and secured against unauthorised entry.

31.5. Norfolk County Council purchased the freehold for sites 1 - 3 via Compulsory Purchase Order in 2014. The settlement costs are not yet known and this matter may not be completed until 2020. NCC owns the freehold title to site 4.

31.6. Physical Parameters

31.6.1. Vehicle and Pedestrian Areas

31.6.1.1. The vehicle areas of the interchange are constructed from reinforced concrete. The vehicle areas of the car park are constructed from asphalt, with thermoplastic road markings identifying the bay locations.

31.6.1.2. Within the interchange the pedestrian walkways are paved with Saxon paving traffika in charcoal and flag pavers in Charcoal and Natural. The footway between the car park and the interchange is surfaced with asphalt. A plan showing the site layout is attached in section 30.9.1.

31.6.2. **Shelters**

31.6.2.1. Each of the five bus stands has a bus shelter provided by B&C Shelters (Formally Go Shelters). Colour is RAL 9002 Pearl Silver with RAL 7043 Traffic Grey seating. The shelters are illuminated during the hours of darkness with internal lighting. This is controlled by a PIR sensor.

31.6.2.2. A gullwing cycle shelter provided by Go Shelters is adjacent to the toilet block. Colour is RAL 9002 Pearl Silver.

31.6.3. **Benches**

31.6.3.1. There are two powder coated benches provided by Broxap (St Breock Steel Bench) around the perimeter of the site. Colour is RAL 7016 Anthracite Grey

31.6.4. **Bollards**

31.6.4.1. Bollards are Broxap (Swansea) in RAL 7016 Anthracite Grey.

31.6.5. **Kiosk**

31.6.5.1. The information kiosk provided by RSL has a mains electricity supply. It is awaiting the connection of a BT line but displays timetable information. For more information on the kiosk please see section 28 real time information management.

31.6.6. **Planters**

31.6.6.1. There are two small landscaping areas planted with hardy shrubs. These are the responsibility of the county council.

31.6.7. **Lighting**

31.6.7.1. The bus station is illuminated by 14 street lighting columns and 4 wall mounted lights on exterior of the toilet block. The street lighting diagram is attached in section 30.9.2.

31.6.7.2.

Ref	Watt	Description
A x 2	LED 63 x 1.1W cool white	Holophane Aeris medium on 3m column tilted to 5deg. Colour RAL 9022
B x 12	LED 63 x 1.1W cool white	Holophane Aeris medium on 5m column tilted to 5deg. Colour RAL 9022
C x 4	LED 6 x 0.8W	iGuzzini iRoll 65 set at 4m above ground level. Grey

31.6.8. **Litter Bins**

31.6.8.1. There are 3No. Broxap 120l Buxton Bins in Goosewing Grey located around the pedestrian concourse.

31.6.9. **CCTV**

31.6.9.1. CCTV is provided with remote access to allow for better management and may provide passengers with a greater sense of security. The equipment is as follows

Camera 1 x 3	PTZ Done Camera with IP Radio Subscriber Unit Mounted on 6m columns
Camera 2 x 5	Anti-vandal fixed dome camera mounted within the bus shelters
Video Recorder	Existing Breckland System

And remote viewing managed by Kings Lynn and West Norfolk District Council

31.7. Lifecycle Options

31.7.1. Creation/Acquisition

31.7.1.1. The bus station was newly constructed in April 2015 from a number of vacant plots in Thetford Town Centre. The freehold for the site is held by Norfolk County Council.

31.7.1.2. The site has been constructed to accommodate further expansion of Thetford and is currently under-utilised. No further expansion should be required

31.7.2. Upgrading

31.7.2.1. As a newly built site, no upgrading should be required until components start to be incompatible with other systems. This is expected to only apply to CCTV, ticket machine and the Kiosk and not before 2026.

31.7.2.2. A problem has been identified with the retaining walls around the site. NPS are working with contractor to resolve this issue with minimal disruption to the operation of the site.

31.7.2.3. The boundary between the interchange and Minstergate is defined with inset granite kerbs. These have broken away from the bedding material (possibly due to the twisting action of bus wheels at this location) these are scheduled to be replaced by asphalt to reduce the likelihood of further maintenance at this location.

31.7.3. Renewal/Replacement

31.7.3.1. To assist with the identification of necessary renewal or replacement work an annual condition survey is undertaken by our Asset Management Engineer. This provides an assessment of priority for works under the following criteria.

- Priority 1 – within 12 months (Urgent)
- Priority 2 – within 24 months (Essential)
- Priority 3 – longer than 2 years (Necessary/Desirable)

31.7.3.2. Vehicle & Pedestrian Areas

31.7.3.2.1. The age of materials combined with the usage of the site will determine the requirement for either replacing the paving or resurfacing the vehicle areas. Slow moving buses produce a significant twisting force on the carriageway which can result in damage.

31.7.3.3. Shelters

31.7.3.3.1. All shelters have a 10 year guarantee.

31.7.3.4. Benches and Bins

31.7.3.4.1. Benches and Bins should remain in good condition for 10 years before re-painting is required.

31.7.3.5. Planting area

31.7.3.5.1. The landscaping is the responsibility of Norfolk County Council. The shrubs provided are low maintenance and slow growing. Re-mulching and pruning is expected every two years with the replacement of some shrubs after 10 years.

31.7.3.6. Lighting

31.7.3.6.1. Lighting columns were installed new in March 2015. They will require an electrical test every 6 years and structural test after 12 years, which will determine their need for replacement.

31.7.3.7. CCTV

31.7.3.7.1. The CCTV cameras and associated equipment were installed in March 2015. They are maintained as required by the installers Kings Lynn and West Norfolk Borough Council.

31.7.3.8. Parking Ticket Machine

31.7.3.8.1. The ticket machine and associated equipment were installed in March 2015. They are maintained as required by the installers Kings Lynn and West Norfolk Borough Council. The ticket machine is expected to need replacement every 5-10years.

31.7.4. **Disposal**

31.7.4.1. The County Council own the freehold of the site.

31.7.4.2. Vehicular and Pedestrian Areas

31.7.4.2.1. The site was previously a garage/car sales area, and so the site could be repurposed to number of uses given the proximity to the town centre. However, options for alternative uses for this site would be dependent on Public Transport services being relocated elsewhere within the Town Centre and currently there are no on highway options.

31.7.4.3. Shelters, Benches and Bins

31.7.4.3.1. If in good condition, the bus shelters, benches and bins could be offered for reinstallation to Town or Parish Councils. If unsuitable for reuse, the materials would be recycled as far as possible.

31.7.4.4. Kiosk

31.7.4.4.1. If possible the kiosk would be relocated to another interchange. If unsuitable for reuse the materials would be recycled as far as possible.

31.7.4.5. CCTV and Parking Machine

31.7.4.5.1. If in good condition, the cameras could be reinstalled at another interchange or at a traffic junction.

If in good condition, the parking machine could be installed at another location.

If unsuitable for reuse the materials would be recycled as far as possible.

31.8. Non Asset Options

31.8.1. Demand Management

31.8.1.1. The demand for a bus interchange within Thetford town centre is underpinned by the County Council's transport strategy to promote the use of public transport. Usage by commercial bus operators relies upon the availability of bus bays to meet the registered service timetables submitted by the operators. This equates to approximately 143 bus movements per day, all of which use Thetford Bus Interchange.

31.8.2. Future Proofing

31.8.2.1. The stands are constructed with DDA compliant boarding points. The site has been constructed to take account of future development in Thetford and is currently under capacity. Lighting columns are provided with LED bulbs and the CCTV and parking machine have wireless connectivity to the control centre in Kings Lynn.

The toilet block materials are robust and water and heat efficient.

31.9. Lifecycle Treatment Options

31.9.1.

Routine / Minimum	Routine maintenance is the regular ongoing day to day work that is necessary to keep assets operating. This includes instances where portions of assets fail and need immediate repair to make operational again. At Thetford Bus Interchange the routine treatments are inspection regimes, routine cleaning, and reactive repair.
Medium Life	Some of the asset types on the site will require renewal/replacement on a medium life cycle 5 to 10 years. These are noted in the following maintenance arrangement tables.
Long Life	The expected life of the parking areas is 40 years. An appropriate maintenance and inspection plan has been put in place.

31.10. Routine Maintenance Standards, Objectives and Response

31.10.1. The objectives of routine maintenance are to keep the asset operating effectively, safely and securely, and to prevent/postpone major maintenance.

31.10.2. If damage occurred which resulted in the item being unsafe, action will be taken within the normal highway operations response times.

31.10.3. If damage occurred to the building that resulted in it being unsecured, action will be taken within 24hrs of notification.

31.10.4.

Asset	Activity	Detail
Vehicular and Pedestrian Areas	Inspection	Inspections are undertaken by Highway Inspectors in line with highway standards. When defects reach intervention level works are programmed and undertaken by Highways.
	Condition Monitoring	A full inspection is made on an annual basis by our Asset Management Engineer. Areas needing attention are prioritised
	Cleaning	Sweeping and Litter picking and bin emptying is undertaken by Breckland District Council.

	Reactive	Defects reported by Members of the Public, Bus Operators, are passed to Highway Engineer for assessment. Should works be required these are undertaken as for inspections. Timescales vary depending on the severity of the defect.
Shelters and Benches	Inspection	Shelters are inspected annually.
	Cleaning	There is no cleaning agreement in place.
	Reactive	Defects are reported by Members of the Public, Thetford Town Council and Bus Operators, direct to TTS. Safety issues are reported to Highway Engineer for remedial action. Replacement parts are ordered from manufacturer by TTS. Timescales vary depending on the severity of the defect.
Kiosk	Condition Monitoring	The kiosks are linked to an electronic fault reporting system.
	Cleaning	Cleaning and paper replacement is undertaken by Westcotec.
	Reactive	Defect/damage is reported by members of the Public and bus operators direct to TTS. Due to the internal electronic fault reporting process most faults are already in progress before the report is received.
Parking Machine	Condition Monitoring	The parking machine is linked to an electronic fault reporting system.
	Cleaning	The machine is maintained by Kings Lynn and West Norfolk Borough Council.
	Reactive	The machine is maintained by Kings Lynn and West Norfolk Borough Council.
Lighting	Inspection	The lighting units are included within the TTS street lighting asset plan. This includes an inspection and cleaning regime.
	Condition Monitoring	The lighting units will require an electrical test after 6 years and structural survey after 12 years.

	Cleaning	The lighting units are included within the TTS street lighting asset plan. This includes an inspection and cleaning regime.
	Reactive	Defect/damage is reported by members of the Public and bus operators direct to TTS. Matters of safety are rectified within the timescales identified in the maintenance contract. Light bulbs will need replacement when failure is reported.
Toilet Block	Inspection	The toilet block is inspected on a daily basis by Thetford Town Council
	Condition Monitoring	In addition to the daily inspection by the Town Council, NPS also undertake an annual survey of the condition of the asset.
	Cleaning	The toilet block is cleaned on a daily basis by Thetford Town Council. There is a management agreement in place between Norfolk County Council and Thetford Town Council.
	Reactive	Small scale repairs are ordered by Thetford Town Council under the toilet management agreement. Larger problems are reported to TTS who arrange repairs.

31.11. Lifecycle Cost Analysis

31.11.1. Lifecycle Cost Analysis is a process of comparing different cost streams over the same extended period of time, to determine the most appropriate strategy. With different strategies for managing elements of the asset will come different levels of service, different cost streams and different residual risk options.

31.11.2. Routine works are funded from our TSS revenue budget.

31.11.3. It will be necessary to fund the various refurbishment works to maintain the facility to the standard. Items such as road surface relining, replacement of light bulbs and cleaning of shelters and signs.

31.11.4.

Asset	Routine	Medium Term

Vehicular and Pedestrian Areas	£500	£10K patching, concrete repairs etc.
Shelters and Signs	£500	£60K for replacement
Benches and Bins	£0	£1K for replacement
Lighting	£100 for bulbs, cleaning etc.	£5K for replacement
Landscaping/Sweeping	£1000	£1K new plants
Toilet Block	£500	£10K replacement of sanitary equipment
Road markings/Signs	£0	£1k
Total Annual Cost	£2600	£87K

31.11.5. Medium Term Maintenance Timescale

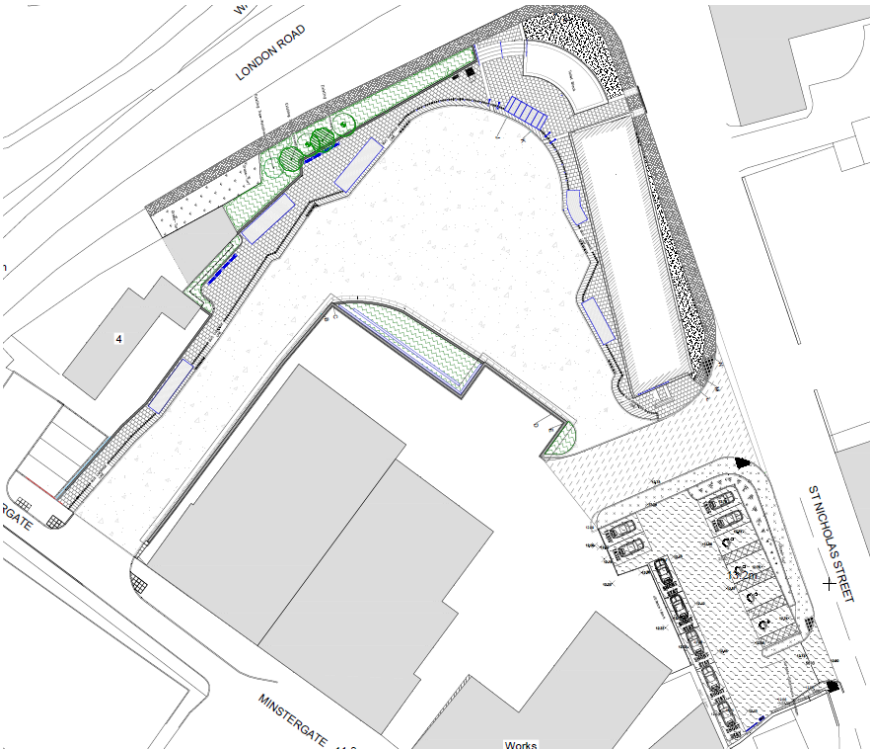
31.11.5.1. Our Asset Management Engineer completes an annual survey of the road and paved areas to inform the long term maintenance strategy. This can be seen in App G (ix). Any defects requiring more urgent action will be brought to the attention of out 'Travel' team.

31.11.5.2.

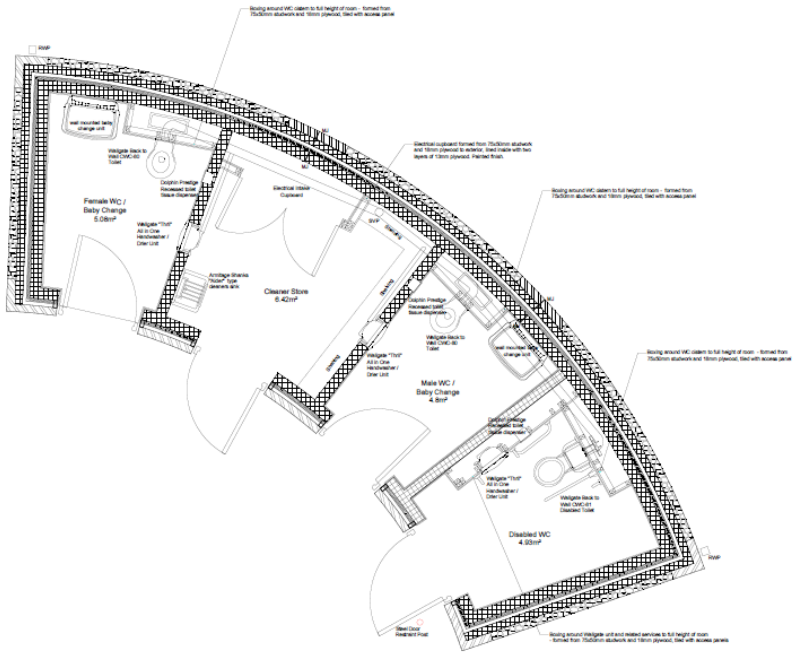
Asset	Work	Timescale
Shelters	Replacement	15 years (next 2030)
Benches	Replacement	10 years (next 2025)
Lighting	LED bulbs	3 years (2018)
	Structural Test	12 years (2027)
	Electrical Test	6 years (2021)
	Replacement	25 years (2040)
Landscaping	Replacement	10 years (2025)
Road markings	Refresh	5 years (next 2020)
Signs	Replacement	10 years (next 2025)
Toilet Block	Replacement of sanitary wear	10 years (next 2025)

31.12. Site Plans

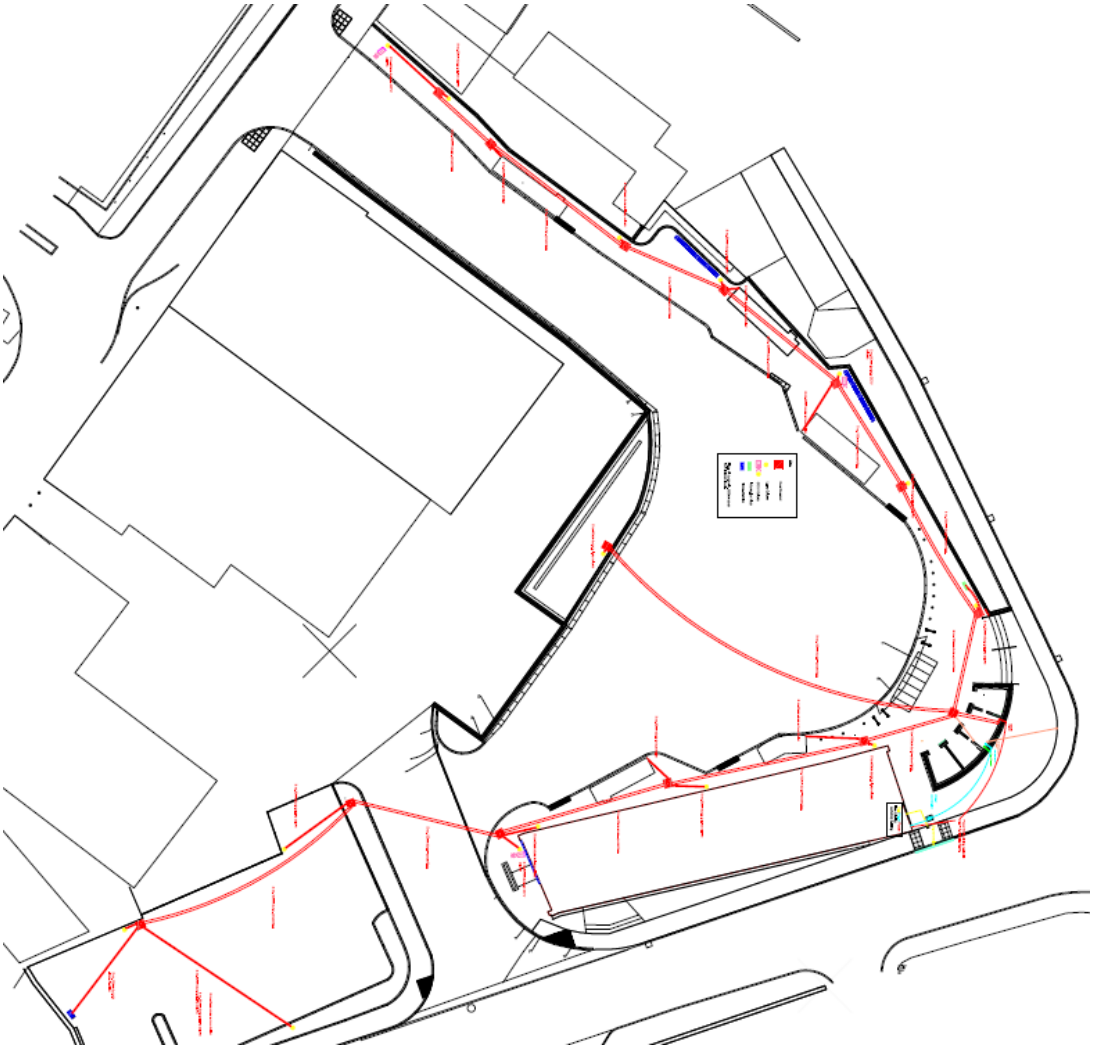
31.12.1. Thetford Bus Interchange – current site layout (March 15)

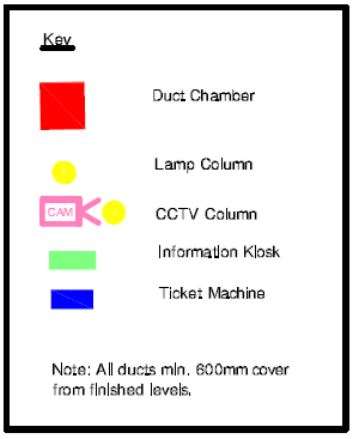


31.12.2. Thetford Bus Interchange – Toilet block detail

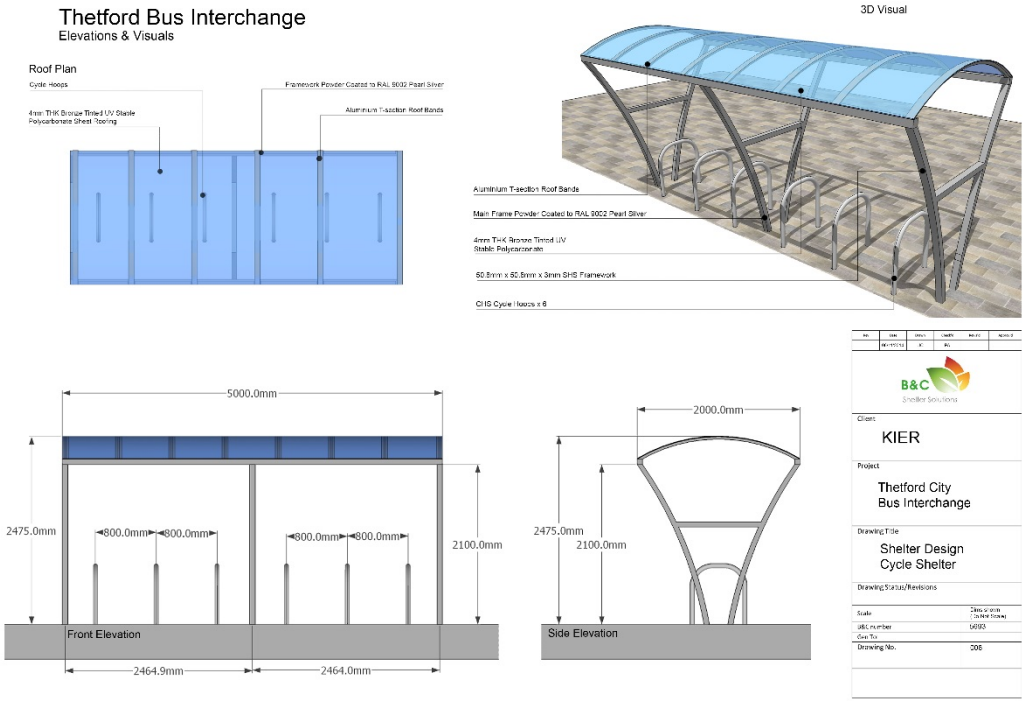


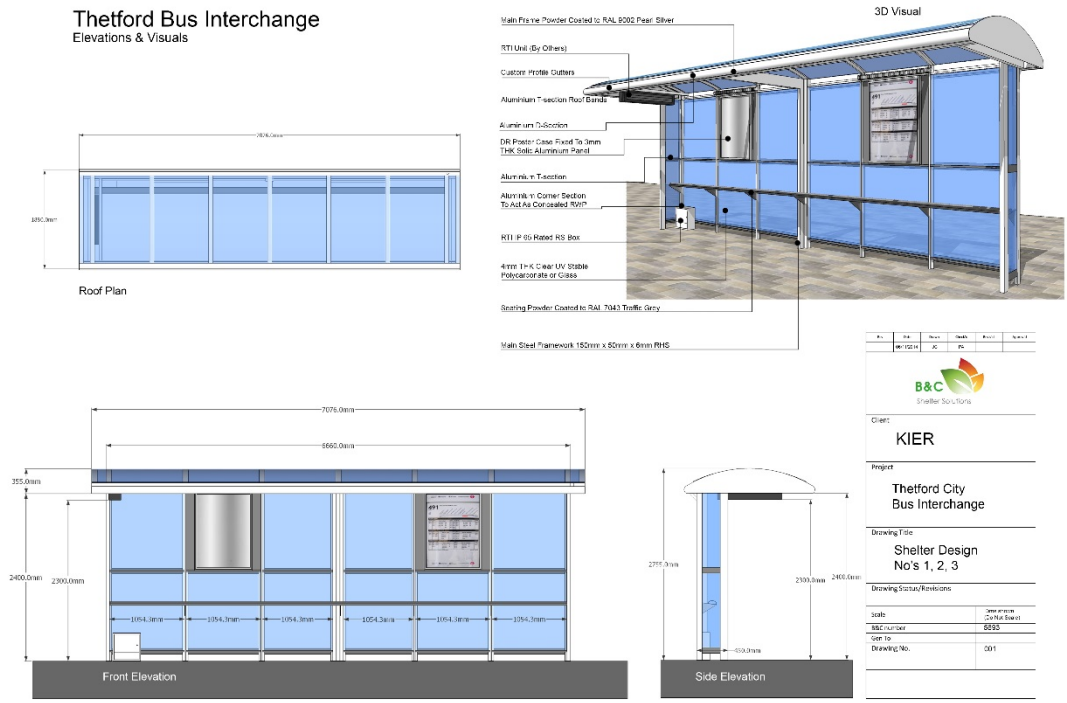
31.12.3. Thetford Bus Station – Utilities layout

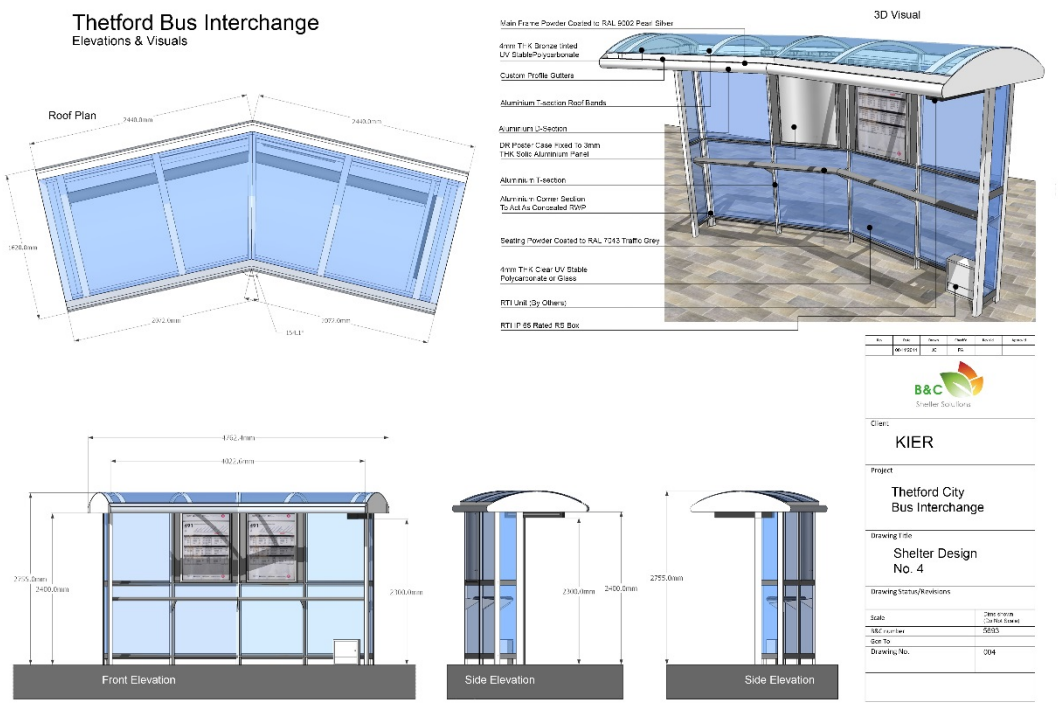


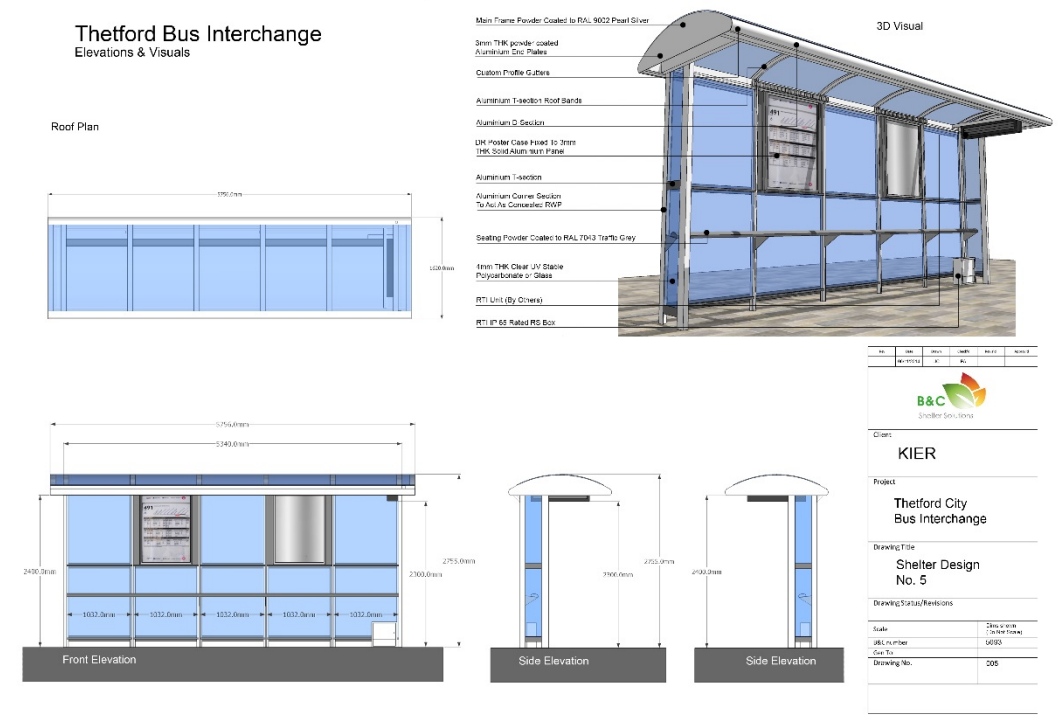

Key
Duct Chamber
Lamp Column
CCTV Column
Information Kiosk
Ticket Machine
Note: All ducts min. 600mm cover from finished levels.

31.12.4. Thetford Bus Interchange – Shelter Layout






Thetford Bus Interchange
Elevations & Visuals
Roof Plan
3D Visual
Main Frame Powder Coated to RAL 9002 Pearl Silver
4mm THK Bronze tinted UV StablePolycarbonate
Custom Profile Gutters
Aluminium Tsection Roof Bands
Aluminium D-Section
DR Poster Case Fixed To 3mm THK Solid Aluminium Panel
Aluminium T-section
Aluminium Corner Section To Act As Concealed RWP
Seating Powder Coated to RAL 7043 Traffic Grey
4mm THK Clear UV Stable Polycarbonate or Glass
RTI Unit (By Others)
RTI IP 65 Rated RS Box
Front Elevation
Side Elevation
Side Elevation
B&C
Shelter Solutions
Client
KIER
Project
Thetford City Bus Interchange
Drawing Title
Shelter Design No. 4
Drawing Status/Revisions
Drawing No.
004


Thetford Bus Interchange
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Roof Plan
3D Visual
Main Frame Powder Coated to RAL 9002 Pearl Silver
3mm THK powder coated Aluminium Zinc Plates
Custom Profile Gutters
Aluminium T-section Roof Bands
Aluminium D Section
DR Poster Case Fixed To 3mm THK Solid Aluminium Panel
Aluminium T-section
Aluminium Corner Section To Act As Concealed RWP
Seating Powder Coated to RAL 7043 Traffic Grey
4mm THK Clear UV Stable Polycarbonate or Glass
RTI Unit (By Others)
RTI IP 65 Rated RS Box
Front Elevation
Side Elevation
Side Elevation
B&C
Shelter Solutions
Client
KIER
Project
Thetford City Bus Interchange
Drawing Title
Shelter Design No. 5
Drawing Status/Revisions
Drawing No.
005

31.13. Service Levels

31.13.1. There are no statutory indicators regarding the Bus Interchange.

31.13.2. We will consider whether any key performance indicators can be developed in the future.

31.13.3. We have inspection regimes in place and any recommendations for priority works are allocated funding. This is a good level of service.

31.14. Risk

31.14.1. Risk – Unplanned closure/partial closure of site. Loss of service, revenue and patronage. Damage to reputation.

31.14.2. Impact = (Loss of £100,000 - £500,000) x Likelihood (Rare)1 = Risk 2

31.14.3. Mitigation = Regular inspections and timely preventative maintenance are the most effective mitigation measures to reduce the likelihood of an unplanned closure.

Part 3 – Appendices

A **Legal Framework**

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- iii Highway Network Hierarchy Map - Roads
- iv Highway Network Hierarchy Map – Footways Cat 1 & 2
- v Network Length by Class, District, Environment & Hierarchy
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- ix Resilience Network Map

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- ii Condition Surveys
- iii Skid Resistance Strategy
- iv Skid Resistance - Norfolk IL Table
- v Inspection of Structures
- vi Routine Response – Defect Categories, Response and Ordering Timescales
- vii Routine Response – Highway Defect Risk Matrix
- viii Routine Response – Highway Defect Risk Register
- ix Routine Response – PROW Defect Risk Register
- x Weather & Other Emergencies – Objectives, Standards & Response
- xi Regulatory Management – Objectives, Standards & Response
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E **Asset Data Assessment –** Inventory and Condition, Collection and Confidence

F **Valuation of the Asset**

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ii Structural Maintenance Budget Allocations for 2017/18

iii Indicative Capital Programmes for 2017/18 - 2021/22

iv Bridges 5 year Capital Bridgeworks Programme

v Draft County Annual Maintenance Programme

vi Draft ‘A’ Road Structural Maintenance Programmes Beyond 2017/18

vii Draft ‘B’ Road Structural Maintenance Programmes Beyond 2017/18

viii Park & Ride, Bus Stations Revenue and Structural Programme beyond 2017/18

H **Asset Management Strategy Performance Measures**

Legal Framework

1. The Highways Act 1980

1.1. This consolidated Acts passed between 1959 and 1971, and their related enactments and amendments.

1.2. There are 345 Sections of the Act referring to many different provisions they may describe duties or powers. Duties which should be suitably actioned by the highway authority otherwise they can be liable to civil action. Powers are discretionary, they are not obligations and are things we can choose to do.

1.3. Section 41 of the Act places a statutory duty on Highway Authorities to maintain public maintainable highways.

1.4. An amendment to Section 41 was made 2003, coming into force on 10 September 2003. The following sub-section was added:

"(1A) In particular, a highway authority is under a duty to ensure, so far, as is reasonably practicable, that safe passage along a highway is not endangered by snow and ice."

1.5. The duty is not however to simply clear snow and ice. The wording of the amendment puts a duty on the highway authority to ensure snow or ice does not endanger safe passage. Therefore, preventative gritting falls within this new duty.

1.6. Section 58 of the Highways Act 1980 provides that, in the event of action against a highway authority for failure to maintain, it shall be a defence to show that the road was kept in reasonable repair having regard to the traffic using it, the standard of maintenance appropriate to its use, and public safety. This establishes the principle of maintaining roads according to their functional importance.

1.7. Sections 139, 140, 169 and 172 relate to the regulation of street management (skips, scaffolds, permits, temporary road closures, street events, licensing).

1.8. Section 36(6) requires a Highway Authority to keep a list of streets within their area, which are publicly maintainable.

2. The Traffic Management Act 2004

2.1. The Traffic Management Act 2004 introduced in England a number of provisions including:

- Highways Agency Traffic Officers
- Local authority duty for network management
- Noticing for all work on the highway (including that of the highway authority)
- Increased control of utility works
- Increased civil enforcement of traffic offences
- Possible intervention by the Secretary of State, if duties are not met
- Optional operation of a permit scheme for working on the highway

2.2. The most important feature of the Act is Section 16(1) which establishes a new duty for local traffic authorities 'to manage their road network with a view to achieving, so far as may be reasonably practicable having regard to their other obligations, policies and the following objectives:

- Securing the expeditious movement of traffic on the authority's road network
- Facilitating the expeditious movement of traffic on road networks for which another authority is the traffic authority

2.3. Section 31 of the Act specifically states that the term 'traffic' includes pedestrians, so the duty requires the authority to consider all road users.

2.4. The duty is not limited to the actions of the department responsible for traffic within an authority. Local authorities will need to consider the duty when exercising their powers under any legislation where this impacts on the operation of the road network. Authorities should therefore ensure that the whole organisation is aware of the duty and the implications for them. Authorities are required to appoint a Traffic Manager to administer the network management duty.

2.5. The Act also strengthens the regulatory regime with regard to the works of utilities and others within the highway including allowing possible permit schemes, new conditions, and fixed penalty notices.

2.6. A range of guidance notes and Codes of Practice are being issued to assist authorities with the implementation of the Act. The Act changes significantly the provisions of the New Roads and Street Works Act 1991, but much of the guidance may still be valid.

2.7. A most important issue for highway maintenance planning and programming is that authorities are expected to operate the Act even-handedly, leading by example and applying conditions and enforcement activity equally to their own and utilities works. We must be able to demonstrate parity and transparency. The Traffic Manager may require the programme for authorities' own works to be compromised on occasion to facilitate utilities works, where these are considered to be of greater priority.

2.8. Civil parking enforcement and legal orders

2.8.1. On-street parking enforcement in Norfolk transferred from the police to local authorities on 7 November 2011

2.8.2. Enforcement of on-street parking restrictions, including yellow lines and time-limited spaces, is now carried out by Civil Enforcement Officers managed by local councils. Norwich City Council covers the Norwich area, Great Yarmouth Borough Council covers Great Yarmouth, and South Norfolk Council covers South Norfolk, whilst King's Lynn and West Norfolk Borough Council covers King's Lynn, West Norfolk, North Norfolk and Broadland. Further details can be found on our website https://www.norfolk.gov.uk/roads-and-transport/roads/parking/civil-parking-enforcement-and-legal-orders

2.9. **Norfolk TMA Permit Scheme**

2.9.1. Using the regulations in the TMA, Norfolk successfully applied to the DfT to become a Permit Authority. This required a specific statutory instrument to be approved and signed by the Minister for the purpose.

2.9.2. Permit Schemes are designed to improve the coordination of road and street works. Our scheme started on the on 6th May 2014.

2.9.3. Subsequently, the Deregulation Bill 2015 changed the method whereby highway authority permit schemes in England are managed. The changes enable highway authorities in England to bring forward, and vary or revoke, schemes. The Traffic Management Permit Scheme (England) Regulations 2007 have been amended and permit schemes were required to comply with the 2015 amendments from the commencement of their scheme, or from 1st October 2015 for existing schemes. This required all permit schemes to use the national condition texts. The conditions contained within statutory guidance may be amended from time to time. Our scheme was amended and complies with current regulations and guidance.

2.9.4. In Jan 17 HAUC England published a draft Guidance: Operation of Permit Schemes. Norfolk will adopt these principles in early summer 17.

2.9.5. Further details can be found on our website https://www.norfolk.gov.uk/roads-and-transport/roads/traffic-orders-notices-and-restrictions/traffic-management-permit-scheme

3. Related Powers and Duties

3.1. Powers contained in the Highways Act 1980, relating specifically to highway maintenance, sit within a much broader legislative framework specifying powers, duties and standards for the wider network management function.

3.2. These include:

- Road Traffic Regulation Act 1984, and the Traffic Signs and General Directions 1994
- Road Traffic Act 1988 which provides a duty for highway authorities to promote road safety, including a requirement to undertake accident studies and take such measures as appear appropriate to prevent such accidents occurring. It also requires authorities, in constructing new roads, to take such measures as appear appropriate to reduce the possibilities of such accidents when the roads come into use
- New Roads and Streetworks Act 1991
- Road Traffic Reduction Act 1997
- The Local Authorities (Transport Charges) Regulations 1998, as applicable to RTRA 1984 and other legislation, provide a power for the traffic authority to impose a charge for a number of its functions
- The Transport Act 2000, under which a local traffic authority may designate any road as a quiet lane or a home zone. The Act also provides for the Secretary of State to review the operation of rural roads and consider whether (and if so how) the law should be amended to facilitate the introduction of rural road hierarchies. The Secretary of State must consult

the Scottish Ministers and The National Assembly for Wales when carrying out the review
- The Transport Act 2000 also introduces a power for authorities to charge Utilities for the occupation of road space during works
- The Traffic Signs and General Directions 2002 gives us guidance on the use of signs and lines within the highway including those of a temporary nature in association with road and street works

3.3. The functions of the highway, street and traffic authority are required to comply with an increasing range of legislation regulating the environment affects of their operations, including:

- The Noxious Weeds Act 1959 places a responsibility on the highway authority to take action to inhibit the growth and spread of injurious weeds growing within the highway. Weed spraying operations are also regulated by the Environment Agency and also by the Health and Safety Commission Code of Practice
- Wildlife and Countryside Act 1981 provides a framework of legislation relating to environmental and Countryside issues with which highway maintenance operations must comply
- The Environmental Protection Act 1990 provides the statutory basis for other environmental issues, in particular waste management, with which highway maintenance operations must comply. It also deals with the requirement to keep the highway clear of litter and refuse which for local roads is not a duty for the highway authority
- Rights of Way 1990
- Countryside and Rights of Way Act 2000

3.4. Common Law still remains part of the legal framework for some aspects of highway management and maintenance, for example, the Highway Authority Discharging Water from the Highway into Adjacent Landowner's Ditch. In such circumstances, our procedures should be followed, which ultimately could result in the matter being referred to Head of Law with a request to investigate, and if necessary, take civil action.

4. Flood and Water Management Act

4.1. "The Act aims to improve both flood risk management and the way we manage our water resources".

4.2. The principle effect of the legislation was to make the County Council the Lead Local Flood Authority (LLFA) for Norfolk with its role to lead the co-ordination, understanding and management of local flood risk (flooding from surface run-off, ground water and ordinary watercourses) across Norfolk. The Environment Agency (EA) has a strategic overview role for all flood risk.

4.3. To fulfil part of this role the County Council must develop, maintain, apply and monitor a local flood risk management strategy for its area. The completed strategy was adopted by the County Council in July 2015

4.4. The Act creates clearer roles and responsibilities for organisations identified as 'Risk Management Authorities' and instils a more risk-based approach. This includes the Highway Authority.

4.5. In exercising its flood risk management functions, the Highways Authority must act in a manner which is consistent with the national and local strategies and guidance.

4.6. The Act began its commencement in September 2010. However, two substantial sections of the Act – Schedule 3 Sustainable Drainage and Schedule 4 Reservoirs, are still not commenced.

4.7. **Flood Risk Regulations 2009**

4.7.1. These Regulations came into force from 10th December 2009. This Council, as a "Lead Local Flood Authority", was required to co-operate and liaise with the Environment Agency to produce a preliminary flood risk assessment for its area. This was completed in July 2011 and will be revised in 2017.

4.8. **Council action**

4.8.1. Environment, Transport & Development officers are working within the Norfolk Water Management Partnership to address these issues.

4.8.2. The Council will also be required to approve, adopt and thereafter maintain SUDS (sustainable urban drainage systems) if Schedule 3 of the Act is commenced.

4.8.3. From 15 April 2015 Norfolk County Council as Lead Local Flood Authority (LLFA) became a statutory consultee on all planning applications for major development. The LLFA is therefore required to comment on planning applications in respect of surface water drainage. This was previously the responsibility of the Environment Agency.

5. Well Managed Code of Practice for Highway Infrastructure

5.1. The Code of Practice is not statutory but provides highway authorities with guidance on highways management. Highway authorities have certain legal obligations to which they have to comply, and which will on occasion be subject to claims or legal action by those seeking to establish non-compliance. It has been recognised that in such cases, the contents of the Code may be considered relevant best practice.

5.2. A new Code of Practice was published in October 2016. It changed to a risk-based approach determined by each Highway Authority and will involve appropriate analysis, development and approval through authorities' executive processes. Its use evidenced by Member's approval will aid the development of our service.

5.3. In September 2017 our EDT committee approved the adoption of the recommendations and an improvement Plan to complete, by the autumn 2018.

Norfolk County Council

Highways Maintenance Section

Highway Engineer Areas

Parishes

Aylsham ☎ **Tel. 0344 800 8020**

North Area Manager - Chris Alston

North 1 - Steve White
North 2 - Jon Winnett
North 3 - Chris Mayes
North 4 - Paul Sellick

King's Lynn

☎ **Tel. 0344 800 8020**

West Area Manager - Karl Rands

West 1 - Sally Bettinson
West 2 - Andy Wallace

Ketteringham ☎ **Tel. 0344 800 8020**

South Area Manager - Matt Worden

South 1 - Gary Overland
South 2 - Bob West
South 3 - David Jacklin
South 4 - Ben Rayner

250817HM

2016 Code of Practice Table 1 -Factors to Consider – Carriageways			Norfolk County Council - Road Hierarchy		
Category	**Type of Road General Description**	**Description**	**Category**	**Sub Category / Description**	**Road class**
Strategic Route	Limited access -motorway regulations apply	Routes for fast moving long distance traffic. Fully grade separated and restrictions on use.	1	Motorway	M
	Trunk and some Principal 'A' class roads between Primary Destinations	Routes for fast moving long distance traffic with little frontage access or pedestrian traffic. Speed limits are usually in excess of 40 mph and there are few junctions. Pedestrian crossings are either segregated or controlled and parked vehicles are generally prohibited.	2a	Trunk	A
			2b	Primary	A
Main Distributor	Major Urban Network and Inter-Primary Links. Short - medium distance traffic	Routes between Strategic Routes and linking urban centres to the strategic network with limited frontage access. In urban areas speed limits are usually 40 mph or less, parking is restricted at peak times and there are positive measures for pedestrian safety.	2c	Most principal roads- see 3a(i) & 3b(iii)	A
			3a (Main Distributor)	3a(i) (Some remaining A roads A1062, A1064 only)	A
				3a(ii) all others	B & C
Secondary Distributor	B and C class roads and some unclassified urban routes carrying bus, HGV and local traffic with frontage access and frequent junctions	In residential and other built up areas these roads have 20 or 30 mph speed limits and very high levels of pedestrian activity with some crossing facilities including zebra crossings. On-street parking is generally unrestricted except for safety reasons. In rural areas these roads link the larger villages, bus routes and HGV generators to the Strategic and Main Distributor Network.	3b (Access routes)	3b(i) HGV	C
				3b(ii) Local	B & C
				3b(iii) Special (A149 Hunstanton-Cromer & C636 Bacton to North Walsham)	A & C
				3b(iv) Tourist	C
Link Road	Roads linking between the Main and Secondary Distributor Network with frontage access and frequent junctions	In urban areas these are residential or industrial interconnecting roads with 20 or 30 mph speed limits, random pedestrian movements and uncontrolled parking. In rural areas these roads link the smaller villages to the distributor roads. They are of varying width and not always capable of carrying two-way traffic.	4a (Link roads)	4a(i)Typically dense urban terrace in Gt.Yar/KL/Nor with on-street parking	B,C & U
				4a(ii) Remaining link roads	B ,C & U (including laybys/service roads adjacent to 'A' roads)
Local Access Road	Roads serving limited numbers of properties carrying only access traffic	In rural areas these roads serve small settlements and provide access to individual properties and land. They are often only single lane width and unsuitable for HGVs. In urban areas they are often residential loop roads or cul-de-sacs.	4b (Minor roads)	Typically urban (40mph or less) cul-de-sac's or loop roads without significant traffic generators	U
			4c (Back lanes)	Roads providing alternative access to property, not intended to carry through traffic. Metalled , open to motor vehicles Typically victorain back alleys	V
Minor road	Little used roads serving very limited numbers of properties.	Locally defined roads.	4d (Soft roads)	Unmetalled with vehicular rights	U

KEY

Not the responsibility of NCC

2016 Code of Practice Table 3 – Factors to Consider – Footways		Norfolk County Council - Walking and Cycling Hierarchy			
Category	Description	**Asset type**	**Category**	**Sub Category / Description**	**Road class**
Prestige Walking Zones	Very busy areas of towns and cities with high public space and streetscene contribution.	Footways	1 (Primary Walking Zone)	Defined 'Town Centre'	A/B/C/U
Primary Walking Routes	Busy urban shopping and business areas and main pedestrian routes.				
Secondary Walking Routes	Medium usage routes through local areas feeding into primary routes, local shopping centres etc.		2 (Secondary Walking Routes)	Remaining urban (40mph or less) in City and towns , or other selected locations where the footway serves significant pedestrian generators	A/B/C/U
Link Footways	Linking local access footways through urban areas and busy rural footways.		3 (Link footways)	Remaining footways	A/B/C/U
Local Access Footways	Footways associated with low usage, short estate roads to the main routes and cul-de-sacs.		4 (Local access footways)	Local access footways alongside road hierarchy 4b	C/U
Minor Footways	Little used rural footways serving very limited numbers of properties				
		Public Rights of Way	5a	Urban	na
			5b	Rural	na

2016 Code of Practice Table 3 – Factors to Consider – Cycleways		Norfolk County Council - Walking and Cycling Hierarchy			
	Description	**Asset type**	**Category**	**Sub Category / Description**	**Road class**
	Cycle lane forming part of the carriageway, commonly a strip adjacent to the nearside kerb. Cycle gaps at road closure point (no entry to traffic, but allowing cycle access).	Cycle ways	A	On road facilities	A/B/C/U
	Cycle track - a highway route for cyclists not contiguous with the public footway or carriageway. Shared cycle/pedestrian paths, either segregated by a white line or other physical segregation, or un-segregated.		B	Shared or dedicated off-road provision contiguous with highway or detached cycleway	FW/CY
	Cycle provision on carriageway, other than a marked cycle lane or marked cycle provision, where cycle flows are significant.	Road			A/B/C/U
	Cycle trails, leisure routes through open spaces. These are not necessarily the responsibility of the Highway Authority, but may be maintained by an authority under other powers or duties.	Norfolk Trails			na

Appendix Ciii

Legend

- 2B - Primary
- 2C - Most Principal Roads
- 3A1 - Main Distributor A Roads
- 3A2 - Main Distributor Others
- 3B1 - HGV Access
- 3B2 - Local Access
- 3B3 - Special Access
- 3B4 - Tourist Access

N

Norfolk Roads by Hierarchy - 2018/19

Norfolk County Council
CES - Asset Management Team
1:262,500

Legend

1

2

Appendix Civ

N

Norfolk Footway Hierarchy Categories 1 & 2 - 2018/19

Norfolk County Council

CES - Asset Management Team

1:262,500

Maintainable Public Highways Digitised Lengths (Km) by District (Feb 16 data)

Roads		1			2			3			5			6			7			4								
		North Norfolk			West Norfolk			Breckland			Broadland			Gt Yarmouth			South Norfolk			County exc. City			Norwich City			County inc. City		
		Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	**Total**	Urban	Rural	Total	Urban	Rural	**Total**
A Class	2B	15.11	52.19	67.30	22.12	94.70	116.82	15.57	65.14	80.71	8.25	18.20	26.45	5.85	3.49	9.34	14.32	102.90	117.22	81.22	336.62	**417.84**	24.28	0.03	24.30	105.49	336.64	**442.14**
	2C	7.40	40.56	47.96	33.38	30.37	63.75	16.44	41.40	57.84	14.55	13.01	27.56	13.17	12.77	25.94	0.00	0.00	0.00	84.94	138.11	**223.05**	25.24	0.00	25.24	110.18	138.11	**248.29**
	3A1	6.51	6.07	12.58	0.00	0.00	0.00	0.00	0.00	0.00	0.61	0.97	1.57	5.05	5.25	10.29	0.00	0.00	0.00	12.16	12.29	**24.44**	0.00	0.00	0.00	12.16	12.29	**24.44**
	3B3	18.15	20.14	38.28	7.96	12.64	20.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	26.11	32.77	**58.88**	0.00	0.00	0.00	26.11	32.77	**58.88**
	Summary	47.16	118.96	166.12	63.46	137.71	201.17	32.01	106.54	138.55	23.41	32.17	55.59	24.06	21.51	45.57	14.32	102.90	117.22	204.43	519.78	**724.21**	49.52	0.03	49.55	253.95	519.81	**773.75**
B Class	3A2	27.82	86.17	113.99	47.00	116.08	163.08	44.40	98.08	142.47	22.97	59.02	81.98	5.69	5.52	11.22	41.79	81.41	123.20	189.67	446.27	**635.94**	6.79	0.00	6.79	196.46	446.27	**642.73**
	3B2	0.00	0.00	0.00	0.00	0.54	0.54	0.00	0.00	0.00	0.00	0.00	0.00	3.07	0.00	3.07	0.00	0.00	0.00	3.07	0.54	**3.61**	0.00	0.00	0.00	3.07	0.54	**3.61**
	4A2	0.00	0.34	0.34	0.07	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.34	**0.42**	0.00	0.00	0.00	0.07	0.34	**0.42**
	Summary	27.82	86.51	114.33	47.08	116.62	163.69	44.40	98.08	142.47	22.97	59.02	81.98	8.76	5.52	14.29	41.79	81.41	123.20	192.82	447.15	**639.97**	6.79	0.00	6.79	199.61	447.15	**646.76**
C Class	3A2	0.00	0.00	0.00	0.00	0.00	0.00	1.31	2.43	3.74	0.00	4.45	4.45	0.00	0.00	0.00	1.25	3.77	5.02	2.55	10.65	**13.20**	0.00	0.00	0.00	2.55	10.65	**13.20**
	3B1	8.06	17.53	25.59	11.70	12.34	24.05	5.58	32.43	38.01	6.93	12.44	19.38	6.57	0.00	6.57	14.85	23.38	38.22	53.68	98.13	**151.81**	0.00	0.00	0.00	53.68	98.13	**151.81**
	3B2	67.06	78.75	145.81	66.91	54.47	121.38	64.20	121.27	185.47	48.22	47.46	95.68	18.34	9.49	27.83	59.67	81.25	140.92	324.40	392.69	**717.09**	4.98	0.00	4.98	329.38	392.69	**722.06**
	3B3	1.46	5.68	7.14	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	1.51	5.68	**7.19**	0.00	0.00	0.00	1.51	5.68	**7.19**
	3B4	10.48	11.92	22.39	7.39	9.15	16.54	1.20	3.67	4.87	3.58	7.96	11.55	17.81	6.70	24.51	0.66	4.86	5.52	41.12	44.26	**85.38**	0.00	0.00	0.00	41.12	44.26	**85.38**
	4A1	0.00	0.00	0.00	2.66	0.00	2.66	0.00	0.00	0.00	0.00	0.00	0.00	10.42	0.00	10.42	0.00	0.00	0.00	13.08	0.00	**13.08**	17.20	0.00	17.20	30.28	0.00	**30.28**
	4A2	91.02	387.96	478.99	116.80	447.57	564.36	75.67	416.70	492.37	81.08	214.00	295.08	32.45	32.68	65.12	128.98	377.15	506.13	525.99	1876.05	**2402.04**	21.49	0.00	21.49	547.48	1876.05	**2423.53**
	4B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.24	0.32	0.08	0.24	**0.32**	0.00	0.00	0.00	0.08	0.24	**0.32**
	Summary	178.08	501.84	679.92	205.45	523.53	728.98	147.94	576.51	724.45	139.86	286.32	426.17	85.59	48.86	134.45	205.49	490.63	696.13	962.41	2427.69	**3390.11**	43.66	0.00	43.66	1006.07	2427.69	**3433.77**
Unclassified	3B1	0.00	0.00	0.00	0.00	4.10	4.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.10	**4.10**	0.00	0.00	0.00	0.00	4.10	**4.10**
	4A1	0.00	0.00	0.00	25.15	0.00	25.15	0.00	0.00	0.00	0.00	0.00	0.00	51.56	0.00	51.56	2.44	0.00	2.44	79.15	0.00	**79.15**	84.39	0.00	84.39	163.54	0.00	**163.54**
	4A2	211.80	488.13	699.93	267.75	410.43	678.18	232.66	471.39	704.05	235.89	271.37	507.26	133.76	58.22	191.98	209.05	548.14	757.19	1290.91	2247.69	**3538.59**	154.44	0.00	154.44	1445.35	2247.69	**3693.04**
	4B	74.24	1.17	75.41	104.48	1.00	105.48	108.27	1.00	109.27	110.78	0.44	111.22	57.53	0.34	57.88	101.25	1.65	102.90	556.56	5.60	**562.15**	56.69	0.00	56.69	613.25	5.60	**618.84**
	4C	0.00	0.58	0.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.02	0.02	0.58	**0.61**	0.00	0.00	0.00	0.02	0.58	**0.61**
	4D	1.43	46.15	47.58	3.89	243.38	247.27	1.95	75.69	77.64	2.26	59.66	61.91	0.08	4.65	4.73	3.14	55.07	58.21	12.75	484.59	**497.34**	0.35	0.00	0.35	13.10	484.59	**497.69**
	Summary	287.46	536.04	823.50	401.28	658.91	1060.19	342.88	548.08	890.96	348.92	331.47	680.39	242.94	63.21	306.15	315.90	604.86	920.76	1939.39	2742.56	**4681.94**	295.87	0.00	295.87	2235.26	2742.56	**4977.82**
																										Road Length exc. V Roads:		3694.88	6137.21	**9832.09**
V Class	4C	1.69	0.04	1.73	0.10	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	15.72	0.00	15.72	0.03	0.00	0.03	17.54	0.04	**17.58**	7.90	0.00	7.90	25.44	0.04	**25.48**
																										Road Length inc. V Roads:		3720.32	6137.25	**9857.57**
Maintained Private	4A2	0.05	0.48	0.53	0.00	0.00	0.00	0.00	0.00	0.00	6.31	0.00	6.31	0.00	0.00	0.00	7.57	0.00	7.57	13.94	0.48	**14.42**	0.42	0.00	0.42	14.35	0.48	**14.83**
Non-maintained	N/A	0.20	0.00	0.20	1.70	2.63	4.34	0.73	2.36	3.08	0.49	0.66	1.14	0.16	0.20	0.36	1.26	0.00	1.26	4.54	5.85	**10.39**	0.03	0.00	0.03	4.58	5.85	**10.42**

Footways & Cycleways

		North Norfolk			West Norfolk			Breckland			Broadland			Gt Yarmouth			South Norfolk			County exc. City			Norwich City			County inc. City		
		Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	**Total**	Urban	Rural	Total	Urban	Rural	**Total**
Footways (inc. known shared use)	1	9.67	0.00	9.67	23.73	0.00	23.73	7.01	0.00	7.01	1.48	0.00	1.48	31.91	0.00	31.91	4.94	0.00	4.94	78.74	0.00	**78.74**	36.95	0.00	36.95	115.69	0.00	**115.69**
	2	52.54	0.12	52.66	49.08	0.00	49.08	51.59	0.00	51.59	76.11	0.00	76.11	50.96	0.00	50.96	50.02	0.00	50.02	330.30	0.12	**330.42**	119.95	0.00	119.95	450.25	0.12	**450.37**
	3	284.17	23.68	307.85	571.25	57.63	628.88	408.12	20.15	428.27	415.90	13.84	429.74	373.62	7.83	381.45	353.62	40.83	394.45	2406.68	163.96	**2570.64**	455.65	0.04	455.69	2862.33	164.00	**3026.33**
	4	111.28	0.03	111.31	163.41	0.00	163.41	162.79	0.14	162.93	172.35	0.00	172.35	93.84	0.00	93.84	151.04	0.00	151.04	854.71	0.17	**854.88**	78.42	0.00	78.42	933.13	0.17	**933.30**
	Summary	457.66	23.83	481.49	807.47	57.63	865.10	629.51	20.29	649.80	665.84	13.84	679.68	550.33	7.83	558.16	559.62	40.83	600.45	3670.43	164.25	**3834.68**	690.97	0.04	691.01	4361.40	164.29	**4525.69**

		North Norfolk			West Norfolk			Breckland			Broadland			Gt Yarmouth			South Norfolk			County exc. City			Norwich City			County inc. City		
		Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	**Total**	Urban	Rural	Total	Urban	Rural	**Total**
Cycleways (exc. known shared use)	A	2.04	0.00	2.04	1.50	0.18	1.68	0.05	0.00	0.05	4.60	0.00	4.60	3.62	0.17	3.80	0.51	0.00	0.51	12.32	0.35	**12.67**	6.30	0.00	6.30	18.63	0.35	**18.98**
	B	0.58	0.00	0.58	1.42	0.00	1.42	0.02	0.00	0.02	0.21	0.06	0.27	1.91	0.00	1.91	0.10	0.04	0.15	4.23	0.10	**4.34**	1.36	0.00	1.36	5.59	0.10	**5.69**
	Summary	2.61	0.00	2.61	2.92	0.18	3.10	0.07	0.00	0.07	4.81	0.06	4.87	5.53	0.17	5.70	0.61	0.04	0.66	16.56	0.45	**17.01**	7.66	0.00	7.66	24.22	0.45	**24.67**

Roads by Hierarchy

	2B	2C	3A1	3A2	3B1	3B2	3B3	3B4	4A1	4A2	4B	4C	4D	**Total**
A	442.14	248.29	24.44	N/A	N/A	N/A	58.88	N/A	N/A	N/A	N/A	N/A	N/A	**773.75**
B	N/A	N/A	N/A	642.73	N/A	3.61	N/A	N/A	N/A	0.42	N/A	N/A	N/A	**646.76**
C	N/A	N/A	N/A	13.20	151.81	722.06	7.19	85.38	30.28	2423.53	0.32	N/A	N/A	**3433.77**
U	N/A	N/A	N/A	N/A	4.10	N/A	N/A	N/A	163.54	3693.04	618.84	0.61	497.69	**4977.82**
Total	442.14	248.29	24.44	655.94	155.91	725.67	66.07	85.38	193.82	6116.98	619.16	0.61	497.69	**9832.09**
V	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	25.48	N/A	**25.48**

9858

Roads

Maintainable Public Highways Digitised Lengths (Km) by Area (Feb 16)

		North			South			East			West			County exc. City			City			County inc. City		
		Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	**Total**	Urban	Rural	Total	Urban	Rural	**Total**
A Class	2B	20.63	72.23	92.86	16.35	120.39	136.74	7.78	10.20	17.99	36.13	133.79	169.92	80.89	336.62	**417.51**	24.61	0.03	24.63	105.49	336.64	**442.14**
	2C	16.35	34.40	50.75	13.51	9.86	23.37	19.16	44.60	63.76	35.77	49.24	85.01	84.79	138.11	**222.89**	25.39	0.00	25.39	110.18	138.11	**248.29**
	3A1	0.00	0.00	0.00	0.00	0.00	0.00	12.16	12.29	24.44	0.00	0.00	0.00	12.16	12.29	**24.44**	0.00	0.00	0.00	12.16	12.29	**24.44**
	3B3	18.15	20.14	38.28	0.00	0.00	0.00	0.00	0.00	0.00	7.96	12.64	20.60	26.11	32.77	**58.88**	0.00	0.00	0.00	26.11	32.77	**58.88**
	Summary	55.13	126.77	181.89	29.86	130.25	160.11	39.10	67.09	106.19	79.86	195.67	275.53	203.95	519.78	**723.72**	50.00	0.03	50.03	253.95	519.81	**773.75**
B Class	3A2	47.33	145.64	192.96	70.69	119.36	190.05	24.62	47.07	71.69	47.00	134.21	181.21	189.63	446.27	**635.91**	6.83	0.00	6.83	196.46	446.27	**642.73**
	3B2	0.00	0.00	0.00	0.00	0.00	0.00	3.07	0.00	3.07	0.00	0.54	0.54	3.07	0.54	**3.61**	0.00	0.00	0.00	3.07	0.54	**3.61**
	4A2	0.00	0.34	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.07	0.07	0.34	**0.42**	0.00	0.00	0.00	0.07	0.34	**0.42**
	Summary	47.33	145.98	193.30	70.69	119.36	190.05	27.69	47.07	74.76	47.08	134.75	181.82	192.78	447.15	**639.93**	6.83	0.00	6.83	199.61	447.15	**646.76**
C Class	3A2	1.31	6.88	8.18	1.25	3.77	5.02	0.00	0.00	0.00	0.00	0.00	0.00	2.55	10.65	**13.20**	0.00	0.00	0.00	2.55	10.65	**13.20**
	3B1	9.08	34.18	43.26	18.32	36.09	54.41	13.31	8.04	21.35	12.97	19.82	32.79	53.68	98.13	**151.81**	0.00	0.00	0.00	53.68	98.13	**151.81**
	3B2	92.43	111.52	203.95	86.87	126.65	213.52	61.34	54.64	115.99	83.77	99.87	183.64	324.40	392.69	**717.09**	4.98	0.00	4.98	329.38	392.69	**722.06**
	3B3	0.35	4.84	5.20	0.00	0.00	0.00	1.16	0.84	1.99	0.00	0.00	0.00	1.51	5.68	**7.19**	0.00	0.00	0.00	1.51	5.68	**7.19**
	3B4	7.44	5.58	13.02	1.86	4.86	6.72	24.44	22.00	46.44	7.39	11.82	19.20	41.12	44.26	**85.38**	0.00	0.00	0.00	41.12	44.26	**85.38**
	4A1	0.00	0.00	0.00	0.00	0.00	0.00	10.42	0.00	10.42	2.66	0.00	2.66	13.08	0.00	**13.08**	17.20	0.00	17.20	30.28	0.00	**30.28**
	4A2	136.64	580.10	716.74	162.70	513.83	676.53	89.35	210.13	299.48	137.30	571.99	709.29	525.99	1876.05	**2402.04**	21.49	0.00	21.49	547.48	1876.05	**2423.53**
	4B	0.00	0.00	0.00	0.08	0.24	0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.24	**0.32**	0.00	0.00	0.00	0.08	0.24	**0.32**
	Summary	247.24	743.11	990.35	271.07	685.44	956.51	200.02	295.65	495.67	244.08	703.50	947.58	962.41	2427.69	**3390.11**	43.66	0.00	43.66	1006.07	2427.69	**3433.77**
U Class	3B1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.10	4.10	0.00	4.10	**4.10**	0.00	0.00	0.00	0.00	4.10	**4.10**
	4A1	0.00	0.00	0.00	2.44	0.00	2.44	51.56	0.00	51.56	25.15	0.00	25.15	79.15	0.00	**79.15**	84.39	0.00	84.39	163.54	0.00	**163.54**
	4A2	349.42	573.62	923.04	309.30	756.03	1065.33	274.06	395.15	669.20	358.04	522.90	880.94	1290.82	2247.69	**3538.51**	154.53	0.00	154.53	1445.35	2247.69	**3693.04**
	4B	147.26	0.93	148.18	152.00	1.65	153.64	110.67	1.66	112.34	146.57	1.36	147.94	556.50	5.60	**562.09**	56.75	0.00	56.75	613.25	5.60	**618.84**
	4C		0.58	0.58	0.02	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.58	**0.61**	0.00	0.00	0.00	0.02	0.58	**0.61**
	4D	3.84	101.93	105.77	3.32	69.77	73.09	0.77	27.03	27.79	4.82	285.87	290.68	12.75	484.59	**497.34**	0.35	0.00	0.35	13.10	484.59	**497.69**
	Summary	500.52	677.06	1177.58	467.07	827.45	1294.52	437.06	423.84	860.89	534.59	814.22	1348.81	1939.24	2742.56	**4681.80**	296.02	0.00	296.02	2235.26	2742.56	**4977.82**
																Road Length exc. V Roads:				3694.88	6137.21	**9832.09**
V Class	4C	1.69	0.04	1.73	0.03	0.00	0.03	15.72	0.00	15.72	0.10	0.00	0.10	17.54	0.04	**17.58**	7.90	0.00	7.90	25.44	0.04	**25.48**
																Road Length inc. V Roads:				3720.32	6137.25	**9857.57**
Maintained Private	4A2	4.21	0.48	4.69	7.57	0.00	7.57	2.15	0.00	2.15	0.00	0.00	0.00	13.94	0.48	**14.42**	0.42	0.00	0.42	14.35	0.48	**14.84**
Non-maintained	N/A	0.24	2.36	2.59	1.90	0.00	1.90	0.71	0.86	1.57	1.70	2.63	4.34	4.54	5.85	**10.39**	0.03	0.00	0.03	4.58	5.85	**10.42**

Footways & Cycleways

		North			South			East			West			County exc. City			City			County inc. City		
		Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	**Total**	Urban	Rural	Total	Urban	Rural	**Total**
Footways (inc. known shared use)	1	7.55	0.00	7.55	9.07	0.00	9.07	35.51	0.00	35.51	26.61	0.00	26.61	78.74	0.00	**78.74**	36.95	0.00	36.95	115.69	0.00	**115.69**
	2	102.14	0.12	102.26	85.87	0.00	85.87	76.05	0.00	76.05	64.82	0.00	64.82	328.88	0.12	**329.00**	121.36	0.00	121.36	450.24	0.12	**450.36**
	3	581.31	31.01	612.32	523.95	49.65	573.60	548.03	22.13	570.16	753.33	61.17	814.50	2406.62	163.96	**2570.58**	455.71	0.04	455.75	2862.33	164.00	**3026.33**
	4	227.02	0.02	227.04	226.93	0.08	227.01	174.53	0.18	174.71	226.19	0.06	226.25	854.67	0.34	**855.01**	78.45	0.00	78.45	933.12	0.34	**933.46**
	Summary	918.02	31.15	949.17	845.82	49.73	895.55	834.12	22.31	856.43	1070.95	61.23	1132.18	3668.91	164.42	**3833.33**	692.47	0.04	692.51	4361.38	164.46	**4525.84**

		North			South			East			West			County exc. City			City			County inc. City		
		Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	**Total**	Urban	Rural	Total	Urban	Rural	**Total**
Cycleways (exc. known shared use)	A	6.54	0.00	6.54	0.54	0.00	0.54	3.73	0.17	3.90	1.52	0.18	1.70	12.33	0.35	**12.68**	6.30	0.00	6.30	18.63	0.35	**18.98**
	B	0.78	0.06	0.84	0.10	0.04	0.14	1.91	0.00	1.91	1.44	0.00	1.44	4.23	0.10	**4.33**	1.36	0.00	1.36	5.59	0.10	**5.69**
	Summary	7.32	0.06	7.38	0.64	0.04	0.68	5.64	0.17	5.81	2.96	0.18	3.14	16.56	0.45	**17.01**	7.66	0.00	7.66	24.22	0.45	**24.67**

Roads by Hierarchy

	2B	2C	3A1	3A2	3B1	3B2	3B3	3B4	4A1	4A2	4B	4C	4D	**Total**
A	442.14	248.29	24.44	N/A	N/A	N/A	58.88	N/A	N/A	N/A	N/A	N/A	N/A	**773.75**
B	N/A	N/A	N/A	642.73	N/A	3.61	N/A	N/A	N/A	0.42	N/A	N/A	N/A	**646.76**
C	N/A	N/A	N/A	13.20	151.81	722.06	7.19	85.38	30.28	2423.53	0.32	N/A	N/A	**3433.77**
U	N/A	N/A	N/A	N/A	4.10	N/A	N/A	N/A	163.54	3693.04	618.84	0.61	497.69	**4977.82**
Total	442.14	248.29	24.44	655.94	155.91	725.67	66.07	85.38	193.82	6116.98	619.16	0.61	497.69	**9832.09**

V	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	25.48	N/A	**25.48**

9858

Highways Network

5A

5B

Trails Network

Appendix Cvii

N

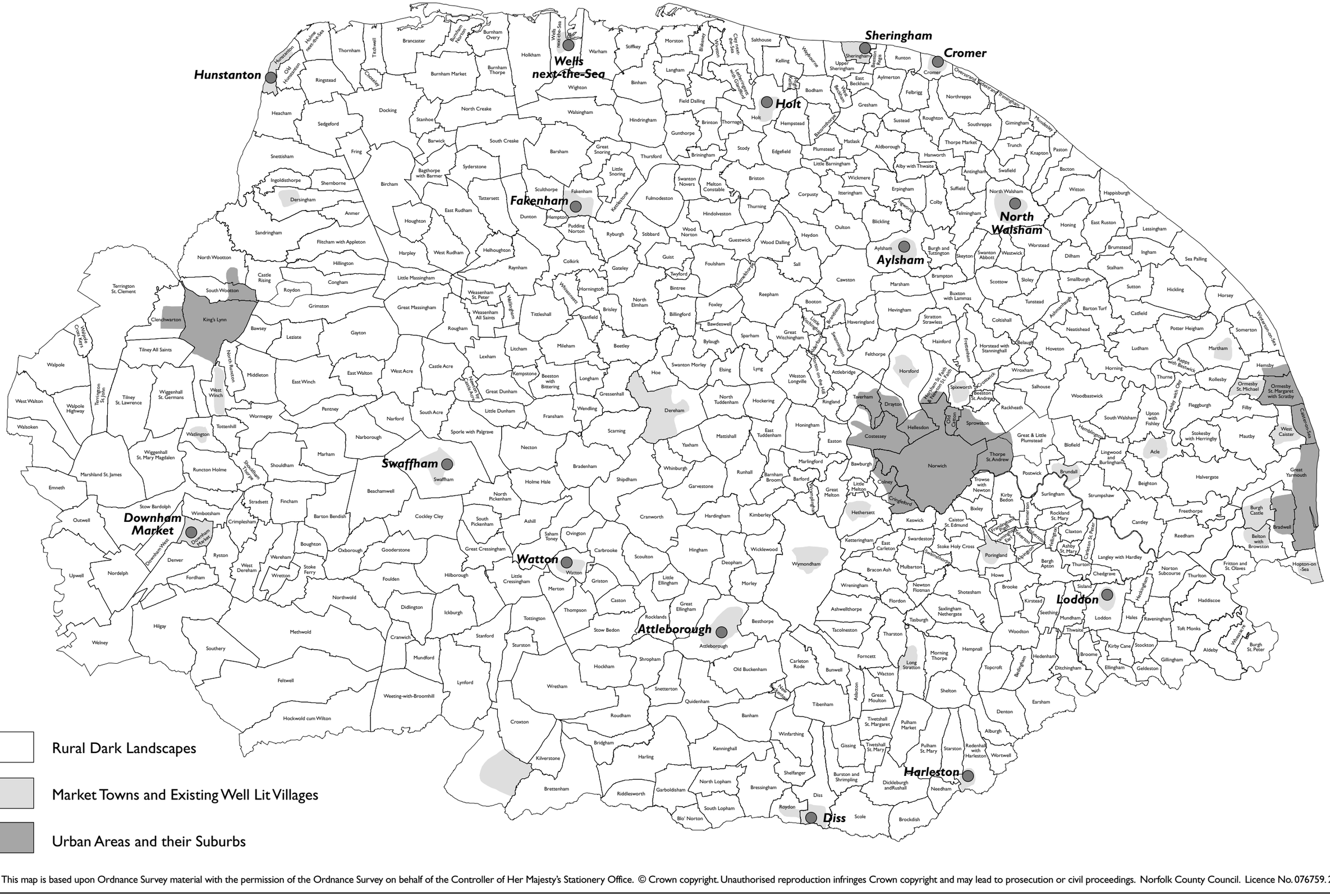
Norfolk Public Right of Way Hierarchy 2018-19

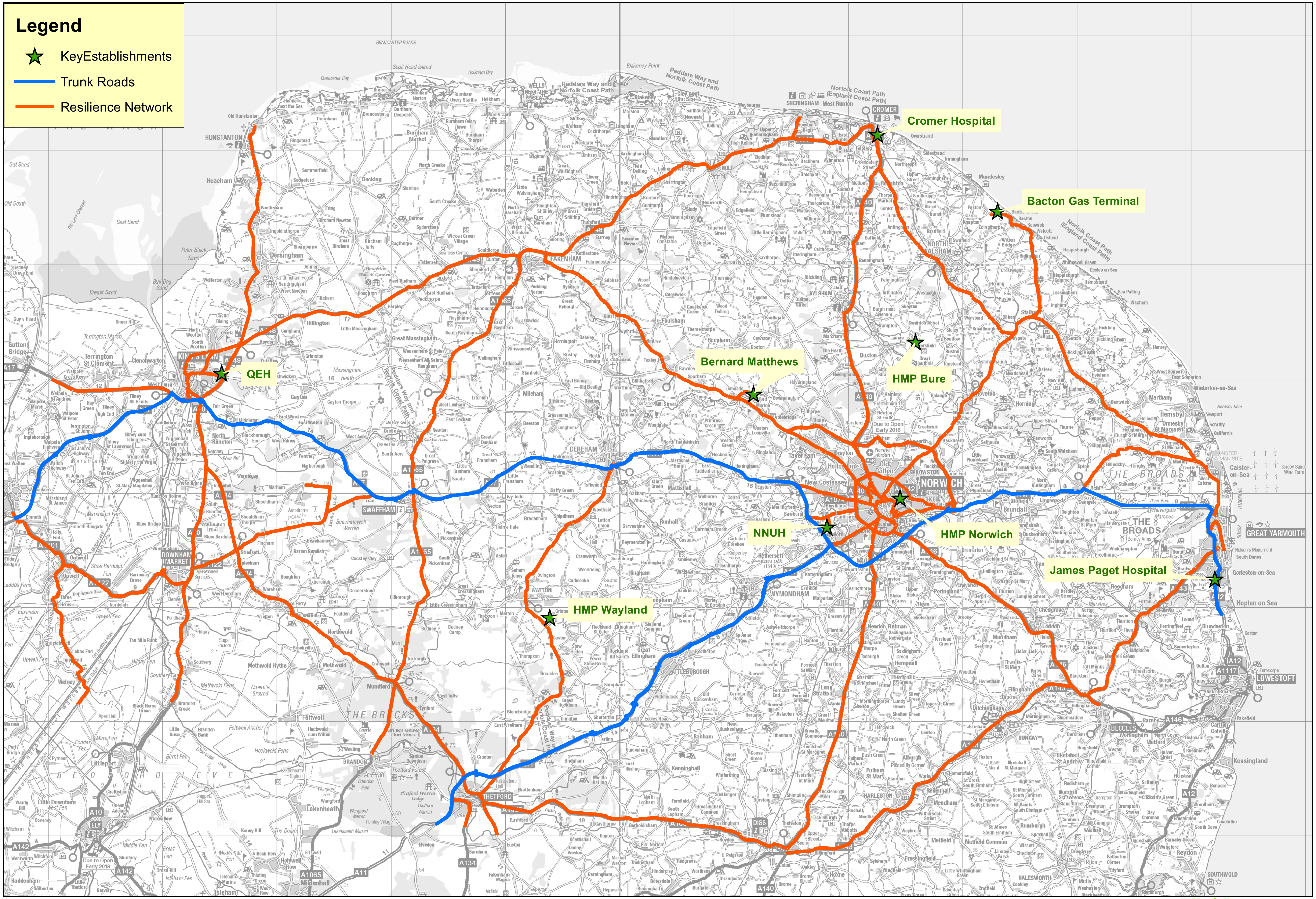
Norfolk County Council

CES - Asset Management Team

1:265,000

Environmental Lighting Zones





Appendix Cix - Resilience Network

Highway Safety Inspections in Norfolk

Norfolk County Council Practice (April 2018)

Hierarchies				Frequency
Subject	**Category**	**Sub-Category**	**Sub-Category / Description**	**Detailed/Safety inspections (combined)**
Roads	2	2a	Trunk	
		2b	Primary	6 weeks
		2c	Most principal roads- see 3a(i) & 3b(iii)	
	3	3a (Main Distributor)	3a(i) (Some remaining A roads A1062, A1064 only)	
			3a(ii) all others	
		3b (Access routes)	3b(i) HGV	
			3b(ii) Local	3 months
			3b(iii) Special (A149 Hunstanton-Cromer & C636 Bacton to North Walsham)	
			3b(iv)Tourist	
			Town Centres : All roads , footways, cycleways within these defined areas (Footway Cat 1)	6 weeks (walked)
	4	4a	4a(i)Typically dense urban terrace in Gt.Yar/KL/Nor with on-street parking	6 months (walked)
			4a(ii) Remaining	6 months
		4b	4b Typically urban (40mph or less) cul-de-sac's or loop roads without significant traffic generators	Annual
		4c	4c Back Lanes	Annual
		4d	4d Soft roads	Every 5 years (i.e. 1/5 each year)
Footways	1(a)			
	1	1	Defined 'Town Centre'	6 weeks with roads (town centre) - walked
	2	2	Remaining urban (Cat 2 & 3 roads) in City and Towns in Norfolk Structure Plan 1999 + exceptions	6 months - walked
			Detached Footway (2)	6 months - walked
	3	3	Link Footways	As per adjacent roads - driven
			Detached Footway (3)	6 months - walked
	4	4	Local access footways alongside road 4b & 4c	Annual - driven (detached walked)
			Detached Footway (4)	
Cycleways	A	A	(i) on road facilities	As per adjacent roads
			(ii) signed only (urban)	
			(iii) signed only (rural)	
	B	B	Shared or dedicated off-road detached Cycleway (not contiguous with highway)	6-monthly
			Shared or dedicated off-road provision alongside road corridor	As per adjacent roads
Public Rights of Way	Urban	Urban	Urban	Annual
	Rural	Rural	Rural	Every 5 years (i.e. 1/5 each year)

Key

Highway Agency responsibility

Condition Inspections in Norfolk

Subject	Category	Sub-Category / Descripton	Road class	Condition
Roads	2	[Principal (Trunk/ Primary/most principal roads- see 3a)]	A	i) SCANNER Survey (100% in one direction alternate every year (2 year return)) ii) Annual SCRIM survey on all of A road network (from 2007) in both directions iii) Ad-hoc scheme specific surveys to support the design of works may be carried out
	3a (Main Distributor)	3a(i) (Some remaining A roads A1062, A1064 only)	A	
		3a(ii) all others	A, B (C&U temp)	On the A149 Hunstanton to Cromer i) SCANNER Survey (100% in one direction 2 year return) ii) Annual SCRIM survey on all of A road network (from 2007) in both directions iii) Ad-hoc scheme specific surveys to support the design of works may be carried out
	3b (Access routes)	3b(i) HGV		
		3b(ii) Local		
		3b(iii) Special (A149 Hunstanton-Cromer & C636 Bacton to North Walsham)		
		3b(iv)Tourist		On B & C roads i) SCANNER on 'B' (100% in one direction per annum alternate every year 2 year return) ii) 'C'roads (50% in one direction - 2 year return for 100% in one direction - 4 year return for 100% in both directions) iii) Ad-hoc scheme specific surveys to support the design of works may be carried out
	4a	4a(i)Typically dense urban terrace in Gt.Yar/KL/Nor with on-street parking	B/C/U	
		4a(ii) Remaining		
	4b	Typically urban (40mph or less) cul-de-sac's or loop roads without significant traffic generators	B/C/U	On U & V roads i) Coarse Visual Inspections using (4-year cycle - 25% each year)
	4c	Back Lanes	V	
	4d	Soft roads	U	No condition surveys undertaken on soft roads
Footways	1	Defined 'Town Centre'	A/B/C/U	Footway Network Survey 2-year cycle
	2	**2** Remaining urban (P,MD,A) in City and Towns in Norfolk Structure Plan 1999 + hand gritted areas + exceptions		
		Detached Footway (2)		
	3	**3** Link Footways		Footway Network Survey 4-year cycle
		Detached Footway (3)		
	4	**4** Local access footways		
Cycleways	A	(i) on road facilities	A/B/C/U	with road surveys
		(ii) signed only (urban)		
		(iii) signed only (rural)		
	B	Shared or dedicated off-road provision contigous with highway or detached Cycleway		Footway Network Survey 4-year cycle

1 SCRIM - Norfolk's Strategy for 2018-19 testing season

1.1 Network

1.1.1 A survey of all designated 'A' roads in both directions. In addition we have a list of ad-hoc sites that are surveyed annual in one direction to help us better understand skid resistance of certain surfaces through time.

1.2 The test equipment to be used

1.2.1 This will be the last contract season under a joint Eastern Region consortium hosted by Cambridgeshire County Council. This has dealt with all our machine based surveys of which one is the Skidding Resistance testing for the last 5 years. Under this contract, the Skid Resistance testing of our A roads, can be carried out by either SCRIM™ (Sideway-force Co-efficient Routine Investigation Machine) or by a Grip Tester Machine.

1.2.2 All routine skidding resistance testing, in Norfolk, will continue to be carried out by the use of a SCRIM™.

1.2.3 Either a SCRIM™ or Grip-Tester machine as appropriate will carry out ad-hoc testing of specific sites for the purposes of a site investigation. However this is not advised without consultation with a member of the Asset Team.

1.2.4 The use of a Pendulum Portable Skid Resistance Tester will be allowed in specific instances for detailed investigations. The Pendulum is not recommended for use on fine textured surfaces and results on coarse textured surfaces can be misleading because of operational difficulties. Comparisons between SCRIM™/Grip-tester and Pendulum are not possible, so this testing is very site specific and coverage is very small. Again, as above, any skid testing is best passed through the Asset Team.

1.3 The method of survey

1.3.1 Norfolk moved to the Annual survey with benchmark method on the A road network for the 2007/8 survey with control sites within the County. This has enabled consideration of the use of the Characteristic SCRIM™ Co-efficient (CSC) from 2010/11 and the CSC has been recorded and does appear to give a more aggregated seasonal score but with reduced network coverage. Therefore further work is required before full satisfaction with this new approach is gained.

1.4 New contract for 2019/20

1.4.1 As mentioned (1.2.1 above) the contract we currently work within will finish at the end of the 2018/19 season. As a result the authorities within the present group called on the Eastern Highways Alliance (EHA) to look at creating a new Highway surveys contract which we, as members, could utilise.

1.4.2 At time of writing the processes are just beginning and meetings are being held to discuss the initial contract outline. As with the previous contract Cambridgeshire C.C. will be the admin lead and it will be procured via them.

1.5 Quality Assurance procedures for data collection

1.5.1 All SCRIM machines are required to attend an Annual Correlation Trial. This is carried out by the TRL (Transport Research Labs) at their test track at Crowthorne, Berkshire. Machines that pass the trial are then authorised to undertake surveys of the Highways England's Motorway and all-purpose Trunk Road Network.

1.5.2 All SCRIM testing on the County road network will be required to have passed the Annual Correlation Trial.

1.5.3 All skidding resistance testing carried out by our contractor in Norfolk will be carried out in accordance with the Eastern Shires Highway Condition Surveys Contract. The contract document will include the Contractors Quality Assurance Procedures.

1.6 Frequency of surveys

1.6.1 Annual survey of 'A' road network.

1.7 The approach to setting investigatory levels

1.7.1 For the 2018-19 season this will be based upon Table 4.1 HD 28/15 but adapted to incorporate Norfolk's local roads (see Appendix D (iv)) for the setting of site categorisation and associated investigatory levels.

1.7.2 Categories A to S1

1.7.3 Based upon paragraph 4.1 of HD28/15, "An Investigatory Level (IL) shall be defined for every part of the network, by determining which Site Category is most appropriate to each location….The objective of setting an IL is to assign a level of skid resistance appropriate for the risk on the site…."

1.7.4 Recent assessment show that approximately 25% of Norfolk's A class network has been improved i.e. redesigned to modern standards generally as village bypasses built between 1970-1995. The remaining 75% is unimproved with alignments that are historic and will be short of modern standards.

1.7.4.1 Norfolk gives a range of 3 alternatives which we have split into three bend radii based on Norfolk's accident record and our knowledge of the network above. Therefore Norfolk has Categories S2a (0.45), S2b(0.5) and S2c(0.55) Single Carriageway radius less than 500m

1.7.4.2 Bends of 250m-500m (S2a) are very common, bends less than 250m (S2b) occur quite frequently and there are a small number of bends less than 100m (S2c). See percentage split of network in App D(iv).

1.7.4.3 Adopt the lowest standard for 250m<radius<500m radius IL = 0.45

Reason: Likely to be a low risk even at the lower radius, so an increase to the new lowest standard for a low risk is appropriate.

1.7.4.4 Adopt the medium standard for 100m<radius<250m IL = 0.5

Reason: Likely to be a medium-risk especially where radius is near 100m, so an increase to the medium standard is appropriate.

1.7.4.5 Adopt the highest standard for radius 100 or less IL = 0.55

Reason: A known high-risk situation therefore the highest standard is chosen even though a decrease on the previous standard of IL=0.6. Many of the bends like this will have already been subject to accident remedial measures, such as super-elevation and addition of chevrons.

1.8 **Frequency of re-assessment of investigatory levels.**

1.8.1 2018-19 will be the eleventh year of applying these standards.

1.9 **List of Staff Authorised to Set or Approve Investigatory Levels.**

1.9.1 The Assistant Director Highways of the Department of Environment, Transport and Development approved the use of Table 4.1 HD 28/04 but adapted it to incorporate Norfolk local roads [see Appendix D (iv)]. The HD above has now been superseded by HD28/15 but there are no changes to the table 4.1.

1.9.2 The Investigatory Levels network will be established and maintained by one of the following as determined:

a) The Testing Contractor.

b) Engineer (Asset Management) or Technician (Asset Management)

The actual assignment of a variation in Investigatory Level value for a category or an individual site will be made by one of the following:

a) Team Manager Network Safety & Sustainability (Transport Strategy)

b) An employed Consultant Engineer experienced in the setting of Investigatory Levels.

1.9.3 Variation of IL values will be related to good knowledge of local:

- Road geometry
- Conflict potential
- Traffic speeds
- Nature of road users

Plus any other unique feature

1.10 The approach to be followed in site investigation including prioritisation of investigations and staff authorised to undertake site investigations. A realistic/achievable timetable for each part of the strategy. Responsibilities for delivering each part of the strategy.

1.10.1

Programme of Inspection, Identification and works		
Task	**Annual Timescale**	**Responsibility**
Inspection data		
Order survey	March /Apr/June (New contract)	Eng (Asset Management)
Contractor carry out early survey	May to Mid-June	Contractor
Contractor carry out middle survey	Mid-June to mid-August	
Contractor carry out late survey	Mid-August to end of Sept.	
Survey data supplied to NCC	End of October	
Process data and supply NRMCS/ALARM figures	End of November	Engineer & Techn. (Asset Management)
Display on ArcView	December	
Identification		
Identify all those sections that are at or below, IL with three or more, wet skid accidents in the previous three years.	Dec/Jan	Engineer (Asset Management) & Technician (Asset Management)
Identify all sections already addressed in the next season's programme.	January	
Assess risk, based on type and frequency of incident on any section or series of sections	January	
Carry out visits of identified sites. Assess if site meets policy criteria, and consider possible treatment options suitable for site.	Jan - Feb	

Consult Network Management (Analysis & Safety) Team to determine whether other minor safety improvements are required and to check against their own programmes of works		Jan - Feb	Programme Eng.
Include in next Seasons Programme		Jan - Feb	
Prepare works briefs and inform Area Staff and Surfacing Engineer		Jan - March	
Works			
Carry out works	Surface Dressing	April – August	Contractor
	Retexture/water jet	April - March	
	Surfacing	April - March	
	Signing (if necessary)	April onwards	Area

1.11 **How remedial works will be prioritised in relation to available funding in the overall context of the TAMP?**

1.11.1 All works identified under the process described in 1.9 as requiring work will be undertaken. If necessary some maintenance work will be displaced to the following year to accommodate these works.

1.12 The documentation to be retained to enable implementation of the policy to be demonstrated (in court if necessary). It is not expected that information will be produced for each scheme but that we have the capability of producing the information after the event.

1.12.1
- Survey received
- Processed data
- Arc view display of sites that are at or below IL.
- Accident records on KEY

1.13 Guidance by CSS & British Horse Society (ENG 03/05)

1.13.1 Areas to be defined locally.

It has been noted in the above guidance that certain surfaces can cause horses to slip when freshly laid and Highways Authorities should be aware of roads where horses/ponies are frequent users.

In Norfolk this will be where warning sign 550.1 "Accompanied horses or ponies likely to be in or crossing road ahead" are placed and then these roads will need to be treated, if surfacing with a negative texture surface course (such as German / Dense SMA), with the recommended 3mm grit at 1kg/m2. In addition to this statement it is now customary in Norfolk to specify (in the form 7/1) gritting of newly laid German / Dense SMAs (and the like) at all sites and not just those mentioned in the guidance.

Investigatory Skidding Resistance Levels for Different Categories of Site

Based upon Volume 7 Section 3 Part 1 HD 28/15. Table 4.1
with Norfolk Local category variation S2a,b & c

Category	Site definition	% of Network	Investigatory levels at 50km/h							
			0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65
A	Motorway									
B	Dual carriageway Non Event Sections	3.38%		■						
C	Single carriageway- Non Event Sections	69.86%			■					
Q	Approaches to & across minor / major juncts & rdbts approaches	13.46%					■			
K	Approaches to pedestrian crossings and other high risk situation	1.46%					■			
R	Roundabout	0.68%				■				
G1	Gradient 5% to 10% longer than 50m	0.87%				■				
G2	Gradient steeper than 10% longer than 50m	0.01%					■			
S1	Bend Radius<500m - dual carriageway	0.20%				■				
S2	Bend Radius<500m - single carriageway									
S2a	Bend Radius=<500m>250m single carriageway	6.38%				■				
S2b	Bend Radius=<250m>100m single carriageway	2.78%					■			
S2c	Bend Radius=<100m single carriageway	0.91%						■		

Key:

= HD 28/04 Lower risk

= HD 28/04 Generally used for Trunk Roads

■ = Norfolk's Investigatory Levels

= Not used in Norfolk

= Highways England Responsible

Adopted from the 2007 season onwards

1. Inspections of Structures

1.1. The condition of structures is managed by a regime of inspections and assessments which are based on the recommendations set out in “Management of Highway Structures – A Code of Practice”. A new code of practice entitled “Well Managed Highway Infrastructure” was published in October 2016 which, rather than giving specific guidance, advocates a risk based approach to inspection frequencies. It is intended that all local authorities adopt the new code of practice by October 2018.

1.2. Frequency of Inspection

1.2.1. Principal Inspections and General Inspections for bridges are reported in accordance with the methodology published by ADEPT for determining the Bridge Condition Indicator and the Inspection Manual for Highway Structures.

1.2.2. Principal Inspections (PIs) are carried out nominally every 6 years on structures carrying highways (including footways and cycleways but not PROWs) with any single span exceeding 5 metres and on some smaller structures where special access equipment is needed. Since 2009 we have been carrying out risk assessments to determine whether the PI interval for each bridge in the inspection programme can be extended to 8, 10 or possibly 12 years. The assessment applies the principles set out in the Code of Practice and takes into consideration type, age, condition and accessibility at General Inspections. So far the risk assessments have extended PI intervals to an average interval to nearly 9½ years.

1.2.3. General Inspections are carried out 2 yearly on bridges. Public Right of Way (PROW) footbridges have been included except for simple structures formed of single span planks up to 5m overall length and without attached handrails which are inspected and maintained by Highways Maintenance Section. Privately owned bridges and culverts primarily intended to carry vehicles but which also carry a PROW will not receive a structural inspection provided there is evidence of current vehicle usage; but will be inspected by Highways Maintenance Section.

1.2.4. Monitoring Inspections are carried out on structures with sub-standard load carrying capacities at 6 month intervals.

1.2.5. Special Inspections are carried out on any structure in response to some event such as an accident or a report of graffiti.

1.2.6. Culverts

1.2.6.1. The inspection frequency for culverts is not set out within the Management of Highway Structures code of practice. Prior to 2015/16 we carried out routine inspections on all structures less than 1.5m including pipes as small as 225mm diameter.

1.2.6.2. Routine inspections on the remaining culverts i.e. those greater than 900mm span and less than 1.5m are carried out at 3 yearly intervals.

1.2.6.3. Routine inspections on the remaining culverts smaller culverts of 900mm span or less and responsibility for these transferred to our Highways Maintenance teams on 1 April 2017. These are also carried out at a 3-year interval.

1.2.7. Retaining walls

1.2.7.1. Retaining walls (RWs) with a retained height of 1.5m or more are inspected every 2 years; RWs between 0.5m and 1.5m high are inspected every 3 years if they are subject to highway loading or have been identified as being in poor condition; RWs less than 0.5m high are not generally given a structural inspection.

1. Routine Maintenance – Response

1.1. Risk Assessment

1.1.1. In accordance with the recommendation in the 2016 Code of Practice and UKRLG Highway Infrastructure Asset Management Guidance, Part C, the response to identified defects has been developed from a process of risk assessment. Any item with a defect level which corresponds to, or is in excess of, the defect investigatory level adopted by the authority is to be assessed for likely risk.

1.1.2. The risk matrix based upon our corporate system can be seen in App D (vii).

1.1.3. The risk register for routine highway defects can be seen in App D (viii) and PROW defects App D (ix).

1.2. Response

1.2.1. Defect Categories

1.2.1.1. The 2016 Code section A.5.8 gives the following guidance

"Defects which are considered to require urgent attention should be corrected or made safe at the time of the inspection, if reasonably practicable. In this context, making safe may constitute displaying warning notices, coning off or fencing off to protect the public from the defect. If it is not possible to correct or make safe the defect at the time of inspection, repairs of a permanent or temporary nature should be carried out as soon as possible. If temporary repairs have been used, permanent repair should be carried out within a reasonable period."

"Defects that do not represent an immediate or imminent hazard or risk of short term structural deterioration may have safety implications, although of far less significance than those which are considered to require urgent attention. They are more likely to have serviceability or sustainability implications. If repairs are to be undertaken these are likely to be within a planned programme of works with their priority determined by risk assessment. Access requirements, other works on the network, traffic levels, and the desirability of minimising traffic management, should also be considered as part of the response."

1.2.1.2. We have called these Category 1 and 2.

• Category 1 - those that require prompt attention because they represent an immediate or imminent hazard or because there is a high risk of short-term structural deterioration.

• Category 2 - all other defects.

1.2.2. **Category 1**

1.2.2.1. On the basis of risk assessment we have divided this category into two, according to priority, high (H) and low (L). We have formally adopted a higher level response time of 2 hours for those Category 1 defects considered to pose a particularly high risk. Those remaining defects have been given a response time of up to 4 days.

1.2.3. **Category 2**

1.2.3.1. We have categorised Category 2 defects according to priority, high (H) and low (L).

1.2.3.2. We have adopted a range of local target response times for Category 2 defects and applied them in responding to various categories of defect, based on the risk probability and its likely impact. This takes into account the likelihood of further deterioration before the next scheduled inspection.

1.2.3.3. The decision whether to record those defects which are considered low risk [Cat 2 (Low, our response D] and have no determined response time remains with the Highway Inspector. When these are recorded they will have no nominally response time.

1.2.3.4. The response for this lowest category could be in the form of submitting a recommendation for surface dressing or a structural maintenance proposal.

1.2.4. **Timescales**

1.2.4.1. The response for each category and sub category of defect is detailed in the following table:

Defect	Response	Timescale
Cat 1 (High)	Response ‘A’	2 hours
Cat 1 (Low)	Response ‘B’	Up to 4 days
Cat 2 (High)	Response ‘C’	Up to 35 days
Cat 2 (Low)	Response ‘D’	More than 35 days (repair during next available programme, schedule a more detailed inspection or review condition at next inspection)

1.2.4.2. They represent the minimum expected response. Those identifying defects are able to prioritise faster if they deem necessary according to individual circumstances and location.

1.2.4.3. A hazard could be initially treated as a Response ‘A’ or ‘B’ to make matters safe and a longer term Response ‘C’ or ‘D’ could be used to follow up with a permanent repair.

1.3. Ordering

1.3.1. The identification of defects takes place through:

- Safety inspections
- Complaints via the public and subsequent reactive works or inspections
- Reports by highway engineering staff

1.3.2. On the basis of risk assessment, Cat 1 response ‘A’ defects are ordered upon identification. The timescale on the order therefore reflects our stated response time.

1.3.3. Category 2 defects are not considered to represent an immediate or imminent hazard. Those for which a repair is deemed required are assembled on a weekly basis into a planned programme of works, with the priority as determined by risk assessment.

1.3.4. As a result the ordering timescales for Category 2 defects may differ from our response times.

1.3.5. There is a need for a target completion date for contractual management and therefore all orders have these.

1.3.6. **Timescale**

The timescale for order completion is detailed in the following table:

Order	**Timescale**
Priority A	2 hours
Priority B	Up to 4 days
Priority C	Up to 28 days
Priority D	Up to 84 days (12 weeks)

LIKELIHOOD	IMPACT				
	Extreme 5	**Major 4**	**Moderate 3**	**Minor 2**	**Negligible 1**
Very Likely 5	25	20	15	10	5
Likely 4	20	16	12	8	4
Possible 3	15	12	9	6	3
Unlikely 2	10	8	6	4	2
Rare 1	5	4	3	2	1

Risk Factor	Defect Category	Priority Response	Priority Response Time
25	1	A	Up to 2 hours from discovery
12 - 20	1	B	Up to 4 days from discovery
5 - 19	2	C	Up to 35 days from discovery
1 - 4	2	D	Defect low risk, continue to monitor or repair on an opportunity basis or next planned programme

Ref	Item	Hazard	Position	Extent	Detail / Information	Priority Response
1	carriageway	Pothole	All	13mm to 19mm	All roads	D
			All	20mm to 39mm	2 Principal Urban	D
					2 Principal Rural	D
					3 MD/Access Routes u	D
					r	D
					4a u	D
					r	D
					4b	D
					r	D
					Town centre	C
					Outside school/doctors/OAP home	C
					Formal cycle lanes	C
					Formal pedestrian crossing inc islands & tactiles	C
			All	40mm to 74mm	2 Principal Urban	B
					2 Principal Rural	B
					3 MD/Access Routes u	B
					r	B
					4a u	B
					r	B
					4b	B
					r	C
					Town centre	B
					Outside school/doctors/OAP home	B
					Formal cycle lanes	B
					Formal pedestrian crossing inc islands & tactiles	B
			All	75mm to 99mm	2 Principal Urban	A
					2 Principal Rural	A
					3 MD/Access Routes u	A
					r	A
					4a u	B
					r	B
					4b	B
					r	C
					Town centre	A
					Outside school/doctors/OAP home	A
					Formal cycle lanes	A
					Formal pedestrian crossing inc islands & tactiles	A
			All	100mm	All roads except 4br	A
					4br	B

Ref	Item	Hazard	Position	Extent/Severity	Detail / Information	Priority Response
2	carriageway	Crack craze inc around covers	All	Stable	All roads	D
			All	Possible to break out before next inspection	2 Principal Urban	C
					2 Principal Rural	C
					3 MD/Access Routes u	C
					r	C
					4a u	C
					r	C
					4b	C
					r	C
					Town centre	C
					Outside school/doctors/OAP home	C
					Formal cycle lanes	C
					Formal pedestrian crossing inc islands & tactiles	C

Ref	Item	Hazard	Position	Extent/Severity	Detail / Information	Priority Response
3	carriageway	Missing Cover	All	All	All roads	A
		Cracked Cover	All	unstable (all)	All roads	A
				stable (Highway Authority)	All roads	C
				stable (Utility)	All roads	Refer to streetworks for action as appropriate to NRSWA Section 81 procedure
		Polished Cover	All	Highway	All roads	C
				Utility	All roads	Refer to streetworks for action as appropriate to NRSWA Section 81 procedure
		Sunken Cover or level difference within framework	All	Highway Authority 20mm to 39mm	2 Principal Urban	D
					2 Principal Rural	D
					3 MD/Access Routes u	D
					r	D
					4a u	D
					r	D
					4b	D
					r	D
					Town centre	C
					Outside school/doctors/OAP home	C
					Formal cycle lanes	C
					Formal pedestrian crossing inc islands & tactiles	C
				Utility 20mm to 39mm	All roads	Refer to streetworks for action as appropriate to NRSWA Section 81 procedure
				Highway Authority 40mm to 74mm	2 Principal Urban	B
					2 Principal Rural	B
					3 MD/Access Routes u	B
					r	B
					4a u	B
					r	B
					4b	B
					r	C
					Town centre	B
					Outside school/doctors/OAP home	B
					Formal cycle lanes	B
					Formal pedestrian crossing inc islands & tactiles	B
				Utility 40mm to 74mm	All roads	Refer to streetworks for action as appropriate to NRSWA Section 81 procedure
				Highway Authority above 75mm	2 Principal Urban	A
					2 Principal Rural	A
					3 MD/Access Routes u	A
					r	A
					4a u	B
					r	B
					4b	B
					r	C
					Town centre	A
					Outside school/doctors/OAP home	A
					Formal cycle lanes	A
					Formal pedestrian crossing inc islands & tactiles	A
				Utility above 75mm	All roads	Refer to streetworks for action as appropriate to NRSWA Section 81 procedure

Ref	Item	Hazard	Position	Extent/Severity	Detail / Information	Priority Response
4	carriageway	Defective trench as stipulated in NRSWA "Specification for the reinstatement of openings in highways 2002" HAUC	Edge of trench	over 10mm depth over continuous length of	All roads	Refer to streetworks fro action as appropriate to NRSWA
			Surface depression/ Crowning	over 10mm depth spanning 100mm within 400mm	All roads	
				over 12mm depth spanning 100mm within 500mm	All roads	
				over 14mm depth spanning 100mm within 600mm	All roads	
				over 17mm depth spanning 100mm within 700mm	All roads	
				over 19mm depth spanning 100mm within 800mm	All roads	
				over 22mm depth spanning 100mm within 900mm	All roads	
				over 25mm depth spanning 100mm over 900mm	All roads	
			Combined	over 10mm depth spanning 100mm within 400mm	All roads	
				over 10mm depth spanning 100mm within 500mm	All roads	
				over 12mm depth spanning 100mm within 600mm	All roads	
				over 14mm depth spanning 100mm within 700mm	All roads	
				over 16mm depth spanning 100mm within 800mm	All roads	
				over 18mm depth spanning 100mm within 900mm	All roads	
				over 20mm depth spanning 100mm over 900mm	All roads	

Ref	Item	Hazard	Position	Extent/Severity	Detail / Information	Priority Response
5	Footway	Pothole / Trip inc erupting tree roots, high/low kerb, high low flag (all surfaces)	All	13mm to 19mm	All footways	D
				greater or equal to 20mm & less than 30mm	2 Principal Urban	C
					2 Principal Rural	C
					3 MD/Access Routes u	C
					r	C
					4a u	C
					r	C
					4b	C
					r	C
					Town centre	C
					o/s school/doctors/OAP home	C
					Formal shared use	C
				greater or equal to 30mm	2 Principal Urban	B
					2 Principal Rural	C
					3 MD/Access Routes u	B
					r	C
					4a u	B
					r	C
					4b	B
					r	C
					Town centre	B
					o/s school/doctors/OAP home	B
					Formal shared use	B
		Trip - Rocking - Flags/modular paving	All	Rocking less than 20mm	2 Principal Urban	C
					2 Principal Rural	C
					3 MD/Access Routes u	C
					r	C
					4a u	C
					r	C
					4b	C
					r	C
					Town centre	B
					o/s school/doctors/OAP home	B
					Formal shared use	C
				Rocking more than 20mm	2 Principal Urban	B
					2 Principal Rural	C
					3 MD/Access Routes u	B
					r	C
					4a u	B
					r	C
					4b	B
					r	C
					Town centre	B
					o/s school/doctors/OAP home	B
					Formal shared use	B
		Trip - Gaps between Flags, open cracks all surfaces	All	more than (20mm wide x 6mm deep) less than (20mm wide x 20mm deep)	2 Principal Urban	D
					2 Principal Rural	D
					3 MD/Access Routes u	D
					r	D
					4a u	D
					r	D
					4b	D
					r	D
					Town centre	D
					o/s school/doctors/OAP home	D
					Formal shared use	D
				more than (20mm wide x 20mm deep)	2 Principal Urban	C
					2 Principal Rural	C
					3 MD/Access Routes u	C
					r	C
					4a u	C
					r	C
					4b	C
					r	C
					Town centre	B
					o/s school/doctors/OAP home	B
					Formal shared use	B

Ref	Item	Hazard	Position	Extent/Severity	Detail / Information	Priority Response
6	Footway	Crack craze inc around covers	All	Stable	All roads	D
				Possible to break out before next inspection	2 Principal Urban	C
					2 Principal Rural	C
					3 MD/Access Routes u	C
					r	C
					4a u	C
					r	C
					4b	C
					r	C
					Town centre	C
					o/s school/doctors/OAP home	C
					Formal shared use	C

Ref	Item	Hazard	Position	Extent	Detail / Information	Priority Response
7	Footway	Depression	All	Depressions / Crowning greater than 10 mm less than 30mm, over 1 metre	All footways	D
				Depressions / Crowning greater than 30mm less than 50mm, over 1 metre	2 Principal Urban	D
					2 Principal Rural	D
					3 MD/Access Routes u	D
					r	D
					4a u	D
					r	D
					4b	D
					r	D
					Town centre	C
					Vulnerable site o/s/school/doctors/OAP	C
					Shared Use	C
				Depressions / Crowning greater than 50mm, over 1 metre	2 Principal Urban	C
					2 Principal Rural	D
					3 MD/Access Routes u	C
					r	D
					4a u	C
					r	D
					4b	C
					r	D
					Town centre	C
					Vulnerable site o/s/school/doctors/OAP	C
					Shared Use	C

Ref	Item	Hazard	Position	Extent/Severity	Detail / Information	Priority Response
8	Footway	Missing Cover	All	small cover	All Footways	B
				manhole cover	All Footways	A
		Cracked Cover		unstable (all)	All Footways	B
				stable (highway	All Footways	D
				stable (utility)	All Footways	Refer to streetworks fro action as appropriate to NRSWA
		Polished Cover		Highway Authority	All footways	D
				Utility	All footways	Refer to streetworks fro action as appropriate to NRSWA
		Sunken Cover or level difference within framework		Highway Authority 13mm to 19mm	All footways	D
				Highway Authority 20mm to 30mm	2 Principal Urban	C
					2 Principal Rural	C
					3 MD/Access Routes u	C
					r	C
					4a u	C
					r	C
					4b	C
					r	C
					Town centre	C
					o/s school/doctors/OAP home	C
					formal shared use	C
				Utility 20mm to 30mm	2 Principal Urban	Refer to streetworks fro action as appropriate to NRSWA
					2 Principal Rural	
					3 MD/Access Routes u	
					r	
					4a u	
					r	
					4b	
					r	
					Town centre	
					o/s school/doctors/OAP home	
					formal shared use	
				Highway Authority more than 30mm	2 Principal Urban	B
					2 Principal Rural	C
					3 MD/Access Routes u	B
					r	C
					4a u	B
					r	C
					4b	B
					r	C
					Town centre	B
					o/s school/doctors/OAP home	B
					formal shared use	B
				Utility more than 30mm	2 Principal Urban	Refer to streetworks fro action as appropriate to NRSWA
					2 Principal Rural	
					3 MD/Access Routes u	
					r	
					4a u	
					r	
					4b	
					r	
					Town centre	
					o/s school/doctors/OAP home	
					formal shared use	

Ref	Item	Hazard	Position	Extent/Severity	Detail / Information	Priority
9	Verges	Overrunning	Fall from edge carriageway into unkerbed road	Upto 39mm	All roads	D
				40mm to 99mm	All roads	D
				Over 99mm	2 Principal Urban	C
					2 Principal Rural	C
					3 MD/Access Routes u	C
					r	C
					4a u	C
					r	C
					4b	C
					r	C
			Verge between road and footway	Greater or equal to 75mm	All roads	C

Ref	Item	Hazard	Position	Extent/Severity	Detail / Information	Priority Response
10	Drainage Actual Flooding	Highway Water	all	all	All	A
		Flooding		Substantial standing water	2 Principal Urban	A
					2 Principal Rural	A
					3 MD/Access Routes u	A
					r	A
					4a u	B
					r	B
					4b u	B
					r	B
					Town centre	A
					Vulnerable site o/s/school/doctors/OAP	A

Ref	Item	Hazard	Position	Extent/Severity	Detail / Information	Priority Response
11	Drainage - Potential	Potential Highway Water entering private buildings	all	all	All	C
		Potential Flooding		Substantial standing water	2 Principal Urban	C
					2 Principal Rural	C
					3 MD/Access Routes u	C
					r	C
					4a u	C
					r	C
					4b u	C
					r	C
					Town centre	C
					Vulnerable site o/s/school/doctors/OAP	C

Ref	Item	Hazard	Position	Extent/Severity	Detail / Information	Priority Response
12	Road Markings	Worn road markings	All	30% loss of marking	Stop, solid centre line	C
					Other	D
				70% loss of marking	Other	C

Ref	Item	Hazard	Position	Extent/Severity	Detail / Information	Priority Response
13	Road studs	Missing reflective catseye (note missing metal shoe treated as pothole defect)		more than 10% in a run	All roads	D

Ref	Item	Hazard	Position	Extent/Severity	Detail / Information	Priority Response
14	Signs	Unlit Signs worn/missing/obscured	all	all	Signs giving orders	B
					Warning	C
					Regulatory	C
					Information	D
					Bollard (not to TSGDR)	D
		Lit signs - worn/missing/obscured	all	all		Refer to street lighting same
		Signs - Lack of overhead clearance over roads 5.2m	all	all	2 Principal Urban	A
					2 Principal Rural	A
					3 MD/Access Routes u	A
					r	A
					4a u	B
					r	B
					4b	B
					r	B
					Town centre	A
		Signs - Lack of overhead clearance over footways 2.1m	all	all	2 Principal Urban	C
					2 Principal Rural	C
					3 MD/Access Routes u	C
					r	C
					4a u	C
					r	C
					4b	C
					r	C
					Town centre	B
					Vulnerable site o/s/school/doctors/OAP	B
					Shared use	B

Ref	Item	Hazard	Position	Extent/Severity	Detail / Information	Priority Response
15	Posts	Unlit posts missing/leaning/damaged	all	Stable but showing wear	All roads	D
				Possible to lean/fall before next inspection	2 Principal Urban	C
					2 Principal Rural	C
					3 MD/Access Routes u	C
					r	C
					4a u	C
					r	C
					4b	C
					r	C
					Town centre	C
					o/s school/doctors/OAP home	C
					Formal shared use	C
				Hazardous	All roads	B
				Fallen	All roads	C
		Lit signs - worn/missing/obscured	all	all		Refer to street lighting same response

Ref	Item	Hazard	Position	Extent/Severity	Detail / Information	Priority Response
16	Traffic Signals	Traffic Signal Fault	All	All		Refer to traffic signals

Ref	Item	Hazard	Position	Extent/Severity/ in Ownership	Detail / Information	Priority Response
17	Fencing	Damaged Safety Fence	all	Highway Authority	Debris / Protruding into carriageway	A
		Damaged Safety Fence	all	Highway Authority	Debris / not Protruding into carriageway	B
		Damaged Pedestrian Guard Rail	all	Highway Authority	all - unsafe	B
					all - safe	D
		Damaged Fencing to subdue road noise	all	Highway Authority	all	D

Ref	Item	Hazard	Position	Extent/Severity /Ownership*	Detail / Information	Priority Response
18	Hedges and Trees *Highway Authority (Please refer to procedures concerning private Hedges trees)	Unstable Tree likely to fall into highway	All		All highways	B
		Obstruction due to Fallen branches/tree		More than 500mm into carriageway	All highways	A
				500mm to 100mm into carriageway	All highways	B
				less than 100mm into carriageway	All highways	C
		Lack of overhead clearance roads 5.2m - Vegetation fallen		Carriageway	2 Principal Urban	A
					2 Principal Rural	A
					3 MD/Access Routes u	A
					r	A
					4a u	B
					r	B
					4b	B
					r	B
					Town centre	A
		Lack of overhead clearance roads 5.2m - Vegetation grown into		Carriageway	2 Principal Urban	D
					2 Principal Rural	D
					3 MD/Access Routes u	D
					r	D
					4a u	D
					r	D
					4b	D
					r	D
					Town centre	D
		Lack of overhead clearance footways 2.1m of vegetation - Vegetation fallen		Footway	2 Principal Urban	C
					2 Principal Rural	C
					3 MD/Access Routes u	C
					r	C
					4a u	C
					r	C
					4b	C
					r	C
					Town centre	B
					Vulnerable site o/s/school/doctors/OAP	B
					Shared use	B
		Lack of overhead clearance footways 2.1m or projection of vegetation narrowing footway by more than 200mm - vegetation grown into		Footway	2 Principal Urban	D
					2 Principal Rural	D
					3 MD/Access Routes u	D
					r	D
					4a u	D
					r	D
					4b	D
					r	D
					Town centre	D
					Vulnerable site o/s/school/doctors/OAP	D
					Adjacent to cycle lane /share use	D

Ref	Item	Hazard	Position	Extent/Severity	Detail / Information	Priority Response
19	Siding	Narrowing of Footway/Shared Use by verge encroachment	all	Upto 300mm	All highways	D
		Narrowing of Carriageway by verge encroachment	all	Upto 300mm	All highways	D
		Loss of visible kerb by verge encroachment	all	Top of kerb not visible	All highways	D

Ref	Item	Hazard	Position	Extent/Severity	Detail / Information	Priority Response	
20	silt	Slippery surface due to Silt deposit after fluvial/tidal flooding/heavy rainfall or erosion. Wind blown sand.	all	More than 25mm deep significant coverage of carriageway	2 Principal Urban	B	
					2 Principal Rural	B	
					3 MD/Access Routes u	B	
					r	B	
					4a u	B	
					r	B	
					4b	B	
					r	C	
					Town centre	B	
		Slippery surface due to debris build up	in channels	More than 300mm wide	All roads	C	May refer to District
				Less than 300mm wide	All roads	D	

Ref	Item	Hazard	Position	Extent/Severity	Detail / Information	Priority Response
21	Highway General	Slippery surface due to Oil	all	More than	All highways	A
		Slippery surface due to Bleeding Tar	all	continuous tracking	All highways	B
				Patches	All highways	D
		Dangerous Objects	all		All highways	A
		Other obstructions advertising boards/signs, traders, encroachment, vehicles for sale, Mud on road abandoned vehicle, illegal signs, encroachment	all		All highways	Refer to procedure Control or Removal of Obstructions on the Highway SP03-01-P04 for action as appropriate
		Skip or Scaffold	all		All highways	Refer to procedure

Ref	Item	Hazard	Position	Extent/Severity	Detail / Information	Response
22	Trod (Unbound footpath - Typically planings, hoggin material)	Narrowing of Trod by encroachment	all	visible surface remaining of 600mm	All highways	D
		Depression	all	Depressions / Crowning greater than 100mm, over 1 metre	All highways	C

Ref	Item	Hazard	Position	Extent/Severity	Detail / Information	Response
23	Soft Road (Unbound road with highway vehicular rights - Typically planings, type 1 sub-base)	Narrowing of passable width by verge encroachment	all	Vehicle unable to pass	All highways	D
		Depression	all	Depressions / Crowning greater than 200mm, over 1 metre	All highways	D

Ref	Item	Hazard	Position	Extent/Severity	Detail / Information	Response
22	Kerbs	Out of Horizontal Alignment	all	projection of 25mm	All highways	D
				projection of 75mm	All highways	C
		Out of Vertical Alignment or loose / rocking or chipped kerb adjacent to footway	all	13mm to 19mm	All highways	D
			all	greater or equal to 20mm & less than 30mm	All highways	C
			all	greater or equal to 30mm	2 Principal Urban	B
					2 Principal Rural	C
					3 MD/Access Routes u	B
					r	C
					4a u	B
					r	C
					4b	B
					r	C
					Town centre	B
					o/s school/doctors/OAP home	B
					Formal shared use	B
		Chipped kerb adjacent to verge not footway	all	Greater or equal to 75mm	All roads	C

For all metalled PROW treat as footway (typically cat 4b) and see sections 5, 6 & 7 of Highway Defect Response register.
For BOAT treat as Soft Road and see section 23 of Highway Defect Response register.

Ref	Item	Hazard	Position	Extent	Detail / Information	Priority Response
1	Unbound Surfaced Routes - including imported stone / shingle surfaces	Pothole / Trip including erupting tree roots	All	Large and / or multiple deep sharp sided pothole(s) across majority of path width - significant trip hazard(s)	All other Urban Restricted byway & Bridleway	C
					All other Urban Public footpath	C
					All Rural Restricted byway & Bridleway	D
					All Rural Public footpath	D
			All	Isolated deep sharp sided pothole - clear route around defect avoiding trip hazard	All other Urban Restricted byway &Bridleway	D
					All other Urban Public footpath	D
					All Rural Restricted byway & Bridleway	D
					All Rural Public footpath	D
			All	Depression	All other Urban Restricted byway &Bridleway	D
					All other Urban Public footpath	D
					All Rural Restricted byway & Bridleway	D
					All Rural Public footpath	D
			All	Erupting Tree Root causing trip hazard(s) across majority of path width	All other Urban Restricted byway &Bridleway	C
					All other Urban Public footpath	C
					All Rural Restricted byway & Bridleway	D
					All Rural Public footpath	D
			All	Erupting Tree Root causing trip hazard - clear route around defect avoiding trip hazard	All other Urban Restricted byway &Bridleway	D
					All other Urban Public footpath	D
					All Rural Restricted byway & Bridleway	D
					All Rural Public footpath	D
	Unsurfaced - All including grass & earth surfaces	Trip Hazard including rutting, holes & cross slopes	All	Large and / or multiple deep ruts / holes or a cross slope over majority of path width	All other Urban Restricted byway &Bridleway	C
					All other Urban Public footpath	C
					All Rural Restricted byway & Bridleway	D
					All Rural Public footpath	D

For all metalled PROW treat as footway (typically cat 4b) and see sections 5, 6 & 7 of Highway Defect Response register.
For BOAT treat as Soft Road and see section 23 of Highway Defect Response register.

Ref	Item	Hazard	Position	Extent	Detail / Information	Priority Response
2	Unsurfaced - All including grass & earth surfaces	Significant surface vegetation growth	All	PROW not reasonably passable	All other Urban Restricted byway &Bridleway	D
					All other Urban Public footpath	D
					All Rural Restricted byway & Bridleway	D
					All Rural Public footpath	D

For all metalled PROW treat as footway (typically cat 4b) and see sections 5, 6 & 7 of Highway Defect Response register.
For BOAT treat as Soft Road and see section 23 of Highway Defect Response register.

Ref	Item	Hazard	Position	Extent	Detail / Information	Priority Response
3	Drainage Actual Flooding	Flooding	All	Substantial standing water across full width of PROW	All BOATs, Restricted byways & Bridleways	D
					Urban public footpath	D
					Rural public footpath	D

For all metalled PROW treat as footway (typically cat 4b) and see sections 5, 6 & 7 of Highway Defect Response register.
For BOAT treat as Soft Road and see section 23 of Highway Defect Response register.

Ref	Item	Hazard	Position	Extent	Detail / Information	Priority Response
4	Finger Post	Not present / missing	All	All	All PROW	D
		Unstable / Damaged	All	All	All PROW	D
		Incorrect PROW status	All	All	All PROW	D
		Obscured by vegetation	All	All	All PROW	D
	Way Markers	Disc not present / damaged	All	All	All PROW	D
		Post Unstable / Damaged	All	All	All PROW	D
		Obscured by vegetation	All	All	All PROW	D

For all metalled PROW treat as footway (typically cat 4b) and see sections 5, 6 & 7 of Highway Defect Response register.
For BOAT treat as Soft Road and see section 23 of Highway Defect Response register.

Ref	Item	Hazard	Position	Extent	Detail / Information	Priority Response
5	Furniture / Structure - including Kissing Gate, Stiles, Field Gates, Pedestrian Gates, Rambler Gates, Chicanes. *Check definitive map to establish legality of structure	Structure potential to cause injury to users	All	All	All urban PROW	B
					All rural PROW	B
		Structure damaged no immediate safety concern	All	All	All urban PROW	D
					All rural PROW	D
		Structure found out of specification	All	All	All PROW	D
	Bridges - < 3m span and without a hand rail	Structure potential to cause injury to users	All	All	All urban PROW	B
					All rural PROW	B
		Structure damaged no immediate safety concern	All	All	All urban PROW	D
					All rural PROW	D
		Structure found out of specification	All	All	All PROW	D
	Fences	Barbed Wire Fence immediately adjacent to PROW	All	Restricting PROW below prescribed width	All PROW	C
		Electric Fence immediately adjacent to PROW		Restricting PROW below prescribed width	All PROW	C
				Appropriate warning signs not in place	All PROW	C
	Other obstructions	Obstruction due to fences/structures across PROW	All	PROW impassable	All urban PROW	D
					All rural PROW	D
				Temporary diversion available around defect	All PROW	D
				PROW still passable	All PROW	D

For all metalled PROW treat as footway (typically cat 4b) and see sections 5, 6 & 7 of Highway Defect Response register.
For BOAT treat as Soft Road and see section 23 of Highway Defect Response register.

Ref	Item	Hazard	Position	Extent	Detail / Information	Priority Response
6	Hedges and Trees *Highway Authority (Please refer to procedures concerning private Hedges trees)	Unstable Tree likely to fall onto PROW	All	In all cases attempt to contact landowner to deal. Carry out work in default of landowner and recharge.	All urban PROW	B
					All rural PROW	C
		Obstruction due to Fallen branches/tree	All	PROW impassable	All urban PROW	D
					All rural PROW	D
				Temporary diversion available around defect	All urban PROW	D
					All rural PROW	D
				PROW still passable	All urban PROW	D
					All rural PROW	D
		Lack of overhead clearance	All	< 3.7m	All BOAT	D
					All Restricted byway	D
					All Bridleway	D
				< 2.1 m	All PROW	D
	Encroachment by vegetation	Narrowing of PROW by vegetation / hedge / crop encroachment	All	PROW impassable	All urban PROW	D
					All rural PROW	D
				PROW passable	All PROW	D

For all metalled PROW treat as footway (typically cat 4b) and see sections 5, 6 & 7 of Highway Defect Response register.
For BOAT treat as Soft Road and see section 23 of Highway Defect Response register.

Ref	Item	Hazard	Position	Extent	Detail / Information	Priority Response
7	PROW General	Other obstructions such as illegal / misleading signs	All	All	All PROW	D
		Reported aggressive on animals on PROW	All	All	All PROW	B
		Animals preventing use of PROW	All	All	All PROW	D

1.0 Weather and Other Emergencies -Objectives, Standards & Response

1.1. There are well established practices for dealing with what can be defined as other emergencies apart from Winter Maintenance. This includes those that are related to weather conditions such as high winds, high temperatures, fluvial and tidal flooding.

1.2. Formal procedures existing for these emergencies and details of how to respond (to fluvial flooding for example) is contained in the County's and District's Flood emergency response plans.

1.3. Smaller scale local emergencies such as diesel spillages or road traffic accidents are dealt with using formalised procedures utilising signs and materials held at Depots throughout the County for such purposes. A memorandum of understanding with emergency services and other authorities has been established for incidents on the highway. Outside normal working hours, an 'out of hours' telephone contact ensures that service is maintained. Highway Emergency Response has been recognised as a high level requirement and a fully detailed Business Impact Analysis and Business Continuity Plan have been developed for this service element.

1.4. In the event of large scale Civil or National incidents, there is a range of Corporate Emergency Plans for guidance. In these situations the County's CES Resilience team will take the lead.

28. Real Time Information Assets - Lifecycle Management Plan

28.1. Physical Parameters

28.1.1. This asset grouping comprises electronic displays installed at bus stations and transport interchanges across Norfolk, as well as a central server that handles the scheduled and live passenger information. Electronic signage has been installed at different times.

28.1.2. The equipment allocated to the real time information as of 1 April 2017 is outlined below.

Element	Number of units	Installation date
Real Time Passenger Information (display and remote comms)	91	Various from 1996
RTPI central server	1	2013

28.1.3. By the end of 2018 / 2019 there are proposed to be 108 Real Time Passenger Information displays installed. New passenger information displays are being installed during 2018 / 2019 using external funding provided through the Local Enterprise Partnership and Local Transport Plan capital programme. Some existing displays will be replaced as part of the installation of new.

28.1.4. The replacement cost of these items is as follows:

Asset	Replacement Cost
Real Time Passenger Information (RTPI) (display and remote comms)	£571,000
RTPI central server	£15,000
Total	£586,000

28.1.5. **Creation or Acquisition**

28.1.5.1. There is the option for the expansion in the number of RTPI related equipment based on funding availability and assessment indicating there would be benefits from further units. A framework contract is in place for the procurement of future displays. The RTPI central server would be procured through competitive tendering.

28.1.6. **Upgrading**

28.1.6.1. Opportunities exist for passenger displays to be upgraded with new hardware and software.

28.1.7. **Renewal /Replacement**

28.1.7.1. Renewals and replacements are the major options when routine maintenance alone cannot sustain the asset. The lifecycle plan should support the optimal time for a specific option.

28.1.7.2. Each piece of equipment is covered by a manufacturer's warranty for 1 year. After the 1 year warranty, annual maintenance contracts have been established with relevant suppliers.

28.1.8. **Disposal**

28.1.8.1. Obsolete passenger displays may being removed and disposed of, with replacements where required, during 2018 / 2019

28.2. Non Asset Options

28.2.1. There are currently no non asset options planned.

28.3. Lifecycle Treatment Options

28.3.1. On-street displays will remain in place until parts become obsolete or they become economically unviable to maintain. There will be no replacement of on-vehicle tracking units.

28.4. Routine Maintenance Standards, Objectives and Response

28.4.1. All on-street displays are covered by a comprehensive maintenance contract. The routine works undertaken have been sub-divided into activities, the standards of which have been displayed in tabular form and are followed by details on objectives and response arrangements.

28.4.2. Reactive activities are by their nature unplanned and occur in response to sudden changes.

Activity Type	Activity	Service Standard
Preventative	The performance of the system is monitored	The maintenance contractor is responsible for maintaining the equipment within agreed service level agreements.
Condition monitoring	As above	As above
Reactive	Minor failures will be repaired by maintenance contractor	Major problems will be repaired by the maintenance contractor

28.5. Real Time Information Assets – Objectives and Response

28.5.1. Safety

28.5.1.1. The equipment is powered by electricity or solar power. Remote and manual checks will be made to ensure the machines are operational and secured to their base unit.

28.5.2. Serviceability

28.5.2.1. The on-street displays are provided to enable live and scheduled bus service information to be provided to customers.

28.6. Lifecycle Cost Analysis

28.6.1. The on-street displays receives regular maintenance during the period up to 10 years of age, which is the life span envisaged for the machines. The annual running costs for the RTPI system are as follows:

28.6.2.

System Maintenance Costs	
Central Server	£24,000
On-street displays (incl Comms)	83,000
Total	£73,000

28.7. Service Levels

28.7.1. There are no statutory indicators identifying the condition of RTPI assets. However, there is a performance indicator for the % vehicles on-time at intermediate bus stops – this information is provided through the Pubtrans system.

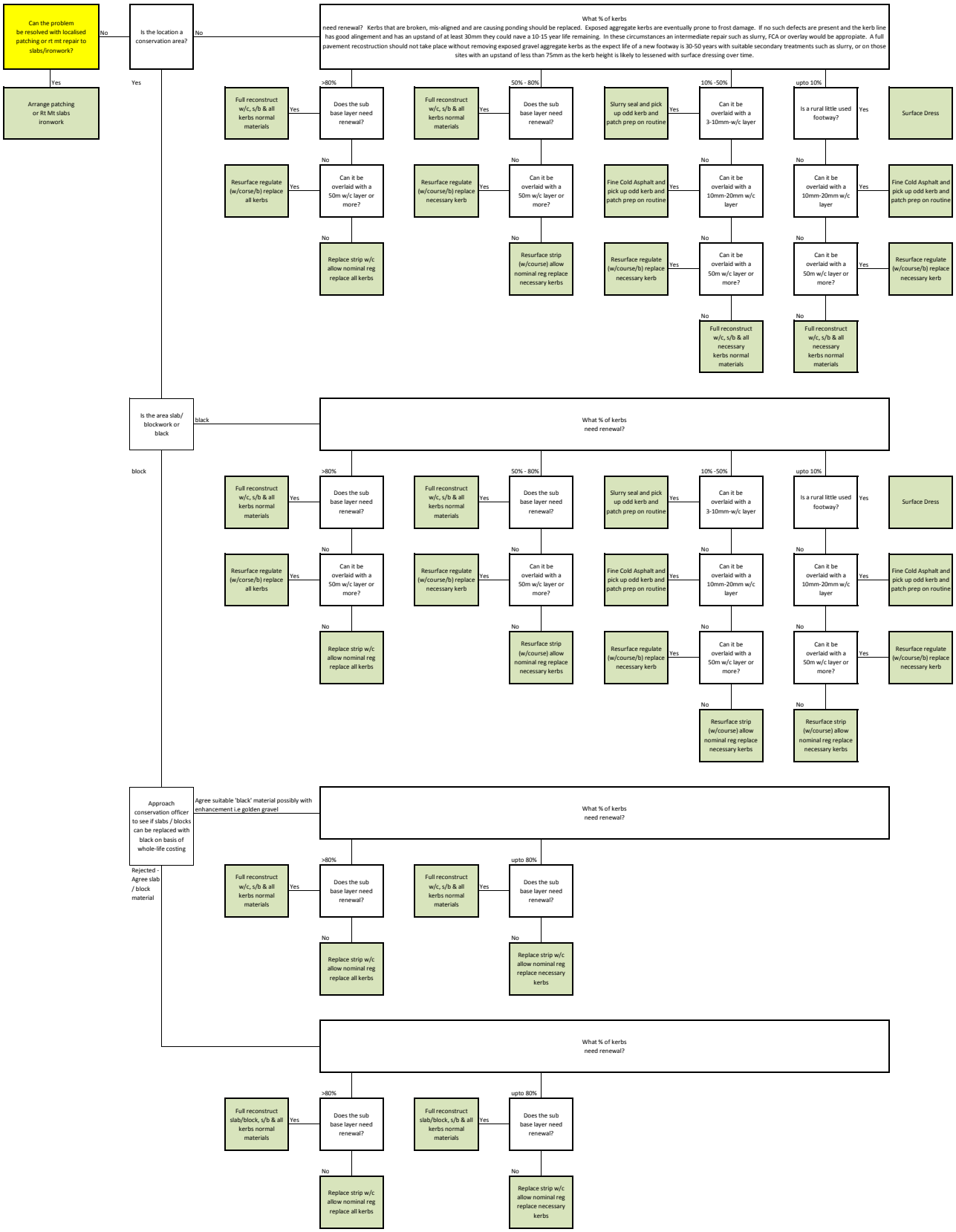
28.8. **Risk**

28.8.1. Risk - Insufficient Budget / Overspend

28.8.2. Impact = 2 (minor) x Likelihood (unlikely) =2 x 2 = 4 = low risk.

28.8.3. Risk - Reduced funding from current contracts

28.8.4. Impact = 2 (minor) x Likelihood (unlikely) =2 x 2 = 4 = low risk.


Can the problem be resolved with localised patching or rt mt repair to slabs/ironwork?
No
Yes
Arrange patching or Rt Mt slabs ironwork
Is the location a conservation area?
No
Yes
What % of kerbs need renewal? Kerbs that are broken, mis-aligned and are causing ponding should be replaced. Exposed aggregate kerbs are eventually prone to frost damage. If no such defects are present and the kerb line has good alingement and has an upstand of at least 30mm they could nave a 10-15 year life remaining. In these circumstances an intermediate repair such as slurry, FCA or overlay would be appropiate. A full pavement recostruction should not take place without removing exposed gravel aggregate kerbs as the expect life of a new footway is 30-50 years with suitable secondary treatments such as slurry, or on those sites with an upstand of less than 75mm as the kerb height is likely to lessened with surface dressing over time.
>80%
Full reconstruct w/c, s/b & all kerbs normal materials
Yes
Does the sub base layer need renewal?
No
Resurface regulate (w/corse/b) replace all kerbs
Yes
Can it be overlaid with a 50m w/c layer or more?
No
Replace strip w/c allow nominal reg replace all kerbs
50% - 80%
Full reconstruct w/c, s/b & all kerbs normal materials
Yes
Does the sub base layer need renewal?
No
Resurface regulate (w/course/b) replace necessary kerb
Yes
Can it be overlaid with a 50m w/c layer or more?
No
Resurface strip (w/course) allow nominal reg replace necessary kerbs
10% -50%
Slurry seal and pick up odd kerb and patch prep on routine
Yes
Can it be overlaid with a 3-10mm-w/c layer
No
Fine Cold Asphalt and pick up odd kerb and patch prep on routine
Yes
Can it be overlaid with a 10mm-20mm w/c layer
No
Resurface regulate (w/course/b) replace necessary kerb
Yes
Can it be overlaid with a 50m w/c layer or more?
No
Full reconstruct w/c, s/b & all necessary kerbs normal materials
upto 10%
Is a rural little used footway?
Yes
Surface Dress
No
Can it be overlaid with a 10mm-20mm w/c layer
Yes
Fine Cold Asphalt and pick up odd kerb and patch prep on routine
No
Can it be overlaid with a 50m w/c layer or more?
Yes
Resurface regulate (w/course/b) replace necessary kerb
No
Full reconstruct w/c, s/b & all necessary kerbs normal materials
Is the area slab/ blockwork or black
black
block
What % of kerbs need renewal?
>80%
Full reconstruct w/c, s/b & all kerbs normal materials
Yes
Does the sub base layer need renewal?
No
Resurface regulate (w/corse/b) replace all kerbs
Yes
Can it be overlaid with a 50m w/c layer or more?
No
Replace strip w/c allow nominal reg replace all kerbs
50% - 80%
Full reconstruct w/c, s/b & all kerbs normal materials
Yes
Does the sub base layer need renewal?
No
Resurface regulate (w/course/b) replace necessary kerb
Yes
Can it be overlaid with a 50m w/c layer or more?
No
Resurface strip (w/course) allow nominal reg replace necessary kerbs
10% -50%
Slurry seal and pick up odd kerb and patch prep on routine
Yes
Can it be overlaid with a 3-10mm-w/c layer
No
Fine Cold Asphalt and pick up odd kerb and patch prep on routine
Yes
Can it be overlaid with a 10mm-20mm w/c layer
No
Resurface regulate (w/course/b) replace necessary kerb
Yes
Can it be overlaid with a 50m w/c layer or more?
No
Resurface strip (w/course) allow nominal reg replace necessary kerbs
upto 10%
Is a rural little used footway?
Yes
Surface Dress
No
Can it be overlaid with a 10mm-20mm w/c layer
Yes
Fine Cold Asphalt and pick up odd kerb and patch prep on routine
No
Can it be overlaid with a 50m w/c layer or more?
Yes
Resurface regulate (w/course/b) replace necessary kerb
No
Resurface strip (w/course) allow nominal reg replace necessary kerbs
Approach conservation officer to see if slabs / blocks can be replaced with black on basis of whole-life costing
Agree suitable 'black' material possibly with enhancement i.e golden gravel
Rejected - Agree slab / block material
What % of kerbs need renewal?
>80%
Full reconstruct w/c, s/b & all kerbs normal materials
Yes
Does the sub base layer need renewal?
No
Replace strip w/c allow nominal reg replace all kerbs
upto 80%
Full reconstruct w/c, s/b & all kerbs normal materials
Yes
Does the sub base layer need renewal?
No
Replace strip w/c allow nominal reg replace necessary kerbs
What % of kerbs need renewal?
>80%
Full reconstruct slab/block, s/b & all kerbs normal materials
Yes
Does the sub base layer need renewal?
No
Replace strip w/c allow nominal reg replace all kerbs
upto 80%
Full reconstruct slab/block, s/b & all kerbs normal materials
Yes
Does the sub base layer need renewal?
No
Replace strip w/c allow nominal reg replace necessary kerbs

Use of the Footway Network Survey for Scheme Building

1. Scheme Production & Selection

1.1. Aim

1.1.1. A method of utilising the survey data to score and recommend treatments for Footway schemes allowing a clear path for prioritising the Footway programme.

1.1.2 The asset management strategy will enable budgets to be set for each Footway Category 1 to 4 based on these results therefore allowing a targeted approach, giving the money to the correct areas of the Network.

1.2. Process – Head office

1.2.1.

- A list will be pulled together by the Asset Team for each Highway Engineer, highlighting Footways within their patch that the survey has identified as needing attention
- This listing will highlight lengths of defects around which scheme could be identified for each category (Hierarchy 1 to 4)
- From this data a treatment will also be recommended i.e. Slurry, strip & relay or full reconstruction – this is only a recommendation and does not need to be followed
- These will not be schemes but highlighted 100m sections that require further investigation
- The list is a guide to what to investigate and is not a finalised priority list or treatment list

1.3. Process - Area staff

1.3.1.

- There is a need for sites visits by Highways Engineers or the Highways Support Engineer to establish the exact location/limits and treatment – (kerbs are not included within the survey and therefore can have a big bearing on Treatment used)
- The flow chart, held in App D(xii), is to be used to help with selection of treatment type
- Any scheme devised from the above method will need to be entered into the WPDB
- All schemes, whether produced via the above method or entered by Area staff will be scored within WPDB using the survey condition data.
- This will give a prioritised scheme list produced by the WPDB based on data score, Engineer priorities and budget
- HEs can at this point alter the priority listings to suit
- Budgets, allocated using network level condition data, are for each HE area and will inform which schemes can be afforded

- non-budgeted schemes will roll-over to the following year/s

1.4. Survey Data

1.4.1. The survey will look for the defects below:

1.4.2.
- Non-structural minor cracking/crazing
- Minor loss of material/stone
- Moderate settlement 10-30mm
- Multiple cracking/crazing >2mm
- Major surface material loss
- Settlement/subsidence greater than 30mm

1.4.3. Currently data is available for 100% of footways.

1.4.4. When the survey data is processed a combination of defect type and area will suggest one of the following treatments for each 100m section

1.4.5. The treatments:

- Recon – full reconstruction- base course or bed plus 50mm w/c or blocks or slabs
- Resur – strip and relay 50mm, relay blocks and slabs (with minimal base course/bed replacement)
- SurImp – slurry seal

1.4.6. The listings supplied will indicate which of the above categories each of the 100m falls into.

HIGHWAYS - ROAD SIGN AUDIT

Date

Inspection Area | Parish | Road section

Grid ref

Sign Diag no:TSRGD | Description of sign | Subject to order (Y/N)

Associated sign

Photo

Description of Hazard

Assessment Section

Hazard if sign removed | Probability | Severity | Risk

	Probability of Occurrence
A	So unlikely that probability is close to zero
B	Unlikely to occur, though conceivable
C	Likely to occur sometime
D	Occurrence not surprising. May occur more than once
E	Occurrence inevitable. May occur many times

	Severity
1	Damage only or minor injury
2	Injury causing lost time of more than 3 days
3	Major injury to one or more persons not causing permanent disability
4	Single fatality or multiple permanent disability
5	Multiple fatality

RISK	Probability				
Severity	A	B	C	D	E
1	L	L	M	H	H
2	L	M	H	H	H
3	L	M	H	S	S
4	M	H	S	S	S
5	M	H	S	S	S

PIA history

PEM/ Complaint History

Proposed Action | work ordered | Copy sent to Asset management team

Asset Data

Contents

Table 1.1 Asset Inventory & Condition Data				
Level 1 Asset Type	**Level 2 Asset Group**	**Level 3: Components that Level 2 implicitly covers in valuation**	**Inventory data**	**Condition Data**
Roads	• Flexible pavements • Flexible composite pavements • Rigid concrete pavements • Rigid composite pavements	• Pavement layers (formation, road base, binder course, surface course) • Other surface types e.g. paved • Hard strip/shoulder • Footway/cycleway attached to road • Central reservation, roundabout, lay-by etc. • Markings • Kerbs • *Earthworks (embankments & cuttings)* • Vegetation • Drainage • Safety fences • Boundary fences and hedges • Verges	• Network Length • Surface - width and construction • Markings – width, colour, pattern, material, class, length, diag no., gap, type • Channel block - type • Road studs – type, class, spacing, colour • Verges – width, surface, angle • Fencing – type, tension, profile, post type • Ditch – type, width • Central islands, reservations – surface and width • Filter drain, soakaway • Grip - type • Bollard • Highway Boundaries and highway boundary markers • Ford – surface, width • Other street furniture – type and location • Maintenance history • Offlet – type, length • Gully – type • Hump – surface • Kerbs – type, material	• Carriageway • SCANNER (A, B & C roads) • SCRIM • CVI • Safety inspection records • Streetworks inspection records

Table 1.1 Asset Inventory & Condition Data				
Level 1 Asset Type	**Level 2 Asset Group**	**Level 3: Components that Level 2 implicitly covers in valuation**	**Inventory data**	**Condition Data**
			• Layby – type, surface, width • Level crossing – type • Ped crossing – type, material • Ped guardrail – type, finish • Traffic islands – surface, width	
Footways and Cycleways [Segregated footpaths and cycle routes]	• Footpath (incl. PROW) • Bridleways.(incl. PROW) • Off road cycle routes • Pedestrian areas	• Binder course and surface course • Formation	• Network length	• FNS and DVI surveys • Street works inspection records • Safety inspection records
Cycle parking facilities			• Location • Type	
Street Lighting	• Lighting columns • Lighting units attached to wall • High mast lighting	• Column and foundations • Bracket • Luminaire (or other fixtures, • e.g. CCTV) • Control gear, switching and internal wiring cabling (may depend on ownership)	• Column type and location • Lamp type • Controller details • Cable routes • Highmast type and location • Illuminated signs – type and location • Subway lights • Belisha beacons • Bollard • Feeder pillars	• Electrical testing records • Structural testing records • Supply faults • BCC visual inspection records • Outage performance - Monitor checks

Table 1.1 Asset Inventory & Condition Data				
Level 1 Asset Type	**Level 2 Asset Group**	**Level 3: Components that Level 2 implicitly covers in valuation**	**Inventory data**	**Condition Data**
			• Maintenance history	
Signals [Traffic management]	• Traffic signals • Pedestrian signals	• Signal, column and foundation • Control equipment and cables • Bulbs	• Controller type, location, age • Installation type • Street furniture details • Detector details • Optical equipment details • Associated regulatory signs • Maintenance history (fault management system) • CAD drawings	• Electrical testing records • Inspection records (NCC periodic visual, Contractor annual inspection and test) • Downtime performance • Fault records • Maintenance records • Fault frequency report Controller risk of failure assessment.
	• Illuminated traffic signals • Non-illuminated traffic signs • Illuminated pedestrian signs • Non-illuminated pedestrian signs	• Sign, column and foundation • Control equipment and cables		
	• Traffic calming	• Speed bumps • Speed cameras	• Humps – surface type	
	• Communication systems	• All components		
Signs			• Signs – ID, Diag no., illuminated, mounted height, width, mounting type, shape, location	• Visual condition

Table 1.1 Asset Inventory & Condition Data				
Level 1 Asset Type	**Level 2 Asset Group**	**Level 3: Components that Level 2 implicitly covers in valuation**	**Inventory data**	**Condition Data**
VAS Signs			• Parish, Location, OS tile, Grid Reference, Electricity Supply Type/Source, Diag No, Flashers	• Fault Records • Maintenance visits
Structures and culverts	• Bridges (includes subways) • Culverts (span < 1.5m) • Retaining walls • Sign/signal gantries and cantilever road signs Other assets included in this group: • Tunnels • Structural earthworks, e.g. strengthened / reinforced soils • Fords and causeways • Cattle grids	All elements identified on the CSS inspection pro forma [Ref. 14 and 15]. Should include all components considered in the maintenance and management of these assets. Smaller water carrying structures are considered as road drainage.	• Type, location, owner, ID, dimensions, restrictions (height, weight, width), historic status.	• Inspection records • Condition rating • Assessments reports • Strengthening records • Maintenance records • Photos, legal records

Table 1.1 Asset Inventory & Condition Data				
Level 1 Asset Type	**Level 2 Asset Group**	**Level 3: Components that Level 2 implicitly covers in valuation**	**Inventory data**	**Condition Data**
Winter Maintenance Facilities			• Depot location, equipment, capacity, drainage and security arrangements • Spreader fleet numbers, locations, type, size • Icelert stations – numbers, type and location detectors	• Depot condition reports, Spreader fleet, age and condition profiles. • Condition and functionality checks. • Test records
Park and Ride sites			• Location • Vehicles	
Footpaths			• Structures – footbridges, stiles, signs, gates	
Ancient Monuments			• Type, material, condition, height	None
Crossovers			• Surface, width	None
Street Furniture	• Town/city centre street/road • Suburban/village street/road • Rural road	• Bus Shelters • Seating • Bins • Bollards • Marker Posts • Street name plates • Tree protection etc.		
Off-highway drainage	• Sustainable urban drainage systems • Soakaways • Pumping stations	• All components		

Appendix E

Table 1.1 Asset Inventory & Condition Data				
Level 1 Asset Type	**Level 2 Asset Group**	**Level 3: Components that Level 2 implicitly covers in valuation**	**Inventory data**	**Condition Data**
Land	• Freehold land • Rights land	Features on the land are not taken into account		

Table 1.2 Asset Statistics Confidence Levels

Table 1.2.1 Extent of Data Collection	
Extent (of data coverage)	**Definition**
Nil	No data stored in electronic or hard copy storage/retrievable system
Initial	Some data in either electronic or hard copy system
Partial	10-50% of asset data is stored in electronic system
General	50-95% of asset data is stored in electronic system
Complete	>95% of asset data is stored in electronic system

Table 1.2.2 Reliability of Data Stored	
Reliability [1]	**Definition**
Poor	Stored data is sometimes correct
Average	Stored data is normally correct half the time
Excellent	Stored data is very seldom incorrect
[1]Reliability of data in storage system, typically when tested against observation on site	

Table 1.2.3 Confidence Level for Data – Doubles Table

Confidence Level is the combination of the two above

	Extent				
Reliability	**Nil**	**Initial**	**Partial**	**General**	**Complete**
Poor	None	Low	Low	Low	Low
Average	None	Low	Low	Med	Med
Excellent	None	Low	Med	Med	High

The above tables describe a method for considering the quality of inventory data.

Table 1.3 Asset Inventory Confidence				
Asset	**Inventory Data**	**Reliability**	**Extent**	**Confidence Level**
Roads	Network Length	Excellent	Complete	High
	Surface - width and construction	Excellent	Complete	High
	Markings – width, colour, pattern, material, class, length, diag no., gap, type	Excellent	Complete	High
	Channel block - type	Excellent	Complete	High
	Roadstuds – type, class, spacing, colour	Excellent	Complete	High
	Verges – width, surface, angle	Average	General	Medium
	Fencing – type, tension, profile, post type	Average	Complete	Medium
	Ditch – type, width	Excellent	Complete	High
	Central islands, reservations – surface and width	Excellent	Complete	High
	Filterdrain, soakaway	Excellent	Initial	Low
	Grip - type	Average	General	Medium
	Bollard	Excellent	Complete	High
	Highway Boundaries and highway boundary markers	Excellent	Complete	High
	Ford – surface, width	Excellent	Complete	High
	Other street furniture – type and location	Excellent	Complete	High
	Maintenance history	Excellent	Complete	High
	Offlet – type, length	Excellent	Complete	High
	Gully – type	Excellent	Complete	High
	Hump – surface	Excellent	Partial	Medium
	Kerbs – type, material	Excellent	Complete	High
	Layby – type, surface, width	Excellent	Complete	High
	Level crossing – type	Excellent	Complete	High
	Ped crossing – type, material	Excellent	Complete	High
	Ped guardrail – type, finish	Excellent	Complete	High
	Traffic islands – surface, width	Excellent	Complete	High

Table 1.3 Asset Inventory Confidence				
Asset	**Inventory Data**	**Reliability**	**Extent**	**Confidence Level**
Footways and Cycleways	Network length – detached footways Network length – detached cycleways	Excellent	Complete	High
	Cycle Parking facilities	Poor	Partial	Low
Street Lighting	Column type and location	Excellent	Complete	High
	Lamp type	Excellent	Complete	High
	Controller details	Excellent	Complete	High
	Cable routes	Excellent	Complete	High
	Highmast type and location	Excellent	Complete	High
	Illuminated signs – type and location	Excellent	Complete	High
	Subway lights	Excellent	Complete	High
	Belisha beacons	Excellent	Complete	High
	Bollard	Excellent	Complete	High
	Feeder pillars	Excellent	Complete	High
	Maintenance history	Excellent	Complete	High
Signals	Controller type, location, age	Excellent	Complete	High
	Installation type	Excellent	Complete	High
	Street furniture details	Excellent	Complete	High
	Detector details	Excellent	Complete	High
	Optical equipment details	Excellent	Complete	High
	Associated regulatory signs	Excellent	Complete	High
	Maintenance history	Excellent	Complete	High
	CAD drawings	Excellent	Complete	High
Signs	Signs – ID, Diag no., illuminated, mounted height, width, mounting type, shape, location	Excellent	Complete	High
Structures and culverts	Type, location, owner, ID	Excellent	Complete	High

Table 1.3 Asset Inventory Confidence				
Asset	**Inventory Data**	**Reliability**	**Extent**	**Confidence Level**
Winter Maint. Facilities	Depot location, equipment, capacity, drainage and security arrangements	Excellent	General	Medium
	Spreader fleet numbers, locations, type, size	Excellent	Complete	High
	Salt Bins	Average	General	Medium
	Icelert stations – numbers, type and location detectors	Complete	Excellent	High
Park and Ride Sites	Location Vehicles			
	Condition (Roads & Footways)	Excellent	Complete	High
Bus Stations	Locations			
Bus Stops	Locations			
Footpaths	Signs Structures – footbridges, stiles, signs, gates			
Ancient Monuments	Type, material, condition, height	Excellent	Complete	High
Crossovers	Surface, width	Excellent	Complete	High

Table 1.4 Asset Inventory Data Collection			
Asset	**Inventory Data**	**Collection Method**	**Collection Frequency**
Roads	Network Length	Initial Survey	Scheme records
	Surface - width and construction	On Reconstruction	
	Markings – width, colour, pattern, material, class, length, diag no., gap, type	On Replacement	
	Verges – width, surface, angle	Field Validation	
	Fencing – type, tension, profile, post type	Field Validation	
	Ditch – type, width	Field Validation	
	Grip - type	Field Validation	
	Highway Boundaries and highway boundary markers	Office Validation	
	Ford – surface, width		
	Other street furniture – type and location		
	Maintenance history	HMMS	As Regime
	Gully – type	Field Validation	
	Ped crossing – type, material		
	Ped guardrail – type, finish		
	Traffic islands – surface, width		
Footways and Cycleways	Network length	As above	
	Surface type and width	On Reconstruction	
Cycle parking facilities	location type	On Construction	
Street Lighting	Column type and location	Part of PFI contract	
	Cable routes		
	Illuminated signs – type and location		
	Subway lights		
	Belisha beacons		

Table 1.4 Asset Inventory Data Collection			
Asset	**Inventory Data**	**Collection Method**	**Collection Frequency**
	Bollard		
	Feeder pillars		
	Maintenance history		
Signals	Controller type, location, age	Site acceptance test (SAT)	Checked during annual inspection
	Installation type	Site acceptance test (SAT)	Checked during annual inspection
	Street furniture details	Site acceptance test (SAT)	Checked during annual inspection
	Detector details	Site acceptance test (SAT)	Checked during annual inspection
	Optical equipment details	Site acceptance test (SAT)	Checked during annual inspection
	Associated regulatory signs	Site acceptance test (SAT)	Checked during annual inspection
	Maintenance history	Prefect FMS	Live database
	CAD drawings	As built survey	On modification
Signs	Type, location	Initial Field Validation	
VAS	Parish Location	Initial Field Validation	 Every Six Months

Table 1.4 Asset Inventory Data Collection			
Asset	**Inventory Data**	**Collection Method**	**Collection Frequency**
Structures and culverts	Type, location, owner, ID,	Field Validation	Every two or three years in conjunction with inspections
Winter Maintenance Facilities	Depot location	Initial	
	Spreader fleet numbers, type, size	Fleet Maintenance	
	Icelert stations –type and location detectors	Vaisala	
Park and Ride sites	location Usage	PTU Konnect (Managing contractor)	Construction records Contract basis
Footpaths	Structures – footbridges, stiles, signs, gates	PROW	
Ancient Monuments	Type, material, condition, height	Env	
Crossovers	Surface, width		

Table 1.5 Asset Condition Confidence				
Asset	**Inventory Data**	**Extent of Records**	**Reliability**	**Confidence Level**
Roads	UKPMS CVI U Roads	Complete	Excellent	High
	SCRIM A Roads	Complete	Excellent	High
	SCANNER A Roads	Complete	Excellent	High
	SCANNER B Roads	Complete	Excellent	High
	SCANNER C Roads	Complete	Excellent	High
Footways	UKPMS CVI U Roads until 2011-12	Complete	Excellent	High
	UKPMS DVI A Roads (Cat 1 & 2) until 2010-11	Complete	Excellent	High
	UKPMS DVI B Roads (Cat 1 & 2) until 2010-11	Complete	Excellent	High
	UKPMS DVI C Roads (Cat 1 & 2) until 2010-11	Complete	Excellent	High
	UKPMS DVI U Roads (Cat 1 & 2) until 2010-11	Complete	Excellent	High
	UKPMS DVI Remote Footways (Cat 1 & 2) only until 2010-11	Complete	Excellent	High
	FNS Cat 1 & 2 from 2011-12	Complete	Excellent	High
	FNS Cat 3 & 4 from 2011-12	Complete	Excellent	High
Signals	Electrical testing records	Complete	Excellent	High
	Inspection records (NCC periodic visual, Contractor annual inspection and test)	Complete	Excellent	High
	Downtime performance	Complete	Excellent	High
	Fault records Maintenance records Fault frequency report Controller risk of failure assessment.	Complete	Excellent	High

Table 1.5 Asset Condition Confidence				
Asset	**Inventory Data**	**Extent of Records**	**Reliability**	**Confidence Level**
Structures and culverts	Condition of Structures	Complete	Excellent	High
Vehicle Restraint Systems	• Tensioning – every 2-years	Complete	Excellent	High
	• Structural condition – every 5 years	Complete	Excellent	High
Park and Ride sites	• Road and Footway condition	Complete	Excellent	High

Table 1.6 Asset Condition Data Collection			
Asset	**Inventory Data**	**Collection Method**	**Collection Frequency**
Roads	UKPMS CVI U Roads	Vehicle	Four year cycle
	SCRIM A Roads	Vehicle	Annual both directions
	SCANNER A Roads	Vehicle	Annually 100% in 1 direction, return in 2
	SCANNER B Roads	Vehicle	Annually 100% in 1 direction, return in 2
	SCANNER C Roads	Vehicle	Annually 50% in 1 direction, return in 4
	Safety Inspection Records	Walked and driven	Varies see App D(i)
	Street Works Inspection Records	Walked	Sample / Random
Footways and Cycle ways	UKPMS FNS Cat 1 & 2	Walked	Two year cycle, 50% per annum
	UKPMS FNS Cat 3 & 4	Walked	Four year cycle, 25% per annum
	Safety Inspection Records	Walked and driven	Varies see App D(i)
Street Works Inspection Records	Inspection Records	Walked	Random sample or upon discovery of issues
Signals	• Electrical testing records	On Site tests	Full site test 3 yearly Partial test annually

Table 1.6 Asset Condition Data Collection			
Asset	**Inventory Data**	**Collection Method**	**Collection Frequency**
	• Inspection records (NCC periodic visual, Contractor annual inspection and test)	On site visual On site visual and test	Annual Annual
	• Downtime performance	Electronic	Continuous (monthly report)
	• Fault records	Electronic	Continuous
	• Maintenance records	Electronic	Continuous
	• Fault frequency report	Electronic	Continuous (monthly report)
	• Controller risk of failure assessment.	Assessment of age and likely hood of failure	Annual review
Structures and culverts	Defects, Extent, Severity, Priority, Estimated repair cost	Field Validation	Every two or three years in conjunction with inspections
Vehicle Restraint Systems	• Inspection record	Site visit - walked	Tensioning – every 2-years Structural condition – every 5 years
Park and Ride sites	• Condition	NCC Asset Management Team	Annual inspection
Customer Satisfaction	• Public perception questionnaire • Contextual return	Ipsos Mori Survey return to NHT coordinating host	Annual
Efficiency	• Questionnaire	Officer return to NHT coordinating host	Annual

Gross Replacement Cost	Carriageway £,000s	Footways + Cycleways £,000s	Structures £,000s	Street Lighting £,000s	Traffic Management £,000s	Street furniture £,000s	Land £,000s	Total £,000s
GRC Opening Balance	**7,643,480**	**614,474**	**493,016**	**96,855**	**26,450**	**29,041**	**4,694,123**	**13,597,439**
Additions	**33,415**	**6,689**	**964**	**0**	**1,878**	**692**	**0**	43,638
Revaluation increases / (decreases) recognised in the Revaluation Reserve	-105,330	-7,921	-13,631	1,592	-2,277	1,880	1,158,315	1,032,628
Disposals / Derecognition	**-36,982**	**-6,482**	**-11,569**	**0**	**-1,036**	**-692**	**0**	-56,761
Other	**6,061**	**0**	**16,984**	**0**	**0**	**0**	**0**	23,045
GRC Closing Balance	**7,540,644**	**606,759**	**485,764**	**98,447**	**25,015**	**30,921**	**5,852,438**	**14,639,989**

Accumulated Depreciation	Carriageway £,000s	Footways + Cycleways £,000s	Structures £,000s	Street Lighting £,000s	Traffic Management £,000s	Street furniture £,000s	Land £,000s	Total £,000s
Accumulated Depreciation Opening Balance	**473,929**	**166,713**	**32,841**	**32,974**	**14,990**	**17,403**		**738,850**
Depreciation Charge	39,324	15,486	11,717	2,349	1,012	1,237		71,126
Depreciation written out to the Revaluation Reserve	-47,380	-25,204	99,993	9	-4,474	587		23,531
Disposals / Derecognition	**-36,982**	-6,482	-11,569	0	-1,036	-692		-56,761
Other								0
Accumulated Depreciation Closing Balance	**428,892**	**150,513**	**132,982**	**35,332**	**10,492**	**18,535**		**776,746**

Opening Net Book Value (DRC)	**7,169,551**	**447,761**	**460,175**	**63,881**	**11,460**	**11,638**		**12,858,589**
Closing Net Book Value (DRC)	**7,111,752**	**456,246**	**352,782**	**63,116**	**14,523**	**12,386**		**13,863,243**

Highway Asset Types	Actual inventory £,000s	Sample inventory £,000s	Estimated values £,000s	Combination £,000s	Closing GRC £,000s
Carriageway	7,540,644	0	0	0	**7,540,644**
Footways + Cycleways	606,759	0	0	0	**606,759**
Structures	485,764	0	0	0	**485,764**
Lighting	98,447	0	0	0	**98,447**
Traffic management	25,015	0	0	0	**25,015**
Street furniture	30,921	0	0	0	**30,921**
Land	0	0	0	5,852,438	**5,852,438**
Total	**8,787,550**	**0**	**0**	**5,852,438**	**14,639,989**

Routine Maintenance Budget Allocations 2018/19

	All County
Verges, Hedges, Trees	680,000
Signs - Non Illuminated	209,820
Road Markings	51,000
Drainage Cleaning- Rodding/Jetting	532,500
Emergency Cleaning - Roads	342,880
Sanding roads - bleeding tar	10,250
Repairs - Fencing	66,000
Repairs - Drainage	553,500
Repairs - Footways, Kerbs	725,000
Repairs - Structures	134,280
PROW - Routine Maintenance	224,000
Insurance Excess Payments	20,500
Third Party Recharge - Insurance Income	-20,000
Grass Cutting - County	1,232,950
Gully Emptying	486,430
Weed Control	343,650
Winter Maintenance	3,132,370
Street Lighting inc ill signs (including energy)	8,945,530
Traffic Signals	147,000
Bridge Repairs	230,000
Condition Surveys	174,140
VRS (inspection , tensioning, risk assessment)	96,870
County Landscape	93,000
Misc Fees	108,000
Total	**£18,519,670**

2018/19 (City & County) Draft approved by EDT committee 19 Jan 2018	2018-19	2019-20	2020-21
Funding			
LTP Structural Maintenance Grant (needs)	23,043,000	23,043,000	23,043,000
LTP Structural Maintenance Grant (permananet pothole fund)	1,616,000	1,616,000	1,616,000
LTP Structural Maintenance Grant (incentive)	4,799,364	4,799,364	4,799,364
LTP Structural Maintenance Grant (challenge fund)	0	0	0
County Coucil Contribution Reserves (challenge fund)	0	0	0
Local Growth Fund	65,000	230,000	150,000
County Contribution Market Town Drainage	356000	571000	
County Council funding to cover £1.065m capitalisation from 2018-19	1065000	1065000	1065000
Capital Integrated Transport Contribution	941,000	1,142,000	2,842,000
NPIF			
Additional Capital Integrated Transport Contribution			
Supply Chain contribution			
Winter / Flood damage Government Grant			
Winter Damage Council additional contribution			
Additional structural Mt grant autumn statement			
Traffic Management contribution (otherwise funded from Network Management)			
Additional Pothole Grant			
	31,885,364	**32,466,364**	**33,515,364**
Spending			
Countywide specialist			
Bridges	800,000	800,000	800,000
Bridges (small works)	400,000	400,000	400,000
Bridges NPIF			
Traffic Signal Replacement	250,000	700,000	525,000
Traffic Signals (small works)	600,000	600,000	600,000
ITS (system)	20,000	20,000	20,000
Traffic Management			
HGV Signing			
Park & Ride	40,000	40,000	40,000
Asset Condition Surveys capitalised 2018-19	150,000	150,000	150,000
sub total	**2,260,000**	**2,710,000**	**2,535,000**
Roads			
Detrunk Principal Roads (Surfacing)			
Principal Roads (Surfacing)	1,437,001	1,037,013	1,250,000
Principal Roads (Surfacing) NPIF			
Principal Roads (Surfacing) LGF named scheme			
Principal Roads (Surface Treatment)	1,641,000	1,930,000	1,930,000
Principal Roads (Surface Treatment) LGF named scheme	65,000	230,000	150,000
Principal Roads (Joint repair)	25,000	25,000	25,000
Principal Roads (SCRIM)	150,000	150,000	150,000
Principal Roads (Reclamite)	164,500	164,500	164,500
Principal Roads (Haven Bridge provisional)			
sub total	**3,482,501**	**3,536,513**	**3,669,500**
B roads (surfacing)	471,000	457,000	800,000
B roads (surfacing) NPIF			
B roads (surface treatment)	931,000	943,000	943,000
B Roads (Surface Treatment) LGF named scheme			
sub total	**1,402,000**	**1,400,000**	**1,743,000**
C roads (surfacing and haunch)	200,000	200,000	200,000
C roads (surfacing and haunch) NPIF			
C roads (surface dressing)	3,958,626	3,850,000	4,124,390
sub total	**4,158,626**	**4,050,000**	**4,324,390**
U roads (surfacing and haunch)			
U roads (surface dressing)	3,958,626	3,850,000	4,124,390
sub total	**3,958,626**	**3,850,000**	**4,124,390**
Capital Structural Funding transfered to the Highways Maintenance Fund for Patching	4,212,772	4,212,772	4,212,772
Capital Structural Funding transfered to the Highways Maintenance Fund for Chip Patching	469,000	469,000	469,000
Capital Structural Funding transfered to the Highways Maintenance Fund for Chip Patching	900,000	900,000	900,000
Capital Structural Funding transfered to the Highways Maintenance Fund for Permanent Pothole repair	900,000	900,000	900,000
Capital Structural Funding transfered to the Highways Maintenance Fund for Chip Patching	305,000	305,000	305,000
Capital Structural Funding transfered to the Highways Maintenance Fund for Permanent Pothole repair	295,000	295,000	295,000
Capitalisation of road markings and studs from 2018-19	500,000	500,000	500,000
sub total	**7,581,772**	**7,581,772**	**7,581,772**
Machine Patching	421,354	421,354	421,354
Patching element from Pothole fund	273,430	504,076	1,000,000
sub total	**694,784**	**925,430**	**1,421,354**
Winter Damage / Flood Damage Patching / Pothole	0	0	0
sub total	**0**	**0**	**0**
	21,278,309	**21,343,715**	**22,864,406**
Contract costs etc.	**3997878**	**3992261**	**4064511**
Vehicle Restraint Systems			
Risk Assessment,	32,000	32,000	32,000
Design & works	60,000	100,000	100,000
VRS Repairs	50,000	50,000	50,000
	142,000	**182,000**	**182,000**
Footways & Drainage & signs			
Signs & post	200,000	200,000	200,000
Area Managers Schemes	140,000	140,000	140,000
Footways - Category 1 & 2	450,000	450,000	450,000
Footways Category 3 & 4	1,542,585	1,372,388	1,574,447
Footways Category 3 & 4 Slurry	513,591	500,000	500,000
Drainage	600,000	600,000	600,000
(Drainage Flood & Water Risk Match Pot)	75,000	75,000	75,000
Drainage Capitalisation	330,000	330,000	330,000
Drainage NPIF			
Drainage - Market Town	356,000	571,000	
Capital Challenge Fund (Drainage)	0	0	0
	4,207,176	**4,238,388**	**3,869,447**
Summary			
Total Structural Maintenance & Bridges Spending	**31,885,364**	**32,466,364**	**33,515,364**
Probable final budget	**31,885,364**	**32,466,364**	**33,515,364**

Norfolk County Council- Highways Capital Programme Summary 2018-19-20

Scheme Type	2018/19	Other Funding	2019/20	Other Funding
Major schemes	1,900	36,832	1,700	13,903
Bus infrastructure	160	0	70	0
Bus priority schemes	0	500	0	0
Public Transport Interchanges	90	50	90	0
Cycling schemes (County)	25	550	155	1,800
Cycling schemes (Norwich "City Cycle Ambition 2")	0	460	0	0
Walking schemes	350	444	350	406
Road crossings	25	220	50	211
Local road schemes	165	2,665	330	655
Great Yarmouth sustainable transport package (LGF funded)	0	2,798	0	900
Attleborough Sustainable transport package (LGF funded)	0	750	0	1,100
Thetford Sustainable transport package (LGF funded)	0	1,200	0	675
Traffic Management & Traffic Calming	205	0	10	0
Local Safety Schemes	250	0	215	0
Other Schemes, Future Fees & Carry Over Costs	30	529	30	529
Integrated transport	**3,200**	**46,998**	**3,000**	**20,179**
Structural/Routine/Bridge Maintenance	31,885		32,465	
Totals:	**35,085**	**46,998**	**35,465**	**20,179**

Notes:

1. Above figures in £000's
2. DfT (Local Transport Plan) funding detailed under main year headings
3. Other Funding includes Section 106, Section 278, LGF, CIL, County Council & Major Scheme funding

	Bridge	2018/19	2019/20	2020/21	2021/22	2022/23
		£'000	£'000	£'000	£'000	£'000
Strengthening	Repps Staithe Bridge	070				
	Rungays Bridge	010	300			
	Total	**080**	**300**	**000**	**000**	**000**
Maintenance	Morton on the Hill; Barney's Bridge				015	015
	Haddiscoe Viaduct Ph3			030	600	
	Free Bridge				030	635
	Earsham Mill Footbridge			160		
	Norwich; Carrow River Bridge	115	375			
	Outwell Church Bridge					
	Chapel Bridge					
	Ringland; Ringland Bridge			115		
	Wroxham Bridge	260				
	Ketteringham Bridge (Network Rail)					
	Mundford Road Railway Bridge					
	Foundry Bridge					
	Wainford Mill Bridge					
	New Mills Yard					
	Thornham Road Bridge					
	Abbey Station Bridge				010	020
	Wretton Fen Bridge					
	River Yare Bridge, Cringleford			015	015	
	Novisad	260				
	Magdalen Street Flyover					
	School Bridge					
	Mile Cross Bridge					
	A Frame over River Wensum					
	Haven Bridge surfacing					
	Southwell Road Footbridge		010	350		
	Capital routine bridge maintenance	400	400	400	400	400
	Minor Bridge Maintenance Schemes/Culverts	030	030	030	030	030
	Total	**1,065**	**815**	**1,100**	**1,100**	**1,100**
Miscellaneous	Height Restriction signing changes	005				
	Future Schemes, Bridge Assessments, Reassessments, Interim Measures and Weight Restrictions	050	085	100	100	100
	Total	**055**	**085**	**100**	**100**	**100**
	Target Spend	1,200	1,200	1,200	1,200	1,200
	Grand Total (£'000)	**1,200**	**1,200**	**1,200**	**1,200**	**1,200**

Proposed

County Annual

Maintenance Programme

2018/19

NORFOLK COUNTY COUNCIL - EDT DRAFT

Non Principal Structural Maintenance Schemes 2018/2019

Kings Lynn District
"C" and "U" Road Surfacing and Haunching

Scheme Number	Road Number	Parish	Location	Description	Estimate £
	VARIOUS	VARIOUS SITES		Retread programme	200,000
				WORKS	200,000
				FEES	
				TOTAL	**200,000**

NORFOLK COUNTY COUNCIL - EDT DRAFT

Non Principal Structural Maintenance Schemes 2018/19

Kings Lynn District
Drainage

Scheme Number	Road Number	Parish	Location	Description	Estimate £
W61D	22414	SNETTISHAM	The Avenue	Damaged Broken pipes	21,499
W58D	22258	HEACHAM	Lords Lane	Carriageway flooded	21,954
W60D	21095	WALPOLE CROSS KEYS	Cross Keys Low Road	Flooding near property	4,360
W74D	20126	DOWNHAM MARKET	Trafalgar Road	Carriageway flooded	13,994
W66D	21069	TERRINGTON ST CLEMENT	Benns Lane	Flooding near property	12,134
W70D	C80	WALPOLE CROSS KEYS	Sutton road	Carriageway flooded	29,923
W72D	C80	TERRINGTON ST CLEMENT	Sutton road	Property land flooded	5,660
				WORKS	109,524
				FEES	19,714
				TOTAL	**129,238**

NORFOLK COUNTY COUNCIL - EDT DRAFT

Non Principal Structural Maintenance Schemes 2018/2018

Kings Lynn District
Footways

Scheme Number	Road Number	Parish	Location	Description	Estimate £
W532F	22251	HEACHAM	Cheney Hill	Resurfacing	12,490
W533F	22251	HEACHAM	Cheney Hill	Resurfacing	15,397
W523F	20740	KING'S LYNN	Lynn Kensington Road	Reconstruction	30,966
W52F	C66	LITTLE MASSINGHAM	Station Road	Reconstruction	16,881
W426F	21362	METHWOLD	Whiteplot Road	Reconstruction	19,311
W486F	B1145	LEZIATE	Gayton Road	resurface	50,507
W422F	C80	CLENCHWARTON	Main Road	Reconstruction	17,456
W91F	A1101	OUTWELL	Wisbech Road	Resurface	9,098
W89F	23688	OUTWELL	Church drove	Resurface	14,127
W520F	20711	KING'S LYNN	Baldock drive	Slurry seal	6,871
W420F	20223	KING'S LYNN	Saint Edmunds Bury Road	Slurry seal	8,760
W524F	20094	HUNSTANTON	Waveney Road	Slurry seal	12,130
W527F	22161	BRANCASTER	London Street	Slurry seal	2,577
W121F	22055	SOUTH WOOTON	Hall Lane	Slurry seal	4,845
W415F	22565	SOUTH WOOTON	Church Lane	Slurry seal	3,794
W531F	22146	SOUTH WOOTON	Birkbeck Close	Slurry seal	1,314
W47F	22405	EAST WINCH	Hall Farm Gardens	Slurry seal	4,212
W468F	23061	DOWNHAM MARKET	Wimbotsham Road	Slurry seal	18,857
W456F	23057	DOWNHAM MARKET	Clackclose Road	Slurry seal	5,409
W454F	23059	DOWNHAM MARKET	Hawthorn Road	Slurry seal	3,042
W455F	23058	DOWNHAM MARKET	Pine Close	Slurry seal	3,623
W457F	23060	DOWNHAM MARKET	Oak View Drive	Slurry seal	6,056
W458F	23062	DOWNHAM MARKET	Batchcroft	Slurry seal	1,609
W459F	23063	DOWNHAM MARKET	Nursery Road	Slurry seal	1,014
W526	20515	KING'S LYNN	Saint James Street	Broken uneven slabs	23,922
W525F	20406	KING'S LYNN	Ferry Street	Broken uneven slabs	14,496
W530F	C105	HEACHAM	Folgate Road	Slurry Seal	15,495
W413F	B1100	WELNEY	New Road	Resurfacing	20,773
				WORKS	345,032
				FEES	33,162
				TOTAL	**378,194**

NORFOLK COUNTY COUNCIL - EDT DRAFT

Non Principal Structural Maintenance Schemes 2018/2019

Kings Lynn District
"A" Roads

Scheme Number	Road Number	Parish	Location	Description	Estimate £
			Re-Surfacing		
W311A	A10	NORTH RUNCTON	West Winch road	Resurfacing	140,407
W297A	A1101	UPWELL	From joint at junction U21024 Wisbech Road to 170metres north of Duck Puddle Drove	Resurfacing	227,434
W300A	A1101	OUTWELL	A1101_U21356 Roundabout	Resurfacing	64,591
W298A	A1101	WELNEY	From Welney House Farm to U21407 Chestnut Avenue	Resurfacing	414,726
			Surface Treatment		
W235A	A148	WEST RUDHAM	From speed limit sign 100m west of junction U22233 Lynn Fields to 360m east of junction U22230 Anchorage Lane	Surface Dressing	96,155
W260A	A1101	EMNETH	From 490metres southeast of junction C583 Outwell Road to junction U21167 Broad Drove	Surface Dressing	61,364
W42A	A149	BRANCASTER	A149 Brancaster Speed Limit to Speed Limit	Surface Dressing	28,717
W64A	A17	TERRINGTON ST CLEMENT	C12 to C22	Surface Dressing	78,357
W142A	A1122	RYSTON	100m West C543 to joint at near Bexwell Business Park entrance	Surface Dressing	47,901
W153A	A149	HEACHAM	200m North C103 Church Lane to 22257 The Broadway, excluding B1454 junction area	Surface Dressing	31,123
W302A	A134	NORTHWOLD	A134_B1112 roundabout to Hill Farm	Surface Dressing	37,009
W225A	A148	HILLINGTON	Fakenham Road A148, from 90m west of junction B1153 Station Road to 280metres east of junction B1153 Hillington Road	Surface Dressing	46,290
W295A	A1101	WELNEY	Wisbech road	Surface Dressing	2,442
			Joint Sealing		
W169A	A1122	Downham Market	A1122 Roundabout	Joint Seal	16,626
					1,293,142

NORFOLK COUNTY COUNCIL - EDT DRAFT

Non Principal Structural Maintenance Schemes 2018/2019

Kings Lynn District
"B" Roads

Scheme Number	Road Number	Parish	Location	Description	Estimate £
			Re-Surfacing		
			NONE		
			Surface Treatment		
W133B	B1144	KINGS LYNN	Level Crossing to junc A148 Gaywood Road	Surface Dressing	9,930
W152B	B1454	DOCKING	From junc B1153 Well Street to junc C88 Docking Road	Surface Dressing	9,114
W153B	B198	WALSOKEN	From 200metres west of junc 21109 Wheatley Bank to 170m East C570 Lynn Road roundabout	Surface Dressing	14,651
W170B	B1155	BURNHAM OVERY	Joint after bridge to 25m east C96 crossroads	Surface Dressing	22,333
W180B	B1355	SOUTH CREAKE	From 200metres north of junc U22289 Roman Road	Surface Dressing	54,060
W207B	B1161	HUNSTANTON	From junc C482 Westgate to joint near entrance to Tesco	Surface Dressing	21,712
W229B	B1153	HILLINGTON	From A148 Fakenham Road to Hill Farm	Surface Dressing	31,754
W73B	B1355	NORTH CREAKE	C98 to joint outside post office	Surface Dressing	7,444
W91B	B1440	INGOLDISTHORPE	River bridge south of Snettisham to joint at U23153	Surface Dressing	41,558
					212,556

NORFOLK COUNTY COUNCIL - EDT DRAFT

Non Principal Structural Maintenance Schemes 2018/2019

South Norfolk District
"C" and "U" Road Surfacing and Haunching

Scheme Number	Road Number	Parish	Location	Description	Estimate £
		NONE			
				WORKS	0
				FEES	0
				TOTAL	**0**

NORFOLK COUNTY COUNCIL - EDT DRAFT

Non Principal Structural Maintenance Schemes 2018/2019

South Norfolk District
Drainage

Scheme Number	Road Number	Parish	Location	Description	Estimate £
S38D	B1113	KESWICK	Mulbarton Road	Flooding at Park & Ride access	50,000
S36D	C466	SCOLE	Low Road	Flooding	5,057
S5D	C497	THARSTON	The Street Phase 1	Flooding	20,000
	C498	THARSTON	The Street Phase 2	Flooding	25,000
S17D	C554	LODDON	Beccles Road	Splashing of properties	15,980
				WORKS	66,037
				FEES	11,887
				TOTAL	**77,924**

NORFOLK COUNTY COUNCIL - EDT DRAFT

Non Principal Structural Maintenance Schemes 2018/2019

South Norfolk District
Footway

Scheme Number	Road Number	Parish	Location	Description	Estimate £
S162F	78235	COSTESSEY	Beaumont Road east side	Resurface	43,266
S139F	78267	COSTESSEY	Valley Road	Resurface	53,617
S121F	C700	WYMONDHAM	Chapel Lane	Reconstruct	41,451
S145F	78249	CRINGLEFORD	Keswick Close - Keswick Road to end	Slurry Seal	5,897
S144F	71242	CRINGLEFORD	Aspen Way / Suffield Close	Slurry Seal	2,696
S140F	71204	CRINGLEFORD	Cringleford Chase - From Colney Lane to end	Slurry Seal	2,965
S141F	C183	CRINGLEFORD	Colney Lane - From Cringleford Chase to Lawrence Drive & section to the North of The Oaklands	Slurry Seal	3,285
S142F	C184	CRINGLEFORD	Keswick Road- From Cantley Lane to Bridge	Slurry Seal	11,793
S151F	78472	HETHERSETT	Park Drive / Park Close estate	Slurry Seal	16,174
S150F	78138	HETHERSETT	New Rd - From Gt.Melton Rd to Mill Rd	Slurry Seal	5,897
S147F	C176	WYMONDHAM	Barnham Broom Rd / Sawmill Close	Slurry Seal	9,772
S146F	78412	WYMONDHAM	Longlands Drive estate	Slurry Seal	20,217
S148F	71449	WYMONDHAM	Banister Way estate	Slurry Seal	4,886
S149F	71359	WYMONDHAM	Melton Close estate	Slurry Seal	6,739
S83F	B1332	FRAMINGHAM Earl	Opposite School	Reconstruction	26,000
S164F	70020	DISS	From Victoria Road to end	Slurry Seal	10,715
S154F	76512	FORNCETT	Orchard Close	Slurry Seal	3,370
S153F	71240	FORNCETT	The Poplers - Bentley Rd to end	Slurry Seal	4,717
S152F	71059	TACOLNESTON	Boileau Ave / Warrens Way	Slurry Seal	4,043
				WORKS	234,233
				FEES	28,570
				TOTAL	**262,803**

NORFOLK COUNTY COUNCIL - EDT DRAFT

Non Principal Structural Maintenance Schemes 2018/2019

South Norfolk District
"A" Roads

Scheme Number	Road Number	Parish	Location	Description	Estimate £
			Re-Surfacing		
S179A	A1066	DISS	Victoria Road, from joint 60metres west of roundabout to joint 20metresteast of U71198 Whytehead Gardens West	Resurface	122,666
S193A	A1074	COSTESSEY	HFS junction area at Lord Nelson Drive	Resurface	24,921
			Surface Treatment		
S237A	A140	KESWICK	50metres south of B1113 junction to 60metres north of Tesco entrance	Surface Treatment	10,032
S82A	A140	KESWICK	Roundabout to 60metres south of Tesco entrance	Surface Treatment	28,179
S134A	A143	TOFT MONKS	A143 Beccles Road, 400metres south of junc C389 Post Office Road to 160metres north of junc C388 Hollow Way Hill	Surface Treatment	45,111
S135A	A143	DITCHINGHAM	Bungay Road A143, from A144 Broad Street roundabout to B1332 Norwich Road roundabout	Surface Treatment	31,907
S154A	A143	HADDISCOE	From joint outside Crown Inn PH to Haddiscoe Bridge, (year fixed 18/19 AIP study work (new lining required, see AIP study in Scheme Folder))	Surface Treatment	82,164
S235A	A140	KESWICK	Marsh Harrier PH to south of bridge	Surface Treatment	4,379
					349,360

NORFOLK COUNTY COUNCIL - EDT DRAFT

Non Principal Structural Maintenance Schemes 2018/2018

South Norfolk District
"B" Roads

Scheme Number	Road Number	Parish	Location	Description	Estimate £
			Re-Surfacing		
S184B	B1108	COLNEY	A47 junction roundabout, Norwich side	Resurfacing	217,299
			Surface Treatment		
S67B	B1172	WYMONDHAM	Fire station to C140 Roundabout	Surface Treatment	10,822
S255B	B1136	RAVENINGHAM	From junc C210 Beccles Road to joint 370m west of junc U76425 The Spinney	Surface Treatment	18,477
S231B	B1527	MORNINGTHORPE	From joint 120metres east of junc U76027 Boylandhall Lane to joint just east of C201 crossroads	Surface Treatment	20,899
S5B	B1134	GISSING	C349 to 140m East C343	Surface Treatment	44,445
S233B	B1332	WOODTON	From joint just north of junc C824 Harveys Lane to just before entrance to Woodton Grange private road	Surface Treatment	17,154
S119B	B1527	WOODTON	C371 to B1332	Surface Treatment	21,595
S236B	B1134	TIVETSHALL ST MARGARET	From joint at junction with U76119 Lodge Road to joint 100metres west of A140 roundabout	Surface Treatment	18,621
S118B	B1527	WOODTON	Joint North of C878 to joint South of C371	Surface Treatment	6,102
					375,414

NORFOLK COUNTY COUNCIL - EDT DRAFT

Non Principal Structural Maintenance Schemes 2018/2019

North Norfolk District
"C" and "U" Road Surfacing and Haunching

Scheme Number	Road Number	Parish	Location	Description	Estimate £
			NONE		
				WORKS	0
				FEES	0
				TOTAL	**0**

NORFOLK COUNTY COUNCIL - EDT DRAFT

Non Principal Structural Maintenance Schemes 2018/2019

North Norfolk District
Drainage

Scheme Number	Road Number	Parish	Location	Description	Estimate £
N98D/N100D PMA359	C335	RYBURGH	Fakenham Road	Drainage scheme	25,450
N101D	B1354	MELTON CONSTABLE	Briston Road	Drainage scheme	6,785
N57D / PMA360	A148	BODHAM	Cromer Road	Drainage scheme	33,853
N115D	19914	TUNSTEAD	Fletcher Close	Drainage Scheme	20,958
				WORKS	87,046
				FEES	19,094
				TOTAL	**106,140**

NORFOLK COUNTY COUNCIL - EDT DRAFT

Non Principal Structural Maintenance Schemes 2018/2019

North Norfolk District
Footway

Scheme Number	Road Number	Parish	Location	Description	Estimate £
N297F	10241	Cromer	The Warren Phase 1	Reconstruction	36,369
N298F	10241	Cromer	The Warren Phase 2	Reconstruction	29,997
N287F	11002	Mundesley	Warren Drive - From Church Lane to Hawthorn Rise	Resurface	31,152
N288F	11186	Mundesley	Gorse Close	Overlay - FCA	8,259
N203F		Well next the Sea	Knitting Needle Lane	Overlay - FCA	6,730
N281F	11027	Beeston Regis	Abbey Park	Reconstruction	10,955
N361F	19247	CATFIELD	St Catherines Road	Reconstruction	34,000
N348F	19848	TUNSTEAD	Manor Close	Slurry Seal	4,467
				WORKS	161,929
				FEES	20,443
				TOTAL	**182,372**

NORFOLK COUNTY COUNCIL - EDT DRAFT

Non Principal Structural Maintenance Schemes 2018/2019

North Norfolk District
"A" Roads

Scheme Number	Road Number	Parish	Location	Description	Estimate £
			Re-Surfacing		
			Surface Treatment		
N174A	A148	THURSFORD	HOLT ROAD	Joint at 40-60 North of Little Snoring to joint West of B1354	131,852
N294A	A149	UPPER SHERINGHAM	WEYBOURNE ROAD	Joint near Leisure Centre to joint near Railway Bridge	76,285
N299A	A149	WIVETON	COAST ROAD	Coast Road A149, from 180metres east of junc U14165 Back Lane to 25metres west of junc U14172 Hall Lane	20,500
N300A	A149	SALTHOUSE	COAST ROAD	Coast Road A149, from 125metres east of junc U14288 Beach Road to 170metres northwest of junc C307 Wood Lane	42,575
N320A	A148	BODHAM	CROMER ROAD	From junc C310 Gipsies Lane to speed limit northeast of village	36,157
N328A	A148	FAKENHAM	HOLT ROAD	From A148_A1067 roundabout to joint 330metres east of Travellers Short Stay Site	47,004
N352A	A1062	HORNING	NORWICH ROAD	SD joint near U19123 Upper Street to 20m West Hall Lane	30,386
N377A	A1062	LUDHAM	YARMOUTH ROAD	From 100metres northeast of junc U19125 Latchmoor Lane to junc U19193 Fritton Lane	31,203
N382A	A140	HANWORTH	NORWICH ROAD	Joint 140m South of 60-40 SL South of Roughton to joint 160m North C302	47,047
					463,008

NORFOLK COUNTY COUNCIL - EDT DRAFT

Non Principal Structural Maintenance Schemes 2018/2019

North Norfolk District
"B" Roads

Scheme Number	Road Number	Parish	Location	Description	Estimate £
			Re-Surfacing		
			Surface Treatment		
N106B	B1354	CORPUSTY	BRISTON ROAD	Joint at B1149 to joint at Croft Lane	14,493
N107B	B1354	BRISTON	NORWICH ROAD	Joint near Horseshoe Lane to joint 20m West Town Close Road	77,288
N138B	B1149	EDGEFIELD	HOLT ROAD	MA Joint at U14417 Rectory Road to MA joint 2.25km North	56,490
N209B	B1145	CAWSTON	AYLSHAM ROAD	Joint outside Manor Lodge to joint 90m North Spa Lane	11,766
N221B	B1354	BRININGHAM	BRISTON ROAD	50m East B1110 junction to 300m east	10,452
N38B	B1145	KNAPTON	NORTH WALSHAM ROAD	20m South C426 to 180m North U19688	25,525
N291B	B1159	WALCOTT	COAST ROAD	From junc U19003 Coast Road to 70metres north of junc Poplar Drive	10,182
					206,196

NORFOLK COUNTY COUNCIL - EDT DRAFT

Non Principal Structural Maintenance Schemes 2018/2019

Broadland District
"C" and "U" Road Surfacing and Haunching

Scheme Number	Road Number	Parish	Location	Description	Estimate £
			NONE		
				WORKS	0
				FEES	0
				TOTAL	**0**

NORFOLK COUNTY COUNCIL - EDT DRAFT

Non Principal Structural Maintenance Schemes 2018/2019

Broadland Area District
Drainage

Scheme Number	Road Number	Parish	Location	Description	Estimate £
P96D / PMA358	C494	BUXTON	Coltishall Road	Drainage Scheme	12,489
N53D	57169	FELTHORPE	Bilney Road	Drainage Scheme	41,172
N117D / PMA363	C794	STRUMPSHAW	Chapel Road	Drainage	23,801
N114D	C401	HORNING	Lower Street	Drainage Scheme	12,987
				WORKS	90,449
				FEES	22,411
				TOTAL	**112,860**

NORFOLK COUNTY COUNCIL - EDT DRAFT

Non Principal Structural Maintenance Schemes 2018/2019

Broadland District
Footways

Scheme Number	Road Number	Parish	Location	Description	Estimate £
N330F / PMA147	57485	HORSTEAD with STANNINGHALL	Glebe Way Phase 2	Overlay	20,964
N342F	57635	SALHOUSE	Chenery Avenue	Slurry Seal	10,192
N343F	51100	SALHOUSE	Heron Close	Slurry Seal	5,783
N344F	51147	SALHOUSE	Mallard Close	Slurry Seal	2,291
N345F	51176	SALHOUSE	Otter Close	Slurry Seal	3,196
N346F	51146	SALHOUSE	Greylag Close	Slurry Seal	1,515
N367F	57637	SALHOUSE	Redell Close	Reconstruction	10,284
N368F	57635	SALHOUSE	Cheyney Avenue	Reconstruction	24,766
N347F	57513	WROXHAM	Charles Close Phase 2	full reconstruction	44,525
N300F	51030	TAVERHAM	Shakespear Way Phase 1	Strip and relay	19,091
N301F	51031	TAVERHAM	Shakespear Way Phase 2	Strip and relay	21,362
N302F	57471	TAVERHAM	Baldic Road	Strip and relay	49,120
N237F	51060	OLD CATTON	Billing Close	Slurry Seal	14,686
N238F	59561	THORPE ST ANDREW	Booty Road Phase 1	Strip and relay	42,154
N305F	C246	SPIXWORTH	Buxton Road	FCA	3,388
N278F	57698	SPROWSTON	Blithe Meadow Drive	FCA	24,263
N294F	C246	OLD CATTON	Spixworth Road	Slurry Seal	2,830
N207F	5F142	SPROWSTON	St Marys Grove	Slurry Seal	11,625
N331F	51216	BLOFIELD	Ropes Walk	Slurry Seal	8,804
N332F	59843	BRUNDALL	Nurseries Avenue	Slurry Seal	6,646
				WORKS	327,485
				FEES	32,735
				TOTAL	**360,220**

NORFOLK COUNTY COUNCIL - EDT DRAFT

Non Principal Structural Maintenance Schemes 2018/2019

Broadland District
"A" Roads

Scheme Number	Road Number	Parish	Location	Description	Estimate £
			Re-Surfacing		
			Surface Treatment		
N348A	A1151	SPROWSTON	WROXHAM ROAD	From A1042 roundabout to joint outside no.86	45,068
N369A	A1151	WROXHAM	NORWICH ROAD	A1151 Norwich Road, southwards from Wroxham Bridge to junc B1140 mini roundabout	48,802
					93,871

NORFOLK COUNTY COUNCIL - EDT DRAFT

Non Principal Structural Maintenance Schemes 2018/2019

Broadland District
"B" Roads

Scheme Number	Road Number	Parish	Location	Description	Estimate £
			Re-Surfacing		
PMA078 / N260B	B1150	SPROWSTON	North Walsham Road Phase 2	From junc U57414 Tills Road to junc C462 White Woman Lane	228,505
			Surface Treatment		
N112B	B1149	HORSFORD	HOLT ROAD	320 Holt Road to joint outisde Brickmakers Pub	19,053
N206B	B1150	SPROWSTON	CONSTITUTION HILL	57650 School Lane to joint 75m north A1042 roundabout	9,729
N303B	B1140	WROXHAM	SALHOUSE ROAD	Salhouse Road B1140, from 100metres west of junc U57696 Keys Drive to 30metres south of junc Keys Drive.	2,376
N64B	B1145	REEPHAM	DEREHAM ROAD	Joint at Park Lane to joint 25m East Broomhill Lane	9,311
N81B	B1149	HORSFORD	HOLT ROAD	Joint outside 96 Holt Road to joint at C282	21,195
					290,168

NORFOLK COUNTY COUNCIL - EDT DRAFT

Non Principal Structural Maintenance Schemes 2018/2019

Breckland District
"C" and "U" Road Surfacing and Haunching

Scheme Number	Road Number	Parish	Location	Description	Estimate £
			NONE		
				WORKS	0
				FEES	0
				TOTAL	**0**

NORFOLK COUNTY COUNCIL - EDT DRAFT

Non Principal Structural Maintenance Schemes 2018/2019

Breckland District
Drainage

Scheme Number	Road Number	Parish	Location	Description	Estimate £
W67D	C115	NORTH PICKENHAM	The Street	Flooding of properties	33,000
S37D	U71746	BILLINGFORD /SCOLE	Low Road	Flooding	3,219
N93D	C117	NECTON	Tunns Road	Replace existing system	15,000
				WORKS	51,219
				FEES	
				TOTAL	**51,219**

NORFOLK COUNTY COUNCIL - EDT DRAFT

Non Principal Structural Maintenance Schemes 2018/2019

Breckland District
Footway

Scheme Number	Road Number	Parish	Location	Description	Estimate £
S133F		Attleborough	London Road	Resurface	32,389
S138F		Thetford	London Road	Resurface	13,086
S132F	30113	Dereham	King's Road	Resurface	21,169
S164F	C540	Dereham	Southend	Resurface	54,908
S196F	3F167	Thetford	Winchester way	Reconstruction	18,981
S197F	3F167	Thetford	Winchester way	Resurface	6,892
S135F	B1108	Scoulton	Norwich Road	Tar & Chip	5,216
S197F	3F167	South Pickenham	The Street	Resurface	30,360
S168F	30149	DEREHAM	Handel Drive, Bishoptyne Ave, Burtontyne Ave, Potters Bar, Smithtyne Ave and George Borrow road - All	Slurry Seal	13,141
S155F	30122	DEREHAM	Neville close	Slurry Seal	2,156
S171F	30162	DEREHAM	South Green gardens estate	Slurry Seal	8,255
S157F	30123	DEREHAM	Sheldrick Place	Slurry Seal	3,061
S156F	33370	WATTON	Garden Close - slurry	Slurry Seal	4,040
S143F	31018	HOCKERING	Bishop Herbert Close	Slurry Seal	2,190
S172F	C134	OVINGTON	crown cresecnt and the street	Slurry Seal	1,348
S159F	C768	SAHAM TONEY	Richmond Road	Slurry Seal	1,932
S136F	33334	SAHAM TONEY	The Oval & Neville Close - Slurry footpaths on all sections within The Oval and Neville Close	Slurry Seal	10,445
S166F	33367	WEETING-WITH-BROOMHILL	Whole section Hereward Way to Cromwell Road	Slurry Seal	1,483
S189F	C117	HOLME HALE	Cook Road, Holme Hale	Slurry Seal	4,455
S190F	C117	HOLME HALE	School Road, Holme Hale	Slurry Seal	2,824
S178F	33296	BEACHAMWELL	All Saints Way, Beachamwell	Slurry Seal	4,624
				Fees	29,314
				TOTAL	**272,270**

NORFOLK COUNTY COUNCIL - EDT DRAFT

Non Principal Structural Maintenance Schemes 2018/2019

Breckland District
"A" Roads

Scheme Number	Road Number	Parish	Location	Description	Estimate £
			Resurfacing		
			None		
			Surface Treatment		
S152A	A1075	SHIPDHAM	A1075 Main Road, from 90m northeast of junc Eastgate to joint just south of entrance to Hedges Farm	Surface Treatment	64,284
S225A	A1075	WRETHAM	A1075 south boundary Wretham camp to north of reservoir	Surface Treatment	14,163
S217A	A134	CRANWICH	33352 Cranwich Road to joint 270m west C42 Foulden Road	Surface Treatment	64,192
					142,638

NORFOLK COUNTY COUNCIL - EDT DRAFT

Non Principal Structural Maintenance Schemes 2018/2019

Breckland District
"B" Roads

Scheme Number	Road Number	Parish	Location	Description	Estimate £
			Re-Surfacing		
S252B	B1077	OLD BUCKENHAM	Between joints on bend near Ragmere Road (Bends)	Resurfacing	£31,665
S251B	B1077	ATTLEBOROUGH	Joint outside depot to bend south of railway line	Resurfacing	74,777
			Surface Treatment		
S224B	B1077	CASTON	U33039 to C130	Surface Treatment	37351.97882
S283B	B1111	SHROPHAM	U33050 to 40-60 SL at C158	Surface Treatment	16615.83891
S272B	B1146	BEETLEY	From junc U35092 Vale Road to 100m east of junc C222 Litcham Road	Surface Treatment	29691.2594
S281B	B1145	NORTH ELMHAM	Elmham Road	Surface Treatment	43512.43478
					233,614

NORFOLK COUNTY COUNCIL - EDT DRAFT

Non Principal Structural Maintenance Schemes 2018/2019

Gt Yarmouth District
"C" and "U" Road Surfacing and Haunching

Scheme Number	Road Number	Parish	Location	Description	Estimate £
			None		
					0
				FEES	0
				TOTAL	**0**

NORFOLK COUNTY COUNCIL - EDT DRAFT

Non Principal Structural Maintenance Schemes 2018/2019

Gt Yarmouth District
Drainage

Scheme Number	Road Number	Parish	Location	Description	Estimate £
			None		
					0
				FEES	
				TOTAL	**0**

NORFOLK COUNTY COUNCIL - EDT DRAFT

Non Principal Structural Maintenance Schemes 2018/2019

Gt Yarmouth District
Footways

Scheme Number	Road Number	Parish	Location	Description	Estimate £
N340F	62030	CAISTER	Breydon Way	Slurry Seal	19,565
N338F	62050	CAISTER	St Nicholas Drive	Slurry Seal	11,247
N320F	C628	GREAT YARMOUTH	North Drive	North Drive Phase1 (West side) The Hamilton hotel (from conc access) northwrds to Beaconsfield Rd. Take up concrete and reconstruct	91,708
N335F	60161	GREAT YARMOUTH	Gt Northern Close	Slurry Seal	3,974
N337F	60179	GREAT YARMOUTH	Stephenson Close	Slurry Seal	3,143
N341F	62289	GREAT YARMOUTH	Anchor Court	Slurry Seal	3,176
N309F	61501	GREAT YARMOUTH	Arnott Avenue	Reconstruct (Take up Slabs / Lay Asphalt + rekerb)	86,224
					219,037
				FEES	19,915
				TOTAL	**238,952**

NORFOLK COUNTY COUNCIL - EDT DRAFT

Non Principal Structural Maintenance Schemes 2018/2019

Gt Yarmouth District
"A" Roads

Scheme Number	Road Number	Parish	Location	Description	Estimate £
			Re-Surfacing		
N366A	A1243	GREAT YARMOUTH	Bridge Road	C630 Southtown Road Junction	135,323
			Surface Treatment		
N375A	A1243	GREAT YARMOUTH	SOUTH QUAY	From U60755 Charles Street to U60779 Mariners Road	5,143
				Fees	
					140,466

NORFOLK COUNTY COUNCIL - EDT DRAFT

Non Principal Structural Maintenance Schemes 2018/2019

Gt Yarmouth District
"B" Roads

Scheme Number	Road Number	Parish	Location	Description	Estimate £
			Re-Surfacing		
			None		
			Surface Treatment		
			None		
					0

NORFOLK COUNTY COUNCIL - EDT DRAFT

Non Principal Structural Maintenance Schemes 2018/2019

Norwich City
"C" and "U" Road Surfacing and Haunching

Scheme Number	Road Number	Parish	Location	Description	Estimate £
			None		
					0
				FEES	
				TOTAL	**0**

NORFOLK COUNTY COUNCIL - EDT DRAFT

Non Principal Structural Maintenance Schemes 2018/2019

Norwich City
Drainage

Scheme Number	Road Number	Parish	Location	Description	Estimate £
C4D	A140/120	NORWICH (MILE CROSS	Sweet Briar Road	Swale and gully reconstruction	10,000
C3D	43003	NORWICH (EARLHAM)	Colman Road ; outside shopping Parade (Bunnett Square)	Additional Gullies	1,500
C5D	A11	NORWICH (TOWN CLOSE & EATON)	Newmarket Road	Additional Gullies	8,000
					19,500
				FEES	10,500
				TOTAL	**30,000**

NORFOLK COUNTY COUNCIL - EDT DRAFT

Non Principal Structural Maintenance Schemes 2018/2019

Norwich City
Footways

Scheme Number	Road Number	Parish (Ward)	Location	Description	Estimate £
C22F (PMA182)	C854	NORWICH (MANCROFT)	St Benedicts Street	Reconstruction	115,970
C16F	40807	NORWICH (BOWTHORPE)	Buttermere Road	Reconstruction	20,000
C19F	40423	NORWICH (MILE CROSS)	Junction Road	Reconstruction	50,000
C15F	40449	NORWICH (SEWELL)	Sun Lane	Reconstruction	26,500
C17F	41003	NORWICH (EATON)	Bek Close	Reconstruction	36,300
C18F	41053	NORWICH (EATON)	Sotherton Road	Reconstruction	63,400
C28F	41402	NORWICH (MILE CROSS)	Bacton Road; both sides	Slurry Seal	4,800
C24F	43005	NORWICH (EARLHAM)	Corrie Road; Colman Road to the Avenue	Slurry Seal	2,619
C26F	41653	NORWICH (LAKENHAM)	Sandy Lane; Railway to outer ring road (or	Slurry Seal	6,100
C21F	45122	NORWICH (BOWTHORPE)	Skoner Road including Lushington Close	Slurry Seal	3,900
					329,589
				FEES	38,452
				TOTAL	**368,041**

NORFOLK COUNTY COUNCIL - EDT DRAFT

Non Principal Structural Maintenance Schemes 2018/2019

Norwich City
"A" Roads

Scheme Number	Road Number	Parish	Location	Description	Estimate £
			Re-Surfacing		
C223A	A1067	NORWICH (HELLESDON)	Drayton High Road; From Boundary Road to Sports Village	Reconstruction	193,650
C115A	A1151	NORWICH (CATTON GROVE)	Wroxham Road/Mousehold Lane Roundabout	Reconstruction	112,725
			Surface Treatment		
C10A	A1024	NORWICH (MILE CROSS)	Heigham Street to Drayton Road rdbt	Surface Dressing	28,560
C117A	A1151	NORWICH (SEWELL)	B1150 to joint at Gilman Road	Surface Dressing	30,983
C194A	A1054	NORWICH	From joint northeast of A146 junc to Bracondale roundabout	Surface Dressing	38,084
C166A	A147	NORWICH (THORPE HAMLET)	A1242 Thorpe Road to B1140 Ketts Hill roundabout	Surface Dressing	32,221
C224A	A1067	NORWICH (LAKENHAM)	From joint east of junc C806 Saint Martins Road to joint west of junc A1402 Aylsham Road	Surface Dressing	2,946
					439,168

NORFOLK COUNTY COUNCIL - EDT DRAFT

Non Principal Structural Maintenance Schemes 2018/2019

Norwich City
"B" Roads

Scheme Number	Road Number	Parish	Location	Description	Estimate £
			Re-Surfacing		
			None		
			Surface Treatment		
			None		
					0

Norfolk County Council
‘A’ Road Draft Schedule of Resurfacing and Surface Treatment 2018-19 to 2022-23

2019-20
Joint Sealing - A Road

Site ID	Road	Parish	Road Name	Location	Recommended Treatment	Cost	Funding Source	Area	District:
W216A	A148	KINGS LYNN	Lynn Road	U23422 to A1076	Joint sealing	£11,800.95	NCC	West	KLWN
C88A	A140	NORWICH	Sweet Briar Road	Hellesdon Hall Road junction	Joint sealing	£3,631.11	NCC	City	Norwich
N126A	A104	THORPE ST	Yarmouth Road	North Side roundabout	Joint sealing	£7,933.62	NCC	North	Broadland
N353A	A104	POSTWICK	Yarmouth Road	Roundabout	Joint sealing	£5,584.97	NCC	North	Broadland
					Sub Total:	**£28,950.66**			

Reclamite - A Road

Site ID	Road	Parish	Road Name	Location	Recommended Treatment	Cost	Funding Source	Area	District:
C231A	A140	NORWICH	Boundary Road	Whiffler Road ASDA Garage junction	Reclamite	£7,574.75	NCC	City	Norwich
C234A	A146	NORWICH	Lakenham Road	A140 Ipswich Road to C820 Hall	Reclamite	£16,564.85	NCC	City	Norwich
					Sub Total:	**£24,139.61**			

Resurfacing - A Road

Site ID	Road	Parish	Road Name	Location	Recommended Treatment	Cost	Funding Source	Area	District:
C71A	A140	NORWICH	Boundary Road	283 Bowers Avenue to 38 Boundary	Plane 105mm and inlay	£159,147.75	NCC	City	Norwich
N374A	A149	CAISTER-	Caister Bypass	A149_C483_C643 roundabout	Plane 105mm and inlay	£84,136.08	NCC	North	Gt Yar .
N67A	A149	CROMER	Prince Of Wales	Jct Hamilton Road to Jct New Street	Plane 105mm and inlay	£74,842.04	NCC	North	N. Norfolk
C68A	A140	NORWICH	Sweet Briar Road	Approach to ASDA junction	Plane 105mm and inlay	£143,905.03	NCC	City	Norwich
N297A	A148	FAKENHAM	Fakenham Bypass	B1105 junction	Plane and in-lay 65mm	£81,643.66	NCC	North	N. Norfolk
W306A	A148	KINGS LYNN	Wootton Road	Pedestrain Crossing	Plane 105mm and inlay 105mm	£46,336.28	NCC	West	KLWN

S119A	A143	NEEDHAM	High Road	C571 High Road roundabout	Plane and in-lay 65mm	£76,450.59	NCC	South	S. Norfolk
W293A	A148	KINGS LYNN	Austin Street	Austin Street	Plane and in-lay 65mm	£65,499.22	NCC	West	KLWN
S224A	A106	SWAFFHAM	London Street	A1065 London Road junction with	Plane and in-lay 65mm	£17,611.60	NCC	South	Breckland
W308A	A10	WIMBOTSHAM	Downham -	Northern approach to	Plane and in-lay 65mm	£25,639.27	NCC	West	KLWN
W28A	A110	WELNEY	Wash Road	A1101 35m North East of Gold Hill	Raise causeway by 0.5m at lowest	£1,000,000.00	NPIF	West	KLWN
C129A	A140	NORWICH	Boundary Road	Boundary Road junction, south	Plane and in-lay 65mm	£146,773.65	NCC	City	Norwich
N33A	A104	THORPE ST	Ring Road	Thunder lane to ma joint near 30-	Plane and in-lay 65mm	£222,719.40	NCC	North	Broadland
C27A	A107	NORWICH	Dereham Road	Larkman lane from 554 to 586	Plane 150mm and inlay	£282,815.80	NCC	City	Norwich
W84A	A149	HUNSTANTON	Cromer Road	From junc C481 The Green to 30-	Plane 105mm and inlay	£312,677.13	NCC	West	KLWN
N345A	A140	MARSHAM	Cromer Road	Allison Street_Cromer Road	Overlay 150mm	£15,946.84	NCC	North	Broadland
N72A	A140	HELLESDON	Holt Road	hr joint north of C259 middletons	Plane 105mm and inlay	£615,118.87	NCC	North	Broadland
N35A	A149	STIFFKEY	Morston Road	sd joint near River stiffkey (bank)	Overlay 65mm	£158,947.60	NCC	North	N. Norfolk
S228A	A134	THETFORD	Bury Road	Brandon Road / London Road / Bury	Plane 105mm and inlay 105mm	£34,997.89	NCC	South	Breckland
W296A	A10	WEST WINCH	Main Road	main road	Plane 150mm and inlay 150mm	£75,567.35	NCC	West	KLWN
S114A	A107	DEREHAM	Yaxham Road	Joint at C540 South Green to joint	Plane and in-lay 65mm	£227,631.48	NCC	South	Breckland
N349A	A115	SPROWSTON	Wroxham Road	From Hall Wood Road roundabout	Plane and in-lay 65mm	£89,690.80	NCC	North	Broadland
S115A	A140	SCOLE	Scole Roundabout	A1066 roundabout	Plane and in-lay 65mm	£155,382.91	NCC	South	S. Norfolk

Sub Total: £4,113,481.26

Surface Treatment - A Road

Site ID	Road	Parish	Road Name	Location	Recommended Treatment	Cost	Funding Source	Area	District:
W234A	A149	OLD HUNSTANTON	Old Hunstanton Road	From 30m east of junc U22149	Surface Dressing	£60,935.90	NCC	West	KLWN
S181A	A107	COSTESSEY	Dereham Road	Two sections. 1.From joint	Surface Dressing	£56,090.61	NCC	South	S. Norfolk

S215A	A112	SWAFFHAM	Downham Road	A47 roundabout to joint	Surface Dressing	£48,779.63	NCC	South	Breckland
N361A	A106	ACLE	Acle Link Road	A47 roundabout to junc C547 Old	Surface Dressing	£15,406.11	NCC	North	Broadland
N43A	A106	RAYNHAM	Swaffham Road	C234 to road joint fakenham side of	Surface Dressing	£15,664.63	NCC	North	N. Norfolk
W307A	A112	OUTWELL	Downham Road	From junc U21012 Mullicourt Road	Surface Dressing	£16,213.71	NCC	West	KLWN
N255A	A149	HOLKHAM	Main Road	B1155 to 60-40 speed limit	Surface Dressing	£79,165.30	NCC	North	N. Norfolk
S141A	A143	WORTWELL	Bungay Road	From C571 Redenhall Road	Surface Dressing	£69,390.72	NCC	South	S. Norfolk
S157A	A143	WORTWELL	Bungay Road	From junc B1062 to junc U76153	Surface Dressing	£53,414.57	NCC	South	S. Norfolk
N204A	A140	HORSFORD	Cromer Road	50m South C253 Manor Street to	Surface Dressing	£82,665.27	NCC	North	Broadland
S227A	A106	GREAT CRESSINGHAM	Brandon Road	From 215m south of junc C111	Surface Dressing	£244,227.38	NCC	South	Breckland
N236A	A106	SCULTHORP	Raynham Road	Joint North of C123 to A148	Surface Dressing	£104,399.23	NCC	North	N. Norfolk
S231A	A134	LYNFORD	Road From	From joint 450metres northwest of	Surface Dressing	£51,540.52	NCC	South	Breckland
W286A	A110	UPWELL	Wisbech Road	From joint 160metres south of junc	Surface Dressing	£31,671.81	NCC	West	KLWN
W152A	A149	HEACHAM	Lynn Road	From joint 175m south of 61	Surface Dressing	£21,075.26	NCC	West	KLWN
S226A	A112	BARTON	Swaffham Road	From junc C45 Narborough Hill to	Surface Dressing	£33,724.60	NCC	South	S. Norfolk
S209A	A106	SPARHAM	Main Road	From joint 150metres west of junc	Surface Dressing	£48,740.31	NCC	South	Breckland
W221A	A10	STOW BARDOLPH	Stow Bardolph	Stow Bardolph Bypass A10, from	Surface Dressing	£38,834.27	NCC	West	KLWN
N379A	A115	SALHOUSE	Wroxham Road	From junc 57055 Welldon Lane to	Surface Dressing	£36,473.23	NCC	North	Broadland
S174A	A106	DISS	Stanley Road	From joint 45m west of junc	Surface Dressing	£12,755.47	NCC	South	S. Norfolk
C141A	A107	NORWICH	Dereham Road	From junc C803 Heigham Road to	Surface Dressing	£15,271.22	NCC	City	Norwich
N357A	A149	STALHAM	Yarmouth Road	50m East B1159 to joint 50m	Surface Dressing	£135,325.58	NCC	North	N. Norfolk
S164A	A143	TOFT MONKS	Beccles Road	From junc C390 Pound Lane to	Surface Dressing	£25,888.47	NCC	South	S. Norfolk
C108A	A105	NORWICH	Ipswich Road	Ring road to St Stephens Road	Surface Dressing	£53,857.76	NCC	City	Norwich

C48A	A147	NORWICH	Saint Crispins Road	Duke street to roundabout	Surface Dressing	£15,098.69	NCC	City	Norwich
S229A	A107	THOMPSON	Road From	From junc C546 Thompson Road to	Surface Dressing	£60,006.86	NCC	South	Breckland
S220A	A134	LYNFORD	Road From	C119 Stanford Road to joint 520m	Surface Dressing	£70,169.96	NCC	South	Breckland
W291A	A112	DOWNHAM	Downham Road	From joint outside Boundary Farm	Surface Dressing	£8,134.91	NCC	West	KLWN
S156A	A143	BROCKDISH	Brockdish/needham	From joint 400metres west of junc	Surface Dressing	£251,025.49	NCC	South	S. Norfolk
W90A	A112	OUTWELL	Downham Road	U21010 Pincushion Drove to 60-40	Surface Dressing	£87,004.89	NCC	West	KLWN
N54A	A149	KELLING	Weybourne Road	sd joint near Mauckleburgh	Surface Dressing	£47,977.82	NCC	North	N. Norfolk
N347A	A149	WELLS-	Mill Road	From joint at corner of Date	Surface Dressing	£21,532.81	NCC	North	N. Norfolk
N381A	A149	GREAT YAR	Acle New Road	From rbt to rbt, northeast lane only,	Surface Dressing	£15,682.55	NCC	North	Gt Yar.

Sub Total: £1,928,145.55
Year Total: £6,094,717.08

2020-21
Resurfacing - A Road

Site ID	Road	Parish	Road Name	Location	Recommended Treatment	Cost	Funding Source	Supervising Area	District:
C101A	A146	NORWICH	Hall Road	Roundabout - Hall Road	Plane 105mm and inlay	£59,669.99	NCC	City	Norwich
W309A	A148	KINGS LYNN	Lynn Road	Ped Crossing near petrol station	Plane 105mm and inlay	£58,617.81	NCC	West	KLWN
N372A	A106	LUDHAM	Norwich Road	Norwich Road A1062 eastwards	Plane and in-lay 65mm	£49,561.65	NCC	North	N. Norfolk
W3A	A110	EMNETH	Outwell Road	A1101 35m North Roundabout with	Plane 105mm and inlay	£623,735.30	NCC	West	KLWN
S203A	A106	GUIST	Norwich Road	joint West of 35251 to ma joint	Overlay 65mm	£202,627.59	NCC	South	Breckland
C201A	A140	NORWICH	Farrow Road	A140 C802 junction area	Plane 105mm and inlay	£41,433.37	NCC	City	Norwich
N10A	A148	SCULTHORP	Creake Road	14504 joint to B1355 joint	Plane and in-lay 65mm	£174,971.72	NCC	North	N. Norfolk
S236A	A140	KESWICK	Ipswich Road	South of bridge to 50metres south of	Plane and in-lay 65mm	£90,428.52	NCC	South	S. Norfolk

C152A	A147	NORWICH	Queens Road	Bus station entrance to joint 55m	Plane and in-lay 65mm	£195,346.10	NCC	City	Norwich
C21A	A147	NORWICH	Barn Road	Roundabout	Plane 105mm and inlay	£194,683.93	NCC	City	Norwich
S116A	A140	DICKLEBUR	Scole Bypass	Roundabout	Plane and in-lay 65mm	£59,586.28	NCC	South	S. Norfolk
C228A	A140	NORWICH	Ipswich Road	From 60metres north of junc	Plane 105mm and inlay	£201,629.17	NCC	City	Norwich
W301A	A110	UPWELL	Main Road	A1101_B1094 junction area	Plane 105mm and inlay	£110,216.03	NCC	West	KLWN
S234A	A134	MUNDFORD	Cranwich Road	Pedestrian Crossing and approaches	Plane 105mm and inlay	£36,919.43	NCC	South	Breckland
W305A	A148	CONGHAM	Lynn Road	A148_B1440 Junction area	Plane and in-lay 65mm	£31,764.94	NCC	West	KLWN
N323A	A115	SPROWSTON	Wroxham Road	Junction area of The Blue Boar	Plane and in-lay 65mm	£76,765.91	NCC	North	Broadland
N326A	A106	FAKENHAM	Pensthorpe Road	A1067 roundabout with C590	Plane 105mm and inlay	£41,771.25	NCC	North	N. Norfolk
C226A	A147	NORWICH	Queens Road	Queens Road_Finkelgate junction	Plane and in-lay 65mm	£25,240.15	NCC	City	Norwich
S149A	A11	CRINGLEFORD	Newmarket Road	Newmarket Road A11_4, from junc	Plane and in-lay 65mm	£92,580.72	NCC	South	S. Norfolk
S199A	C162	COSTESSEY	Long Lane	Roundabout	Plane 100mm and overlay	£100,296.28	NCC	South	S. Norfolk

Sub Total: £2,467,846.16

Surface Treatment - A Road

Site ID	Road	Parish	Road Name	Location	Recommended Treatment	Cost	Funding Source	Supervising Area	District:
S190A	A106	SOUTH LOPHAM	Diss Road	From joint 230metres west of junc	Surface Dressing	£57,969.92	NCC	South	Breckland
N363A	A115	ASHMANHA	Stalham Road	C398 to jct U19042 Barton Road	Surface Dressing	£124,989.34	NCC	North	N. Norfolk
N376A	A115	SMALLBURGH	Norwich Road	From junc U19042Barton Road	Surface Dressing	£117,985.58	NCC	North	N. Norfolk
S204A	A106	BINTREE	Fakenham Road	Joint South of C228 to MA joint	Surface Dressing	£51,960.32	NCC	South	Breckland
N47A	A148	UPPER SHERINGHAM	Holt Road	MA joint west of A1082 to MA	Surface Dressing	£28,158.66	NCC	North	N. Norfolk
N233A	A108	UPPER SHERINGHAM	Holway Road	A148 to joint South of U11053	Surface Dressing	£31,491.33	NCC	North	N. Norfolk
C153A	A147	NORWICH	Queens Road	Joint 55m West 42803 Ashby Street	Surface Dressing	£23,160.09	NCC	City	Norwich

S14A	A143	GILLINGHA	Norwich Road	A143 A146 Roundabout North to	Surface Dressing	£51,435.42	NCC	South	S. Norfolk
N310A	A148	THORNAGE	Fakenham Road	From 100m east of junc U14271	Surface Dressing	£35,026.30	NCC	North	N. Norfolk
W36A	A148	KINGS LYNN	Wootton Road	A1076 Junction to A1078 Junction	Surface Dressing	£80,451.36	NCC	West	KLWN
W165A	A134	SHOULDHA	Lynn Road	155m North 21326 Church Lane to	Surface Dressing	£87,961.12	NCC	West	KLWN
W237A	A149	BAWSEY	Queen Elizabeth Way	From B1145 roundabout southwards	Surface Dressing	£101,925.86	NCC	West	W.
S87A	A140	NEWTON	Ipswich Road	50-40 SL to 50m South U78145	Surface Dressing	£53,292.42	NCC	South	S. Norfolk
N378A	A149	REPPS WITH	High Road	From joint north of junc U69342	Surface Dressing	£29,268.88	NCC	North	Gt.Yar.
N327A	A106	FAKENHAM	Pensthorpe Road	From C590_A1067 roundabout to	Surface Dressing	£32,147.74	NCC	North	N. Norfolk
S201A	A107	WATTON	Dereham Road	From joint just south of entrance to	Surface Dressing	£33,534.56	NCC	South	Breckland
W143A	A112	RYSTON	Bexwell Road	East of layby to joint before A10	Surface Dressing	£26,422.32	NCC	West	KLWN
W192A	A134	STRADSETT	Lynn Road	Joint at Chiswick Farm entrance to	Surface Dressing	£43,967.98	NCC	West	KLWN
N358A	A149	SUTTON	Yarmouth Road	Joint South of U19677 Staithe Road	Surface Dressing	£33,796.68	NCC	North	N. Norfolk
N227A	A149	MORSTON	Morston Chase	Joint West of White Bridge farm to	Surface Dressing	£70,291.64	NCC	North	N. Norfolk
C52A	A147	NORWICH	Saint Crispins Road	Over subway	Surface Dressing	£4,492.30	NCC	City	Norwich
S86A	A140	NEWTON	Ipswich Road	130m North C194 to 50-40 SL	Surface Dressing	£61,002.56	NCC	South	S. Norfolk
W168A	A134	NORTHWOL	Thetford Road	Hill Farm to joint 275m West C42	Surface Dressing	£205,574.32	NCC	West	KLWN
S216A	A134	CRANWICH	Lynn Road	33352 Cranwich Road to 60-40	Surface Dressing	£86,542.57	NCC	South	Breckland
W223A	A10	DENVER	Lynn Road (a10)	Lynn Road A10, from junc C32	Surface Dressing	£75,818.13	NCC	West	KLWN
W243A	A134	STRADSETT	Lynn Road	60metres south of junction with	Surface Dressing	£40,322.30	NCC	West	KLWN
S230A	A106	GREAT CRESSINGHAM	Brandon Road	From joint outside Rowley Farm	Surface Dressing	£24,944.94	NCC	South	Breckland
N359A	A149	CATFIELD	By Pass	MA joint South of C408 to MA	Surface Dressing	£83,926.41	NCC	North	N. Norfolk
S52A	A107	GRISTON	Thetford Road	40m West Woodfield Farm Cottage	Surface Dressing	£32,952.25	NCC	South	Breckland

W256A	A149	CASTLE RISING	Queen Elizabeth Way	From 85metres south of junc B1439	Surface Dressing	£178,010.68	NCC	West	W.
S212A	A106	FOXLEY	Norwich Road	From joint 66metres northwest of	Surface Dressing	£12,119.51	NCC	South	Breckland
W161A	A148	KINGS LYNN	Out South Gates	North of South Gates roundabout	Surface Dressing	£5,881.68	NCC	West	KLWN
S198A	C162	COSTESSEY	Long Lane	Bridge deck between joints	Surface Dressing	£3,106.42	NCC	South	S. Norfolk

Sub Total: £1,929,931.56
Year Total: £4,397,777.72

2021-22
Resurfacing - A Road

Site ID	Road	Parish	Road Name	Location	Recommended Treatment	Cost	Funding Source	Supervising Area	District:
N346A	A140	AYLSHAM	Cromer Road	From pedestrian refuge past The	Overlay 150mm	£309,710.92	NCC	North	Broadland
C151A	A124	NORWICH	Thorpe Road	C596 Harvey Lane junction	Plane and in-lay 65mm	£35,253.42	NCC	City	Norwich
S211A	A106	GUIST	Norwich Road	From joint northwest of junc B1110	Plane and in-lay 65mm	£219,902.96	NCC	South	Breckland
N69A	A149	KELLING	Salthouse Road	red joint at speedlimit east of	Plane and in-lay 65mm	£141,763.33	NCC	North	N. Norfolk
W290A	A148	KINGS LYNN	Railway Road	From joint at junc A1078 John	Plane and in-lay 65mm	£112,571.18	NCC	West	KLWN
N384A	A106	ACLE	Acle Link Road	A1064_C547 junction area	Plane and in-lay 65mm	£28,602.73	NCC	North	Broadland
C126A	A11	NORWICH	Newmarket Road	Eaton Road junction	Plane and in-lay 65mm	£44,036.01	NCC	City	Norwich
C59A	A140	NORWICH	Daniels Road	Junction with Daniels Road	Plane 105mm and inlay	£256,291.88	NCC	City	Norwich
C162A	A107	NORWICH	Dereham Road	C802 Bowthorpe Road junction	Plane and in-lay 65mm	£26,982.68	NCC	City	Norwich
W267A	A107	KINGS LYNN	John Kennedy Road	From junc A148 Austin Street to	Plane 105mm and inlay	£170,729.42	NCC	West	KLWN
S66A	A106	BRETTENHAM	Mundford Road	A1088 roundabout	Plane 105mm and inlay 105mm	£142,695.29	NCC	South	Breckland
S184A	A143	DITCHINGH	Broome Bypass	A143_B1332 roundabout	Plane and in-lay 65mm	£43,972.21	NCC	South	S. Norfolk
C236A	A115	NORWICH	Magdalen Road	B1150_A1151 junction area	Plane and in-lay 65mm	£35,327.92	NCC	City	Norwich

S238A	A140	KESWICK	Ipswich Road	Entrance to Tesco junction	Plane and in-lay 65mm	£89,823.75	NCC	South	S. Norfolk
N365A	A149	NORTH	North Walsham	C559 Norwich Road junction,	Plane and in-lay 65mm	£93,570.94	NCC	North	N. Norfolk

Sub Total: £1,751,234.65

Surface Treatment - A Road

Site ID	Road	Parish	Road Name	Location	Recommended Treatment	Cost	Funding Source	Supervising Area	District:
S182A	A140	SAXLINGHA	Ipswich Road	From joint 50metres south of junc	Surface Dressing	£71,247.10	NCC	South	S. Norfolk
W156A	A107	KINGS LYNN	Gayton Road	Hospital Roundabout to Queensway,	Surface Dressing	£55,333.38	NCC	West	KLWN
S219A	A134	THETFORD	Bury Road	Service road to county boundary	Surface Dressing	£57,331.03	NCC	South	Breckland
C207A	A140	NORWICH	Ipswich Road	From 70metres south of junc	Surface Dressing	£37,334.60	NCC	City	Norwich
W164A	A10	DOWNHAM MARKET	Downham Bypass	Between A1122 roundabouts	Surface Dressing	£71,966.03	NCC	West	KLWN
N225A	A149	WARHAM	Coast Road	B1105 to joint 1.1km East	Surface Dressing	£59,868.12	NCC	North	N. Norfolk
S160A	A140	LONG STRATTON	Norwich Road	40m north of junc C497	Surface Dressing	£59,232.19	NCC	South	S. Norfolk
S120A	A146	HOLVERSTO	Loddon Road	From junc U76508 Slade Lane to	Surface Dressing	£62,934.06	NCC	South	S. Norfolk
C175A	A140	NORWICH	Colman Road	Colman Road A140, from junc	Surface Dressing	£23,272.00	NCC	City	Norwich
S133A	A146	FRAMINGHA	Loddon Road	Loddon Road A146, from junc C577	Surface Dressing	£87,378.79	NCC	South	S. Norfolk
N266A	A106	DRAYTON	Drayton High Road	Joint north of 57388 Drayton	Surface Dressing	£11,065.49	NCC	North	Broadland
S232A	A134	THETFORD	Mundford Road	From joint outside Guide and Scout	Surface Dressing	£56,885.54	NCC	South	Breckland
N256A	A149	SALTHOUSE	Coast Road	Red at 30-60 speed limit (Cley next	Surface Dressing	£122,249.02	NCC	North	N. Norfolk
C110A	A11	NORWICH	Newmarket Road	Joint at Upton Road to ring road	Surface Dressing	£16,475.27	NCC	City	Norwich
S221A	A134	THETFORD	Mundford Road	A11 roundabout to joint 1.37 km	Surface Dressing	£54,844.78	NCC	South	Breckland
S223A	A106	SWAFFHAM	Brandon Road	C768 Watton Road to joint	Surface Dressing	£57,240.38	NCC	South	Breckland
C176A	A11	NORWICH	Newmarket Road	Newmarket A11, from junc U42407	Surface Dressing	£52,097.18	NCC	City	Norwich

C136A	A140	NORWICH	Aylsham Road	Boundary Road junction to joint	Surface Dressing	£26,702.42	NCC	City	Norwich
W255A	A149	BURNHAM	Wells Road	From joint at speed limit west of	Surface Dressing	£28,050.75	NCC	West	KLWN
N226A	A149	STIFFKEY	Wells Road	Camping Hill service road to 30-20	Surface Dressing	£28,152.75	NCC	North	N. Norfolk
S222A	A107	HOCKHAM	Wretham Road	60m North 33056 Woodcock Road	Surface Dressing	£70,473.17	NCC	South	Breckland
W236A	A17	WALPOLE	Lynn Road	From County Boundary to 170m	Surface Dressing	£203,095.98	NCC	West	KLWN
N194A	A140	HELLESDON	Holt Road	Joint South of B1149 roundabout to	Surface Dressing	£51,478.53	NCC	North	Broadland
W238A	A134	WORMEGAY	Stoke Road	From 150m southeast of A10	Surface Dressing	£58,589.92	NCC	West	KLWN
N221A	A140	HORSFORD	Cromer Road	From 620m north of B1149	Surface Dressing	£42,651.32	NCC	North	Broadland
S173A	A106	ROYDON	High Road	From joint 80m west of junc	Surface Dressing	£33,196.88	NCC	South	S.Norfolk
W229A	A134	STOKE FERRY	Stoke Ferry Bypass	Stoke Ferry Bypass A134, from	Surface Dressing	£98,607.61	NCC	West	KLWN
N265A	A106	DRAYTON	Fakenham Road	Joint west of 57463 Drayton Grove	Surface Dressing	£18,929.02	NCC	North	Broadland
N332A	A140	MARSHAM	Cromer Road	From joint 85metres north of junc	Surface Dressing	£70,063.90	NCC	North	Broadland
S187A	A106	RIDDLESWO	Thetford Road	From joint 300m southeast of junc	Surface Dressing	£108,407.14	NCC	South	Breckland
N287A	A106	STIBBARD	Norwich Road	C316 Fulmodeston Road junction	Surface Dressing	£18,676.65	NCC	North	N. Norfolk
N169A	A140	ROUGHTON	Norwich Road	Joint at B1436 mini-roundabout to	Surface Dressing	£36,155.94	NCC	North	N. Norfolk
S25A	A143	GILLINGHA	Yarmouth Road	160m West C388 to A146	Surface Dressing	£47,129.60	NCC	South	S. Norfolk
W262A	A112	CRIMPLESH	Downham Road	From 100metres west of junc C543	Surface Dressing	£82,303.99	NCC	West	KLWN
N321A	A149	NORTHREPP	Crossdale Street	From 150metres south of junc	Surface Dressing	£75,482.76	NCC	North	N. Norfolk
S191A	A106	GARBOLDISH	Thetford Road	From where Garboldisham FP9	Surface Dressing	£13,949.41	NCC	South	Breckland
N312A	A106	DUNTON	Swaffham Road	From junc U14040 Church Lane to	Surface Dressing	£40,481.24	NCC	North	N. Norfolk
N373A	A149	WEST CAISTER	Caister By Pass	Caister Bypass A149, southwards	Surface Dressing	£143,315.75	NCC	North	Gt.Yar.
C188A	A147	NORWICH	Barn Road	Dereham road to roundabout,	Surface Dressing	£15,253.88	NCC	City	Norwich

C227A	A140	NORWICH	Ipswich Road	From junc U42859 Tuckswood lane	Surface Dressing	£9,458.90	NCC	City	Norwich
W222A	A10	WIMBOTSHAM	Downham -	Downham-Wimbotsham Bypass	Surface Dressing	£85,249.70	NCC	West	KLWN
S90A	A140	TIVETSHALL	Ipswich Road	Hidden joint after bend North of	Surface Dressing	£61,981.75	NCC	South	S. Norfolk
C67A	A140	NORWICH	Sweet Briar Road	North approach to Hellesdon Hall	Surface Dressing	£12,123.31	NCC	City	Norwich
N163A	A149	CROMER	Norwich Road	From 70m south of junc C467	Surface Dressing	£33,864.43	NCC	North	N. Norfolk
N217A	A140	AYLSHAM	Cromer Road	B1145 roundabout to U57717	Surface Dressing	£30,369.74	NCC	North	Broadland
S102A	A106	BRETTENHAM	Thetford Road	From 50m west C147 Rushford	Surface Dressing	£95,937.05	NCC	South	Breckland
N383A	A140	ERPINGHAM	Cromer Road	Joint South of C515 to joint North	Surface Dressing	£131,483.79	NCC	North	N. Norfolk
W281A	A149	HOLME-	Thornham Road	From junc U22153 Eastgate to joint	Surface Dressing	£79,905.92	NCC	West	KLWN
W46A	A148	CASTLE	Hillington Road	A148 120m east A149 Roundabout	Surface Dressing	£117,798.17	NCC	West	KLWN
N329A	A106	STIBBARD	Norwich Road	From 290metres southeast of junc	Surface Dressing	£35,614.35	NCC	North	N. Norfolk
W282A	A149	GRIMSTON	Queen Elizabeth Way	From joint south of A148_A149	Surface Dressing	£183,663.91	NCC	West	W.
N380A	A106	FILBY	Main Road	From joint west of Filby Bridge joint	Surface Dressing	£79,856.03	NCC	North	Gt.Yar.
N388A	A115	WROXHAM	Norwich Road	U57145 The Avenue to junc B1140	Surface Dressing	£22,881.71	NCC	North	Broadland
S94A	A146	THURTON	Norwich Road	Joint near 30mph SL to SD joint	Surface Dressing	£55,525.22	NCC	South	S. Norfolk
S208A	A106	LEXHAM	Fakenham Road	From junc C67A Newton Road to	Surface Dressing	£163,076.89	NCC	South	Breckland
N162A	A149	CROMER	Norwich Road	Joint south U11177 Court Drive to	Surface Dressing	£14,769.72	NCC	North	N. Norfolk
W220A	A10	RUNCTON	Lynn Road	Lynn Road A10, from 60metres	Surface Dressing	£206,531.52	NCC	West	KLWN
N234A	A148	TATTERSETT	Fakenham Road	U22228 Abbey Lane to B1454	Surface Dressing	£38,358.55	NCC	North	N. Norfolk
W241A	A10	FORDHAM	Fordham Bypass	Between junctions of C486 Ely	Surface Dressing	£54,527.14	NCC	West	KLWN
S214A	A106	GREAT	Brandon Road	From joint at speed limit 170metres	Surface Dressing	£155,439.45	NCC	South	Breckland
W263A	A110	UPWELL	Main Road	From 225metres northeast of junc	Surface Dressing	£23,130.40	NCC	West	KLWN

N224A	A149	WELLS-	Burnt Street	B1105 to B1105	Surface Dressing	£36,116.97	NCC	North	N. Norfolk
W283A	A110	EMNETH	Elm High Road	From A147 roundabout to joint	Surface Dressing	£20,930.00	NCC	West	KLWN
W159A	A149	THORNHAM	High Street	30-60 speed limits both sides of	Surface Dressing	£94,433.31	NCC	West	KLWN
N284A	A149	WARHAM	Coast Road	sd joint near Warborough hill to sd	Surface Dressing	£94,730.53	NCC	North	N. Norfolk

Sub Total: £4,205,662.02
Year Total: £5,956,896.66

2022-23
Joint Sealing - A Road

Site ID	Road	Parish	Road Name	Location	Recommended Treatment	Cost	Funding Source	Supervising Area	District:
W314A	A149	HOLME-	Main Road	From C89 Peddars Way to U22153	Joint sealing	£9,450.57	NCC	West	KLWN

Sub Total: £9,450.57

Resurfacing - A Road

Site ID	Road	Parish	Road Name	Location	Recommended Treatment	Cost	Funding Source	Supervising Area	District:
W313A	A149	HEACHAM	Lynn Road	A149_B1454 junction area	Plane and in-lay 65mm	£77,169.32	NCC	West	KLWN
W71A	A112	BARTON	Swaffham Road	50m North C45 to 50m West C122	Overlay 105mm	£572,237.17	NCC	West	KLWN
N252A	A106	HEMPTON	Gravelpit Hill	From junc C333 Helhoughton Road	Plane 105mm and inlay	£110,210.31	NCC	North	N. Norfolk
C55A	A146	NORWICH	Loddon Road	Junction with Trowse bypass	Plane and in-lay 65mm	£174,565.36	NCC	City	Norwich

Sub Total: £934,182.16

Surface Treatment - A Road

Site ID	Road	Parish	Road Name	Location	Recommended Treatment	Cost	Funding Source	Supervising Area	District:
C65A	A140	NORWICH	Guardian Road	Bowthorpe Road to Dereham Road	Surface Dressing	£22,359.08	NCC	City	Norwich
N202A	A140	STRATTON	Cromer Road	Joint south of C245 to joint at bus	Surface Dressing	£14,689.07	NCC	North	Broadland
W253A	A149	BRANCASTE	Main Road	From junc C95 Dalegate Road to	Surface Dressing	£17,150.79	NCC	West	KLWN

S206A	A106	SPARHAM	Main Road	Joint East B1145 to 160m West	Surface Dressing	£104,554.57	NCC	South	Breckland
S132A	A11	CRINGLEFORD	Newmarket Road	Westbound side of Newmarket Road	Surface Dressing	£130,051.91	NCC	South	S. Norfolk
N336A	A140	HEVINGHAM	Cromer Road	From joint south of C281 The	Surface Dressing	£30,074.57	NCC	North	Broadland
N260A	A149	NORTH	Cromer Road	Joint South U14438 to joint north	Surface Dressing	£71,755.61	NCC	North	N. Norfolk
S210A	A106	STIBBARD	Norwich Road	From joint southeast of junc C335	Surface Dressing	£62,748.32	NCC	South	N. Norfolk
S163A	A143	TOFT	Yarmouth Road	From junc B1136 to junc C390	Surface Dressing	£72,773.69	NCC	South	S. Norfolk
N311A	A148	LETHERINGS	Thornage Road	From junc U14421 Barnaway Lane	Surface Dressing	£33,806.81	NCC	North	N. Norfolk
C132A	A104	NORWICH	Mile Cross Lane	15m East 40251 Partridge Way to	Surface Dressing	£15,200.23	NCC	City	Norwich
C139A	A107	NORWICH	Dereham Road	Joint East C171 Norwich Road to	Surface Dressing	£18,032.33	NCC	City	Norwich
N235A	A148	DUNTON	Tattersett Road	B1454 to U14504 The street	Surface Dressing	£232,738.07	NCC	North	N. Norfolk
C102A	A140	NORWICH	Sweet Briar Road	Dereham Road to Hellesdon Hall	Surface Dressing	£68,432.11	NCC	City	Norwich
N277A	A149	WEYBOURN	The Street	Joint 70m east speed limit east of	Surface Dressing	£49,933.75	NCC	North	N. Norfolk
N263A	A106	ATTLEBRID	Fakenham Road	Joint west of C262 Fir Covert Road	Surface Dressing	£35,628.07	NCC	North	Broadland
N283A	A149	THORPE	Cromer Road	110m south of A140 Junction to	Surface Dressing	£81,619.82	NCC	North	N. Norfolk
N50A	A106	RAYNHAM	Swaffham Road	U14477 to joint near lady ferrers	Surface Dressing	£47,024.58	NCC	North	N. Norfolk
N264A	A106	TAVERHAM	Fakenham Road	MA joint ast of C262 Beech Avenue	Surface Dressing	£60,577.40	NCC	North	Broadland
N195A	A140	HELLESDON	Cromer Road	Joint North of Boundary Road to	Surface Dressing	£39,248.89	NCC	North	Broadland
S167A	A106	ROYDON	Stanley Road	From joint 30m northwest of junc	Surface Dressing	£20,803.14	NCC	South	
W257A	A148	HARPLEY	Fakenham Road	From junc U22410 to joint 100m	Surface Dressing	£54,314.76	NCC	West	KLWN
C193A	A140	NORWICH	Ipswich Road	From railway bridge to joint south	Surface Dressing	£9,857.26	NCC	City	Norwich
S180A	A107	SHIPDHAM	Dereham Road	From joint 100metres south of	Surface Dressing	£55,104.23	NCC	South	Breckland
W264A	A110	UPWELL	Main Road	From junc B1094 Silt Road to joint	Surface Dressing	£27,740.16	NCC	West	KLWN

N318A	A108	SHERINGHA	Holway Road	From 50metres north of junc	Surface Dressing	£20,489.28	NCC	North	N. Norfolk

Sub Total: £1,396,708.51
Year Total: £2,340,341.24

2023-24
Resurfacing - A Road

Site ID	Road	Parish	Road Name	Location	Recommended Treatment	Cost	Funding Source	Supervising Area	District:
N301A	A148	UPPER	Holt Road	A148 Holt Road, from Woodlands	Plane 105mm and inlay	£307,878.45	NCC	North	N. Norfolk
C206A	A147	NORWICH	King Street	Bracondale_King Street junction area	Plane 105mm and inlay	£72,458.94	NCC	City	Norwich
W181A	A148	KINGS LYNN	Railway Road	20427 Blackfriars Street to 15m	Plane and in-lay 65mm	£36,277.12	NCC	West	KLWN
N313A	A149	CROMER	Norwich Road	From junc C491 Cromwell Road to	Plane 105mm and inlay	£73,188.77	NCC	North	N. Norfolk

Sub Total: £489,803.28

Surface Treatment - A Road

Site ID	Road	Parish	Road Name	Location	Recommended Treatment	Cost	Funding Source	Supervising Area	District:
W194A	A107	STOW BARDOLPH	Watton Road	From joint just north of junc C402	Surface Dressing	£58,978.81	NCC	West	Breckland
W4A	A149	SANDRINGH	Queen Elizabeth Way	A149 90M South B1439 to Cats	Surface Dressing	£46,151.49	NCC	West	W.
C133A	A104	NORWICH	Chartwell Road	55m East C807 Catton Grove Road	Surface Dressing	£38,260.95	NCC	City	Norwich
W299A	A149	TITCHWELL	Main Road	From joint outside Marsh View to	Surface Dressing	£40,428.71	NCC	West	KLWN
W30A	A149	BRANCASTE	Main Road	A149 132m West Chalkpit Rd	Surface Dressing	£13,235.32	NCC	West	KLWN
S233A	A106	ICKBURGH	Swaffham Road	From joint south of junc B1108	Surface Dressing	£123,928.36	NCC	South	Breckland
S213A	A106	WEASENHA	Castleacre Road	Castle Acre Road	Surface Dressing	£63,375.75	NCC	South	Breckland
N170A	A140	ROUGHTON	Norwich Road	Joint South of petrol station to joint	Surface Dressing	£31,059.55	NCC	North	N. Norfolk
N168A	A140	NORTHREPP	Norwich Road	Joint near 40-60 SL to A149	Surface Dressing	£36,682.71	NCC	North	N. Norfolk
W154A	A149	SANDRINGH	Queen Elizabeth Way	90m North C79 to outside 3 Cats	Surface Dressing	£36,264.94	NCC	West	W.

N158A	A148	UPPER	Cromer Road	30-60 SL East of Bodham to joint	Surface Dressing	£31,506.18	NCC	North	N. Norfolk
C134A	A104	SPROWSTON	Chartwell Road	Constitution Hill roundabout to	Surface Dressing	£19,638.18	NCC	City	Broadland
N159A	A148	AYLMERTO	Holt Road	110m East to 350m West C301	Surface Dressing	£19,192.91	NCC	North	N. Norfolk
N360A	A149	NORTH	North Walsham	Joint South of B1150 to 50-60 SL	Surface Dressing	£36,852.96	NCC	North	N. Norfolk
S188A	A106	RIDDLESWO	Thetford Road	From junc U33153 Lodge Lane to	Surface Dressing	£57,944.74	NCC	South	Breckland
S137A	A146	GILLINGHA	Norwich Road	Norwich Road A146, from 40metres	Surface Dressing	£48,936.98	NCC	South	S. Norfolk
N371A	A106	LUDHAM	Johnson Street	Johnson Street A1062, southwards	Surface Dressing	£19,670.65	NCC	North	N. Norfolk
S165A	A140	LONG STRATTON	Ipswich Road	From junc U76552 Lime Tree	Surface Dressing	£18,797.12	NCC	South	S. Norfolk
S218A	A106	WEETING-	Mundford Road	Joint 125m south of Cattery to	Surface Dressing	£35,799.07	NCC	South	Breckland
N370A	A106	HORNING	Norwich Road	Horning Road A1062 eastwards	Surface Dressing	£110,902.59	NCC	North	N. Norfolk
S162A	A107	OVINGTON	Dereham Road	From junc 35043 Wood Lane	Surface Dressing	£59,469.83	NCC	South	Breckland
W162A	A10	SOUTHERY	Ferry Bank	B1160 (North junction) to joint	Surface Dressing	£48,632.91	NCC	West	KLWN
S126A	A108	BRETTENHAM	Euston Road	260m south A1066 roundabout to	Surface Dressing	£84,090.82	NCC	South	Breckland
N368A	A106	HOVETON	Horning Road	A1151 to 19668 Palmers Lane	Surface Dressing	£72,450.66	NCC	North	N. Norfolk

Sub Total: £1,152,252.17
Year Total: £1,642,055.46

Norfolk County Council

‘B’ Road Draft Schedule of Resurfacing and Surface Treatment 2018-19 to 2022-23

2019-20

Reclamite - B Road

Site ID	Road	Parish	Road Name	Location	Recommended Treatment	Cost	Funding Source	Area	District:
N297B	B1534	BRADWELL	Beaufort Way	B1534 between A12 and A143, inc	Reclamite	£58,222.54	NCC	North	Gt.Yar.
					Sub Total:	**£58,222.54**			

Resurfacing - B Road

Site ID	Road	Parish	Road Name	Location	Recommended Treatment	Cost	Funding Source	Area	District:
S70B	B1108	COLNEY	Watton Road	245m West C182 to 150m East	Plane and in-lay 70mm	£20,000.00	DEV	South	S. Norfolk
S254B	B1172	WYMONDHAM	London Road	From Millhouse to C572	Overlay 90mm	£208,511.82	NCC	South	S. Norfolk
W212B	B1160	WEREHAM	College Road	Entrance and exit areas to BRITISH	Plane and in-lay 100mm	£121,587.10	NCC	West	KLWN.
C29B	B1108	NORWICH	Convent Road	From A147 roundabout to B1108	Plane and inlay 50mm	£37,502.73	NCC	City	Norwich
S280B	B1145	STANFIELD	Stanfield Road	B1146_B1145 junction area	Plane and in-lay 70mm	£66,713.71	NCC	South	Breckland
S182B	B1172	WYMONDHAM	Station Road	A11 southbound roundabout	Plane and in-lay 70mm	£51,302.47	NCC	South	S. Norfolk
S159B	B1077	ATTLEBORO	Church Street	North half of one-way system	Plane and in-lay 50mm	£87,503.49	NCC	South	Breckland
S3B	B1113	SOUTH LOPHAM	Redgrave Road	50m North U33164 to Suffolk	Overlay 90mm	£45,917.91	NCC	South	Breckland
W218B	B1160	WEREHAM	Wereham Bypass	C32_B1160 junction area	Plane and in-lay 70mm	£27,370.85	NCC	West	KLWN.
S208B	B1108	WATTON	Brandon Road	From junc U31273 Threxton Road	Plane and in-lay 70mm	£149,268.69	NCC	South	Breckland
S9B	B1113	MULBARTO	Norwich Road	125m South U78336 to 90m East	Overlay 70mm	£124,845.95	NCC	South	S. Norfolk
N55B	B1145	CAWSTON	Aylsham Road	Joint outside Manor Lodge to joint	Overlay 70mm	£158,681.21	NCC	North	Broadland
S289B	B1172	WYMONDHAM	London Road	Fire Station to 50metres east of	Plane and in-lay 70mm	£49,134.78	NCC	South	S. Norfolk

W231B	B1155	STANHOE	Burnham Road	B1155_C769 bend	Plane 70mm and inlay 70mm	£19,113.56	NCC	West	KLWN.
S165B	B1146	HOE	Holt Road	C225 Gressenhall Road junction	Plane and in-lay 50mm	£21,930.66	NCC	South	Breckland
W42B	B1112	METHWOLD	Stoke Road	Joint at Brook Lane to joint at	Plane 70mm and inlay 70mm	£123,143.16	NCC	West	KLWN.

Sub Total: £1,312,528.08

Surface Treatment - B Road

Site ID	Road	Parish	Road Name	Location	Recommended Treatment	Cost	Funding Source	Area	District:
C21B	B1150	NORWICH	Constitution Hill	Wall Road to Denmark Road	Surface Dressing	£20,644.51	NCC	City	Norwich
S215B	B1108	BAWBURGH	Watton Road	From the South Bypass Rdbt to Bow	Surface Dressing	£102,316.42	NCC	South	S. Norfolk
N258B	B1150	SPROWSTON	North Walsham	From junc U57650 George Hill to	Surface Dressing	£12,108.61	NCC	North	Broadland
N304B	B1159	WALCOTT	Coast Road	C415 to 30_40 speed limit	Surface Dressing	£13,877.22	NCC	North	N. Norfolk
N299B	B1145	SALLE	Cawston Road	C268 to MA joint at Electricity	Surface Dressing	£43,063.92	NCC	North	Broadland
S259B	B1145	MILEHAM	Litcham Road	U35203 to National Speed sign	Surface Dressing	£68,474.19	NCC	South	Breckland
W210B	B1100	WELNEY	March Road	From County Boundary to junc	Surface Dressing	£65,377.61	NCC	West	KLWN.
S229B	B1135	HARDINGHAM	Norwich Road	From joint 100metres southeast of	Surface Dressing	£38,643.14	NCC	South	Breckland
S219B	B1136	RAVENINGH	Yarmouth Road	From joint 150m west of The	Surface Dressing	£42,090.72	NCC	South	S. Norfolk
N226B	B1105	WELLS-	Fakenham Road	Fakenham Road B1105, from junc	Surface Dressing	£38,219.96	NCC	North	N. Norfolk
N285B	B1145	COLBY	North Walsham	From 25m west of junc U14237	Surface Dressing	£31,403.22	NCC	North	N. Norfolk
N141B	B1110	BRINTON	Dereham Road	Joint at U14032 Letheringsett Road	Surface Dressing	£54,768.83	NCC	North	N. Norfolk
S59B	B1135	WICKLEWO	Crownthorpe Road	B1110 to C166	Surface Dressing	£79,766.42	NCC	South	S. Norfolk
W155B	B1160	SOUTHERY	Feltwell Road	C872 Feltwell Road to junc Lynn	Surface Dressing	£73,968.78	NCC	West	KLWN.
W41B	B1112	NORTHWOL	Methwold Road	50m South U21391 to Joint at	Surface Dressing	£59,598.67	NCC	West	KLWN.
W147B	B1098	UPWELL	Croft Road	A1101 to County Border	Surface Dressing	£20,944.54	NCC	West	KLWN.

W144B	B1153	GRIMSTON	Gayton Road	From 30metres south of junc	Surface Dressing	£32,477.51	NCC	West	KLWN.
S203B	B1332	FRAMINGHA	Norwich Road	From 350m northwest of junc	Surface Dressing	£49,617.50	NCC	South	S. Norfolk
S98B	B1108	WATTON	Norwich Road	A1075 to 101 Norwich Road	Surface Dressing	£12,967.68	NCC	South	Breckland
S212B	B1108	COLNEY	Watton Road	East of junc Colney Lane to east of	Surface Dressing	£14,936.61	NCC	South	S. Norfolk
S170B	B1332	BROOKE	Norwich Road	Joint 35m north west of C375 to	Surface Dressing	£43,002.51	NCC	South	S. Norfolk
N276B	B1159	WALCOTT	Coast Road	U19003 Coast Road to C643	Surface Dressing	£17,826.84	NCC	North	N. Norfolk
C10B	B1108	NORWICH	Earlham Road	Recreation Road to West Parade	Surface Dressing	£17,120.21	NCC	City	Norwich
N265B	B1145	SWAFIELD	The Street	From junc C295 Trunch Road	Surface Dressing	£12,000.80	NCC	North	N. Norfolk
N252B	B1146	HEMPTON	Hempton Green	From junc A1065 Raynham Road	Surface Dressing	£12,390.22	NCC	North	N. Norfolk
N301B	B1145	CAWSTON	Cawston Road	From MA joint at electricity bends	Surface Dressing	£9,707.31	NCC	North	Broadland
C13B	B1108	NORWICH	Earlham Road	210 Earlham Road to Cemetery	Surface Dressing	£4,190.39	NCC	City	Norwich

Sub Total: £991,504.33

Year Total: £2,362,254.95

2020-21

Resurfacing - B Road

Site ID	Road	Parish	Road Name	Location	Recommended Treatment	Cost	Funding Source	Area	District:
W232B	B1112	METHWOLD	Brandon Road	B1112_C873 junction area	Overlay 70mm	£42,206.28	NCC	West	KLWN.
W124B	B1440	SANDRINGH	Hillington Road	Junc B1439 to West Newton parish	Overlay 90mm	£94,406.84	NCC	West	KLWN.
W77B	B1145	GAYTON	Lynn Road	60-30 speed limit East of Gayton to	Plane and in-lay 70mm	£106,902.73	NCC	West	KLWN.

Sub Total: £243,515.85

Surface Treatment - B Road

Site ID	Road	Parish	Road Name	Location	Recommended Treatment	Cost	Funding Source	Area	District:
N20B	B1159	BACTON	Coast Road	Outside electricity base to C414	Surface Dressing	£42,461.70	NCC	North	N. Norfolk

N200B	B1145	REEPHAM	Bawdeswell Road	57051 Fir Lane to C199 Reepham	Surface Dressing	£40,754.24	NCC	North	Broadland
N88B	B1156	FIELD DALLING	Brinton Road	C313 to A148	Surface Dressing	£28,669.09	NCC	North	N. Norfolk
W192B	B1145	LEZIATE	Lynn Road	From junc U22014 Well Hall Lane	Surface Dressing	£37,492.22	NCC	West	KLWN.
N293B	B1152	REPPS WITH	Mill Road	From joint south of junc A149 High	Surface Dressing	£21,351.98	NCC	North	Gt.Yar.
W13B	B1153	BRANCASTE	Mill Road	From junc A149 to 200metres	Surface Dressing	£97,758.21	NCC	West	KLWN.
N146B	B1110	SWANTON	Dereham Road	MA joint North of C331 to Ma	Surface Dressing	£42,369.97	NCC	North	N. Norfolk
W132B	B1145	BAWSEY	Gayton Road	Joint at 22123 Spot Lane to joint	Surface Dressing	£112,211.17	NCC	West	KLWN.
N218B	B1149	HORSFORD	Holt Road	From 280m south of junc C282	Surface Dressing	£23,267.64	NCC	North	Broadland
S270B	B1146	BRISLEY	Fakenham Road	Fakenham Road B1146, from junc	Surface Dressing	£34,270.52	NCC	South	Breckland
W105B	B1153	GRIMSTON	Grimston Road	Joint at 30-60 speed limit South of	Surface Dressing	£42,456.49	NCC	West	W.
S206B	B1077	ATTLEBORO	Station Road	From junc U33176 Thieves Lane to	Surface Dressing	£7,841.11	NCC	South	Breckland
N292B	B1159	WALCOTT	Coast Road	From junc U19003 Coast Road to	Surface Dressing	£13,320.20	NCC	North	N. Norfolk
S64B	B1172	HETHERSET	Ketts Oak	100m East of U78003 to 225	Surface Dressing	£63,607.74	NCC	South	S. Norfolk
S13B	B1113	BUNWELL	The Turnpike	C346 to Outside Rosedell, The	Surface Dressing	£53,968.43	NCC	South	S. Norfolk
N270B	B1145	NORTH WALSHAM	Greens Road	60mph sign to joint West of	Surface Dressing	£17,170.39	NCC	North	N. Norfolk
N108B	B1354	BRININGHA	Melton Road	Joint at B1110 to joint at South	Surface Dressing	£39,304.85	NCC	North	N. Norfolk
S249B	B1108	BARFORD	Watton Road	From joint outside garage eastwards	Surface Dressing	£10,332.86	NCC	South	S. Norfolk
S265B	B1147	BYLAUGH	Dereham Road	c217 Mill Street to A1067	Surface Dressing	£75,910.74	NCC	South	Breckland
S180B	B1077	GREAT ELLINGHAM	Attleborough Road	Attleborough Road B1077, from	Surface Dressing	£64,095.60	NCC	South	Breckland
W146B	B1145	GREAT MASSINGHAM	Litcham Road	22047 Peddars Way to 200m East	Surface Dressing	£37,633.80	NCC	West	KLWN.
N287B	B1150	HORSTEAD	Norwich Road	From junc U57164 Mill Road to	Surface Dressing	£18,952.67	NCC	North	Broadland
S116B	B1332	BIXLEY	Bungay Road	A146 to C191 Arminghall Lane	Surface Dressing	£56,884.07	NCC	South	S. Norfolk

Sub Total: £982,085.70

Year Total: £1,225,601.55

2021-22

Resurfacing - B Road

Site ID	Road	Parish	Road Name	Location	Recommended Treatment	Cost	Funding Source	Area	District:
N264B	B1110	WOOD NORTON	Holt Road	B1110_C335 Junction area	Plane 70mm and inlay 70mm	£12,066.57	NCC	North	N. Norfolk
W194B	B1112	METHWOLD	Stoke Road	From 480m north of junc C87	Plane 70mm and inlay 70mm	£336,875.43	NCC	West	KLWN.
W94B	B1440	DERSINGHA	Lynn Road	Joint 20m South U23207 to joint at	Plane 70mm and inlay 70mm	£103,062.38	NCC	West	KLWN.

Sub Total: £452,004.38

Surface Treatment - B Road

Site ID	Road	Parish	Road Name	Location	Recommended Treatment	Cost	Funding Source	Area	District:
N279B	B1159	STALHAM	Stepping Stone	A149 to 70m beyond C412	Surface Dressing	£23,317.23	NCC	North	N. Norfolk
N63B	B1145	REEPHAM	Dereham Road	C266 to joint at Park Lane	Surface Dressing	£7,328.24	NCC	North	Broadland
N244B	B1156	FIELD DALLING	Langham Road	From junc C598 Holt Road to junc	Surface Dressing	£37,212.51	NCC	North	N. Norfolk
S76B	B1108	SCOULTON	Norwich Road	U33021 to C130	Surface Dressing	£26,675.13	NCC	South	Breckland
S271B	B1110	NORTH ELMHAM	Pump Street	High Street B1110, from Millers Old	Surface Dressing	£8,700.19	NCC	South	Breckland
N142B	B1110	BRININGHA	Dereham Road	Junc B1354 Briston Road to 40-60	Surface Dressing	£49,363.32	NCC	North	N. Norfolk
N219B	B1436	THORPE MARKET	Roughton Road	A149 to 40-30 speed limit	Surface Dressing	£6,072.90	NCC	North	N. Norfolk
N272B	B1140	WOODBAST	South Walsham Road	Joint at bridge to C874	Surface Dressing	£12,629.46	NCC	North	Broadland
W216B	B1145	GAYTON	Litcham Road	From joint 150metres east of junc	Surface Dressing	£35,082.24	NCC	West	KLWN.
S277B	B1145	MILEHAM	The Street	From joint 200metres southwest of	Surface Dressing	£46,537.57	NCC	South	Breckland
N251B	B1149	EDGEFIELD	Norwich Road	From junc U14417 Rectory Road to	Surface Dressing	£30,181.76	NCC	North	N. Norfolk
N296B	B1140	CANTLEY	Station Road	From joint at junc C433 Limpenhoe	Surface Dressing	£26,005.96	NCC	North	Broadland

N232B	B1146	PUDDING NORTON	Dereham Road	Dereham Road B1146, from junc	Surface Dressing	£19,395.73	NCC	North	N. Norfolk
N74B	B1149	CAWSTON	Holt Road	Joint at C228 to joint at C263	Surface Dressing	£18,050.49	NCC	North	Broadland
N267B	B1149	CAWSTON	Holt Road	From joint north of B1145	Surface Dressing	£34,295.02	NCC	North	Broadland
S261B	B1147	SWANTON	Mill Street	C213 to C217	Surface Dressing	£37,265.37	NCC	South	Breckland
N85B	B1110	MELTON CONSTABLE	Dereham Road	Joint at B1354 to joint at C704	Surface Dressing	£18,810.02	NCC	North	N. Norfolk
S14B	B1113	CARLETON	The Turnpike	C351 to C350	Surface Dressing	£32,791.61	NCC	South	S. Norfolk
S274B	B1145	BILLINGFOR	The Street	From 125metres east of River	Surface Dressing	£35,207.34	NCC	South	Breckland
N145B	B1110	SWANTON	Dereham Road	Ma Joint North of C637 to joint at	Surface Dressing	£20,591.04	NCC	North	N. Norfolk
N193B	B1110	WOOD DALLING	Holt Road	C331 to C335	Surface Dressing	£53,130.03	NCC	North	N. Norfolk
W161B	B1094	UPWELL	Ha Penny Toll	21132 Greenend to farm southwards	Surface Dressing	£12,325.99	NCC	West	KLWN.
S93B	B1111	HARLING	Garboldisham Road	Pegasus, Garboldisham Road to	Surface Dressing	£32,409.20	NCC	South	Breckland
S256B	B1145	BAWDESWE	Billingford Road	30mph sign at East entrance to	Surface Dressing	£63,640.69	NCC	South	Breckland
W101B	B1153	DOCKING	Brancaster Road	60-30 speed limit North of Docking	Surface Dressing	£11,965.88	NCC	West	KLWN.
W98B	B1153	BIRCHAM	Lynn Road	Joint at C83 to joint at C82 Anmer	Surface Dressing	£89,881.43	NCC	West	KLWN.
S197B	B1527	HEMPNALL	Bungay Road	Bungay Road B1527, from junc	Surface Dressing	£33,290.16	NCC	South	S. Norfolk
N266B	B1145	SALLE	Cawston Road	From joint outside no.67 to railway	Surface Dressing	£17,436.31	NCC	North	Broadland
N25B	B1150	BEESTON ST	North Walsham	U57189 to C462	Surface Dressing	£43,146.25	NCC	North	Broadland
W178B	B1355	NORTH CREAKE	Burnham Road	Creake Road B1355, from speed	Surface Dressing	£56,835.32	NCC	West	KLWN.W.
N75B	B1149	CAWSTON	Holt Road	Joint 20m South C263 to joint	Surface Dressing	£11,938.13	NCC	North	Broadland
W160B	B1094	UPWELL	Ha Penny Toll	County boundary to after bends	Surface Dressing	£17,392.69	NCC	West	KLWN.

Sub Total: £968,905.22

Year Total: £1,420,909.60

2022-23

Resurfacing - B Road

Site ID	Road	Parish	Road Name	Location	Recommended Treatment	Cost	Funding Source	Area	District:
N278B	B1150	WESTWICK	Norwich Road	50m South U19102 to MA joint	Overlay 70mm	£165,906.97	NCC	North	N. Norfolk

Sub Total: £165,906.97

Surface Treatment - B Road

Site ID	Road	Parish	Road Name	Location	Recommended Treatment	Cost	Funding Source	Area	District:
N201B	B1436	FELBRIGG	Cromer Road	A148 to joint west C291 Old Mill	Surface Dressing	£99,739.31	NCC	North	N. Norfolk
W214B	B1440	SNETTISHA	Lynn Road	From speed limit 150metres south	Surface Dressing	£32,537.14	NCC	West	KLWN.
S199B	B1332	HEDENHAM	Norwich Road	Norwich Road B1332, from	Surface Dressing	£19,605.70	NCC	South	S. Norfolk
N131B	B1149	HEYDON	Holt Road	Joint at C228 to joint near track	Surface Dressing	£19,378.87	NCC	North	Broadland
S268B	B1110	GUIST	Holt Road	A1067 to 35162 Guist Lane	Surface Dressing	£11,709.53	NCC	South	Breckland
S284B	B1108	HILBOROUG	Watton Road	Junc A1065 to entrance of Bodney	Surface Dressing	£116,328.78	NCC	South	Breckland
S216B	B1332	PORINGLAN	The Street	From joint 50metres north of junc	Surface Dressing	£14,826.21	NCC	South	S. Norfolk
N286B	B1145	FELMINGHAM	Aylsham Road	From 95m west of junc U14240	Surface Dressing	£120,222.97	NCC	North	N. Norfolk
S205B	B1077	OLD BUCKENHAM	Attleborough Road	From junc U33083 Fen Street to	Surface Dressing	£33,243.55	NCC	South	Breckland
N79B	B1149	STRATTON	Holt Road	Joint at C245 to joint at C278	Surface Dressing	£34,829.59	NCC	North	Broadland
S179B	B1108	DEOPHAM	Hingham Road	30-60 speed limit to C166	Surface Dressing	£62,420.42	NCC	South	S. Norfolk
S65B	B1172	WYMONDHAM	Harts Farm Road	A11 Roundabout to C700	Surface Dressing	£62,991.99	NCC	South	S. Norfolk
N280B	B1354	HORSTEAD	Buxton Road	From junc C494 to junc B1150	Surface Dressing	£42,133.49	NCC	North	Broadland
W233B	B1454	SEDGEFORD	Docking Road	Sedgeford 40mph terminal east to	Surface Dressing	£62,082.82	NCC	West	KLWN..
N227B	B1105	BARSHAM	Wells Road	From junc U14182 Waterden Road	Surface Dressing	£53,134.67	NCC	North	N. Norfolk

S204B	B1077	ATTLEBORO	Ellingham Road	From junc U35334 southeastwards	Surface Dressing	£22,440.65	NCC	South	Breckland
W190B	B1153	DOCKING	Station Road	From junc Well Street to 375m east	Surface Dressing	£39,465.42	NCC	West	KLWN.
N295B	B1140	CANTLEY	Manor Road	From junc C438 Strumpshaw Road	Surface Dressing	£28,775.73	NCC	North	Broadland
N284B	B1140	CANTLEY	Manor Road	Manor Road B1140, from junc	Surface Dressing	£43,646.74	NCC	North	Broadland
W217B	B1145	GAYTON	Litcham Road	From joint at junc C71 Drunken	Surface Dressing	£32,723.53	NCC	West	KLWN.
N203B	B1436	THORPE	Roughton Road	A140 to 40-30 speed limit	Surface Dressing	£45,517.54	NCC	North	N. Norfolk
N283B	B1140	CANTLEY	High Road	From junc C429 Norwich Road to	Surface Dressing	£51,972.83	NCC	North	Broadland
S195B	B1113	TACOLNEST	Norwich Road	Norwich Road B1113, from joint	Surface Dressing	£44,589.24	NCC	South	S.Norfolk
S61B	B1135	WYMONDHAM	Tuttles Lane East	U71200 to B1172 roundabout	Surface Dressing	£27,326.82	NCC	South	S. Norfolk

Sub Total: £1,121,643.53
Year Total: £1,287,550.50

2023-24
Resurfacing - B Road

Site ID	Road	Parish	Road Name	Location	Recommended Treatment	Cost	Funding Source	Area	District:
C27B	B1108	NORWICH	Unthank Road	Convent Road B1108, from A147	Plane and in-lay 50mm	£29,927.52	NCC	City	Norwich
N105B	B1354	BRININGHA	Briston Road	Joint 345m West B1110 to 340m	Overlay 90mm	£59,222.05	NCC	North	N. Norfolk
N215B	B1149	CORPUSTY	Briston Road	B1354 to C288 Matlaske Road	Plane and in-lay 70mm	£22,975.41	NCC	North	N. Norfolk
N290B	B1152	REPPS WITH	Mill Lane	From junc A149 Main Road to junc	Overlay 70mm	£78,625.31	NCC	North	Gt.Yar.
W219B	B1112	HOCKWOLD-	Feltwell Road	Joint outside 5 Wilton Road to joint	Plane 70mm and inlay 70mm	£370,741.48	NCC	West	KLWN.
N289B	B1140	BEIGHTON	White House Lane	From junc C446 Acle Road to joint	Overlay 70mm	£39,123.98	NCC	North	Broadland

Sub Total: £600,615.74

Surface Treatment - B Road

Site ID	Road	Parish	Road Name	Location	Recommended Treatment	Cost	Funding Source	Area	District:
S198B	B1077	WINFARTHI	Mile Road	Mile Road B1077, from junc B1134	Surface Dressing	£39,907.92	NCC	South	S. Norfolk
N140B	B1354	CORPUSTY	Briston Road	Joint near Prospect Point to MA	Surface Dressing	£14,252.03	NCC	North	N. Norfolk
W75B	B1355	SOUTH	Burnham Road	60-40 speed limit North of South	Surface Dressing	£22,691.84	NCC	West	KLWN
S269B	B1146	BRISLEY	Fakenham Road	B1145 to 50m south C234	Surface Dressing	£31,831.28	NCC	South	Breckland
S273B	B1145	BAWDESWE	Reepham Road	From 40m north of junc U35283	Surface Dressing	£21,796.38	NCC	South	Breckland
S285B	B1107	THETFORD	Brandon Road	Brandon Road B1107, from	Surface Dressing	£74,241.80	NCC	South	Breckland
N191B	B1156	LANGHAM	Langham Road	A149 to C598	Surface Dressing	£56,133.62	NCC	North	N. Norfolk
S145B	B1113	CARLETON	The Turnpike	76004 Bunwell Hill to C351 Rode	Surface Dressing	£23,343.65	NCC	South	S. Norfolk
N229B	B1149	CORPUSTY	Norwich Road	Norwich Road B1149, from	Surface Dressing	£95,444.54	NCC	North	N. Norfolk
N302B	B1149	CAWSTON	Holt Road	Joint north of C264 to joint south	Surface Dressing	£23,618.88	NCC	North	Broadland
S263B	B1110	NORTH ELMHAM	Broom Green	From joint outside 2 Bridge Road to	Surface Dressing	£52,522.82	NCC	South	Breckland
N24B	B1150	BEESTON ST	North Walsham	C249 to 75m North U57186	Surface Dressing	£45,651.15	NCC	North	Broadland
S253B	B1332	HEDENHAM	Norwich Road	From 200metres east of junc C368	Surface Dressing	£29,184.68	NCC	South	S. Norfolk
S54B	B1135	GARVESTON	Dereham Road	U35030 to C198	Surface Dressing	£36,183.41	NCC	South	Breckland
S282B	B1110	GUIST	Holt Road	From south of junc C335 Stibbard	Surface Dressing	£41,909.24	NCC	South	Breckland
S257B	B1145	BAWDESWE	Norwich Road	100m North A1067 to 20 Norwich	Surface Dressing	£5,520.05	NCC	South	Breckland
S63B	B1172	HETHERSET	Norwich Road	100m West of C185 to 100m East	Surface Dressing	£44,474.03	NCC	South	S. Norfolk
N250B	B1354	MELTON CONSTABLE	Briston Road	From joint just west of junc 227	Surface Dressing	£24,510.80	NCC	North	N. Norfolk
W234B	B1454	DOCKING	Docking Road	to 30mph at Docking	Surface Dressing	£37,498.76	NCC	West	KLWN
N294B	B1152	FLEGGBURG	Main Road	From joint at junc U69345 Hall	Surface Dressing	£31,236.08	NCC	North	Gt.Yar .
S142B	B1332	KIRSTEAD	Norwich Road	From joint south of C203 crossroads	Surface Dressing	£88,402.96	NCC	South	S. Norfolk
S232B	B1332	BROOKE	Norwich Road	Joint 30m south of 30-60 speed	Surface Dressing	£14,551.76	NCC	South	S. Norfolk

S250B	B1172	HETHERSET	Norwich Road	From junc C182 Colney Lane to	Surface Dressing		£56,484.02	NCC	South	S. Norfolk
N249B	B1105	BARSHAM	Wells Road	From junc C336 Egmere Road to	Surface Dressing		£42,186.91	NCC	North	N. Norfolk
S201B	B1077	HEYWOOD	Shelfanger Road	Shelfanger Road B1077, from joint	Surface Dressing		£34,095.75	NCC	South	S. Norfolk
S153B	B1077	WINFARTHI	Short Green	C143 Winfarthing Road to C208	Surface Dressing		£46,124.77	NCC	South	S. Norfolk
N298B	B1354	COLTISHALL	Wroxham Road	From Post Office to junc U57131	Surface Dressing		£19,296.47	NCC	North	Broadland
S140B	B1111	GARBOLDISH	Hopton Road	A1066 to county boundary	Surface Dressing		£33,607.51	NCC	South	Breckland
W64B	B1155	DOCKING	Stanhoe Road	Joint at B1454 junction to joint at	Surface Dressing		£14,496.84	NCC	West	KLWN
W117B	B1155	DOCKING	Stanhoe Road	60-40 SL North and South Bircham	Surface Dressing		£27,449.22	NCC	West	KLWN

Sub Total: £1,128,649.18

Year Total: £1,729,264.92

	Financial Year TOTAL	Airport P&R	Postwick P&R	Sprowston P&R	Harford P&R	Thickthorn P&R	Costessey P&R	Norwich Bus Station	Cromer Bus interchange	Thetford Bus interchange
Priority 1	**2018/19**									
joint/crack seal	£ 300.00	£ 300.00								
Joint/crack filling	£ 3,200.00			£ 2,500.00		£ 700.00				
Surfacing Trials various treatments to inform future	£ 20,300.00			£ 2,200.00	£ 10,000.00	£ 8,100.00				
Take out and reinstall asphalt humps	£ 2,220.00			1500	720					
Specialist concrete repairs	£ 7,500.00							£ 7,500.00		
Boundary fencing works	£ 650.00					£ 650.00				
Crossing point design and renewal	£ 3,500.00							£ 3,500.00		
2017/18 total	£ 37,670.00	£ 300.00	£ -	£ 6,200.00	£ 10,720.00	£ 9,450.00	£ -	£ 11,000.00	£ -	£ -
	£ 37,670.00									
Priority 1	**2019-20**									
joint/crack seal or seal	£ 400.00		£ 400.00							
drainage replacement	£ 4,000.00							£ 4,000.00		
Surfacing Trials various treatments to inform future	£ 18,600.00	£ 2,650.00		£ 9,200.00		£ 6,750.00				
Take out and reinstall asphalt humps	£ -									
Specialist concrete repairs	£ 16,000.00					£ 5,000.00		£ 11,000.00		
Boundary fencing works	£ -									
Crossing point design and renewal	£ -									
2018/19 total	£ 39,000.00	£ 2,650.00	£ 400.00	£ 9,200.00	£ -	£ 11,750.00	£ -	£ 15,000.00	£ -	£ -
	£ 39,000.00									
Priority 2	**2010-21**									
Drainage	£ 1,500.00			£ 1,500.00						
Surfacing Trials various treatments to inform future	£ 22,000.00			£ 14,500.00		£ 7,500.00				
reseal joints/cracks	0									
Ped crossing joint	£ -									
Flood works concrete retaining wall	0									
joint seal	£ -									
Replacement hump	£ -									
Specialist concrete repairs	£ 8,700.00							£ 7,500.00	£ 1,200.00	
2018/19 total	£ 32,200.00	£ -	£ -	£ 16,000.00	£ -	£ 7,500.00	£ -	£ 7,500.00	£ 1,200.00	£ -
	£ 32,200.00									

Priority 3	**2021-22+**									
Repair to concrete bays	£ 2,500.00							£ 2,500.00		
Resurface whole site	£ 50,000.00			£ 50,000.00						
Specialist concrete repairs	£ -									
Crossing point design and renewal	£ -									
Surfacing Trials various treatments to inform future	£ 15,000.00	£ 5,000.00	£ 5,000.00				£ 5,000.00			
Total	**£ 67,500.00**	**£ 5,000.00**	**£ 5,000.00**	**£ 50,000.00**	**£ -**	**£ -**	**£ 5,000.00**	**£ 2,500.00**	**£ -**	**£ -**
	£ 67,500.00									
Long Term	**upto 2024/25**									
Resurfacing	£ 610,000.00			£ 190,000.00	£ 190,000.00	£ 170,000.00	£ 60,000.00			
Animal/Rabbit issues	£ -	£ -						£ -		
Retexture	£ -	£ -								
		£ -	**£ -**	**£ 190,000.00**	**£ 190,000.00**	**£ 170,000.00**	**£ 60,000.00**	**£ -**	**£ -**	**£ -**
Total	£ 610,000.00									

Key

Structural Maintenance = £ 138,700.00 without longterm items

Asset Management Strategy Performance Measures

Theme		Indicator Description	Vital Sign	Frequency of reporting	Service Level to inform backlog	LTP	15-16	Context	16-17	Context	Agreed performance targets 14 Oct 2016 EDT committee 16-17	17-18	18-19	19-20	Actual 17-18	Context	Which is better?	Aim
Serviceability	Roads	Condition of Principal roads		Annual	2006-7 treatments	4.2%	2.50%		2.80%		2.80%	3.10%	3.40%	3.80%	2.55%		Lower	Slight decline
		Condition of classified non-Principal roads		Annual	2006-7 treatments		6.48%		7.69%		7.49%	8.34%	9.24%	10.12%	7.54%		Lower	Slight decline
		Condition of Unclassified roads		Annual	2006-7 treatments		17%		18%		18%	20%	21%	23%	14.60%		Lower	Slight decline
	Footways	Condition of Footways 1 - Footway Network Survey (FNS) level 4		Annual	12.50%		16.10%		12.70%		19%	22%	25%	27%	12.70%		Lower	Slight decline
		Condition of Footways 2 - FNS level 4		Annual	25%		32.70%		27.80%		36%	39%	41%	42%	25.60%		Lower	Slight decline
		Condition of Footways 3 - FNS level 4		Annual	30%		28.90%		27.90%		29%	30%	31%	32%	30.10%		Lower	Slight decline
		Condition of Footways 4 - FNS level 4		Annual	30%		29.50%		28.90%		30%	31%	32%	33%	31.60%		Lower	Slight decline
	Structures	Bridge Condition Index Score HGV		Annual	91.92		89.9		90.03%		89.3	88.8	88.2	87.8	89.99%		Higher	Slight decline
		Bridge Condition Index Score Non-HGV		Annual	88.93		90.92%		90.83%		91	90.5	90	89.5	91.02%		Higher	Slight decline
		Bridge Strengthening number of bridges requiring strengthening		Annual	2		2		2		1	0	0	0	2		Lower	Improve
	Traffic Signals	Traffic Signals controller age no more than 20 years		Annual	20 yrs.		6		5		3	0	0	0	6		Lower	Improve
	Street Lighting	% Street Lighting working as planned (lights in light)		Monthly			99.63%		99.34%		99%	99%	99%	99%	99.31%		Higher	Maintain
Customer Satisfaction	NHT Overall	KBI 01 - Overall (local)		Annual			56.2	2nd best County	56	3rd best County	56.2	56.2	56.2	56.2	54	7th best County	Higher	Maintain
		KBI 11 - Pavements & Footpaths		Annual			58.8	5th best County	59	8th best County	58.8	58.8	58.8	58.8	56	11th best County	Higher	Maintain
	NHT Walking & Cycling	KBI 13 - Cycle routes and facilities		Annual			53.8	3rd best County	52	9th best County	53.8	53.8	53.8	53.8	49	20th best County	Higher	Maintain
		KBI 15 - Rights of Way		Annual			58	17th best County	57	22nd best County	58	58	58	58	56	24th best County	Higher	Maintain
	NHT Highway Maintenance & Enforcement	KBI 23 - Condition of highways		Annual			43.6	3rd best County	40	5th best County	43.6	43.6	43.6	43.6	38	10th best County	Higher	Maintain
		KBI 24 - Highway maintenance		Annual			55.8	4th best County	53	7th best County	55.8	55.8	55.8	55.8	52	13th best County	Higher	Maintain
		KBI 25 - Street lighting		Annual			62.6	18th best County	66	9th best County	62.6	62.6	62.6	62.6	60	23th best County	Higher	Maintain
Safety		Number of people killed and seriously injured on Norfolk's roads		Monthly			369		402		369				427	Member Working Group looking at Road Safety Strategy and future performance measures	Lower	Improve
		Repudiation Rate of Highway Insurance Claims		Annual			81%		79%		81%	81%	81%	81%	81%		Higher	Maintain
		Winter gritting - % of actions completed within 3 hours	✓	Monthly					86%		100%	100%	100%	100%	85%		Higher	Maintain
		Highway Safety Inspection carried out on time		Monthly			97.76%		TBC		97.76%	97.76%	97.76%	97.76%	94.20%	* data 2017-18 not available new reporting system established, data for month April 2018 shown	Higher	Maintain
		% Priority A defects attended within response timescale (2 hours)		Monthly			96%		TBC		96%	96%	96%	96%	85%		Higher	Maintain
		% Priority B defects attended within response timescale (Up to 4 days)		Monthly			98%		TBC		98%	98%	98%	98%	87%		Higher	Maintain
Sustainability (Economic & Environment)		Street lighting – C02 reduction (tonnes) (Annual emissions)	✓	Annual			10517		10352	Target 9814 tonnes by 2020 (12.5% reduction from 2008/9 baseline)	10711	10375	9870	9814			Lower	Improve