



Lifecycle Planning and Prioritisation Strategy



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Document Information

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Author(s)	Michael Kay and Gareth Hurndall
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Checked: Name and Signature	Simon Houldsworth 
Authorised: Name and Signature	Simon Houldsworth 
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Foreword

Good asset management optimises investment by taking a robust, sustainable and long-term approach to improving asset performance, maintaining safety and reducing risk for operators and users. This approach also supports carbon reduction and climate change objectives set out in the Highway Infrastructure Asset Management Strategy.

Effective asset management therefore depends on managing each asset through its whole lifecycle and prioritising the most appropriate maintenance within the annual works programme. This requires reliable asset data, clear understanding of network condition, and an efficient maintenance plan that supports agreed levels of service and a sustainable highway network.

Lifecycle planning provides:

- an understanding of the maintenance need and cycle of the asset to maintain its performance over the whole of its life.
- a forecast of the future works and budget implications required to maintain levels of service appropriate to the network hierarchy.

Underpinned by quality inventory and condition data, lifecycle planning can provide an indicative long term forward plan of works likely to be required over the next 5, 10, 20 years, including a forecast of future budget needs.

Furthermore, through a process of condition projection modelling, the future condition of the highway infrastructure network asset can be assessed against various budget investment scenarios to secure the most appropriate and effective maintenance plan and to ascertain associated funding needs over the period of the Asset Management - forward works programme (typically 5 years).

However, undertaking all the recommended maintenance is unlikely to be affordable within current budget and resource availability and an appropriate, consistent, and repeatable prioritisation process is recommended to ensure those maintenance schemes likely to have the greatest influence on maintaining a safe,

serviceable, sustainable, accessible, and available network of highway infrastructure assets are included in the annual works programme.

Introduction

This A well-defined Lifecycle Planning and Prioritisation Strategy helps local authorities address the following challenges:

- Understanding whole-network maintenance needs, including safety, accessibility, availability, sustainability, recycling and carbon reduction.
- Managing the highway maintenance budget across all highway infrastructure assets.
- Managing stakeholder expectations across the highway network.
- Providing a transparent approach to the prioritisation and selection of highway infrastructure maintenance and replacement schemes.
- Providing a long-term understanding of future works and associated budget requirements across the highway network.
- Understanding the long-term outcomes of the maintenance decisions made each year.
- Monitoring the effectiveness of the Authority's asset management approach.

The Highways infrastructure Code of Practice provides the following recommendations for Lifecycle Planning and Asset Prioritisation:

RECOMMENDATION 13 - WHOLE LIFE / DESIGNING FOR MAINTENANCE

Authorities should take whole life costs into consideration when assessing options for maintenance, new and improved highway schemes. The future maintenance costs of such new infrastructure are therefore a prime consideration.

RECOMMENDATION 29 - LIFECYCLE PLANS

Lifecycle planning principles should be used to review the level of funding, support investment decisions and substantiate the need for appropriate and sustainable long-term investment. (HIAMG Recommendation 6).

RECOMMENDATION 30 - CROSS ASSET PRIORITIES

In developing priorities and programmes, consideration should be given to prioritising across asset groups as well as within them.

RECOMMENDATION 31 - WORKS PROGRAMMING

A prioritised forward works programme for a rolling period of three to five years should be developed and updated regularly. (HIAMG Recommendation 7).

RECOMMENDATION 32 - CARBON

The impact of highway infrastructure maintenance activities in terms of whole life carbon costs should be taken into account when determining appropriate interventions, materials and treatments.

It is against this background that a 'Lifecycle Planning and Prioritisation Strategy' is required.

Scope

The strategy sets out an asset management methodology for maintaining and replacing highway infrastructure assets in line with the Highway Infrastructure Asset Management Strategy.

This strategy aims to

- Provide a consistent, transparent and data-led approach to planned maintenance, considering whole-life asset performance.
- Optimise maintenance treatments by considering cost, performance, use, carbon, recycling and long-term sustainability.
- Develop long-term forward plans and budget forecasts to support agreed levels of service.
- Prioritise work within and across asset groups so that maintenance and replacement activity:
 - provides the most effective solution through a risk-based approach to service delivery.
 - aligns with the Council's objectives for a safe, serviceable, sustainable, available and accessible highway network.
- Set out the short, medium, and long-term objectives that the approach seeks to deliver.

Key to this strategy is a 'Lifecycle Planning and Prioritisation Framework' which serves to link lifecycle plans with the annual works programme and to make these available on a scale of granularity suitable for an effective understanding of investment strategies in the maintenance of the highway infrastructure network at all levels.

Lifecycle Planning and Prioritisation Framework

Lifecycle Plans have been aligned with condition projection modelling and with the councils' budgets and resources to support the provision of an effective 12-month Annual Works Programme, this process is shown in Figure 1 below.

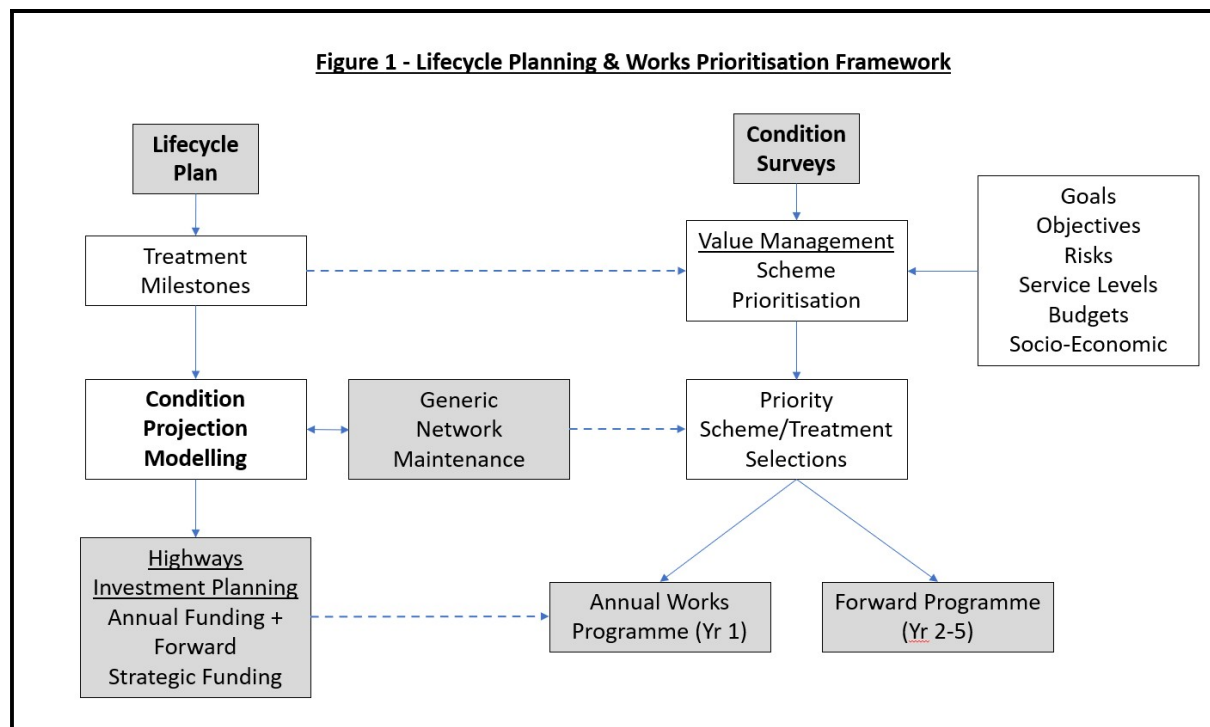


Figure 1 - Life Cycle Planning & Works Prioritisation Framework

The 'Lifecycle Plan' models the future asset maintenance interventions required to optimise the longevity of the asset in the most cost-efficient manner and to achieve optimal asset performance. The maintenance lifecycle is then applied to the process of asset condition projection modelling and tested against various funding and resource scenarios to develop a future understanding of the condition outcomes and to determine the most effective investment profile.

Reactive, Cyclical and Planned Maintenance

Lifecycle planning and works prioritisation supports the following principles.

Safety	Safe for all users, meets requirements of the Highways Act 1980: S56/58.
Availability	Network available to all users 24/7.
Serviceability	Designed and constructed to enable future maintenance as against replacement, where practicable.
Accessibility	Meets the requirements of the Disability Act.
Sustainability	Subject to maintenance policies and practices that promote the use of recycling, minimise the use of scarce materials, consider the environment and reduce the council's carbon footprint.

The Council applies three complementary approaches to highway asset maintenance: reactive, cyclical and planned.

Reactive Approach

Given the scale and complexity of the highway network, unforeseen asset failures will occur. Reactive maintenance ensures that safety defects and urgent failures are identified, prioritised and repaired in line with risk-based response times.

Regular safety inspections and reactive maintenance works support the Council's service levels by addressing unplanned safety defects, potholes, obstructions and ancillary asset failures.

Although reactive maintenance is primarily response-led, defect priority and repair timescales are determined by the likelihood and consequence of risk to highway users.

- 2 hours: emergency/immediate safety response
- 24 hours: urgent safety response
- 6 days: according to the likelihood and consequence arising from the defect.
- 30 days: according to the likelihood and consequence arising from the defect.
- 99 days: according to the likelihood and consequence arising from the defect.

Cyclical Approach

Cyclical inspections and maintenance are undertaken at defined intervals where they reduce the need for reactive repairs, support planned maintenance, or improve network availability and accessibility.

They include such operations (as shown below), which are undertaken on a predetermined time frequency.

- Gully Emptying
- Road Sweeping
- Sign Cleaning

In addition, the following cyclical maintenance services are also provided by ancillary service groups in support of highway infrastructure asset safety and serviceability:

- Weed Control
- Grass Cutting
- Tree Pruning
- Painting

Cyclical maintenance operations are based on;

- Manufacturers Recommendations
- Legislation
- Best Practice
- Guarantee

Planned Approach

Planned maintenance is informed by condition surveys, inspections, asset deterioration knowledge and available treatment options. It supports timely interventions that maintain or extend asset life.

A planned approach provides the greatest opportunity to manage whole-life cost, reduce risk and improve service outcomes;

- reduces the risk of component failure.
- promotes efficiency.
- improves safety and reduces user risk.
- supports levels of service and performance.
- reduces carbon and enhances sustainability.
- reduces overall costs.
- reduces user delays and promotes network availability and accessibility.
- extends the serviceable life of the asset prior to its eventual replacement.
- enables effective works planning and procurement.

This approach provides a cost-effective and efficient means of delivering a safe, available, serviceable, accessible and sustainable highway infrastructure network.

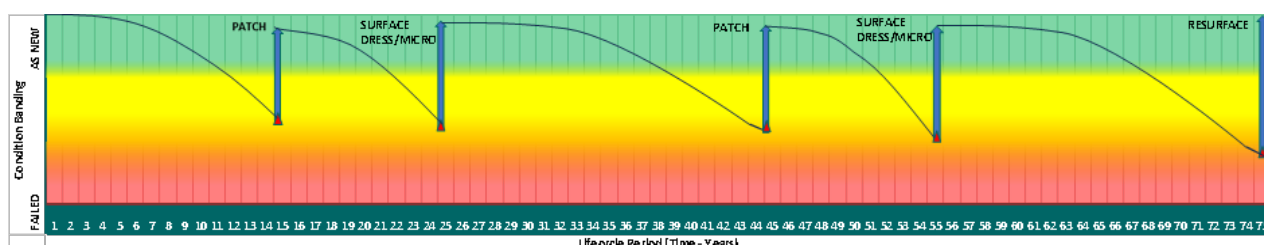
Life Cycle Model

An asset lifecycle model covers the period from installation through operation, maintenance and eventual renewal, replacement, removal or decommissioning.

Lifecycle planning is the continuous process of managing an asset throughout its service life. It supports long-term planning of maintenance and replacement interventions to optimise performance and extend serviceable life where appropriate.

Lifecycle models reflect asset type, construction, environment and use. They identify appropriate maintenance milestones and provide an evidence base for investment planning and service priorities.

A typical carriageway lifecycle plan is illustrated below. It shows how a carriageway may be maintained through routine and planned interventions over time. Appendix 1 provides an example of treatment milestones.



Lifecycle planning is an indicative works programming tool. Used with condition survey analysis and projection modelling, it helps review annual programmes and estimate long-term investment needs under different budget scenarios.

The model can also support funding decisions by demonstrating the investment required to maintain steady-state condition or improve asset condition over time.

Lifecycle Planning

- advises on what should be done to achieve / maintain a steady condition state of performance (i.e., a network in a stable condition).
- may be used to determine the minimum level of maintenance or asset replacement that should be undertaken to maintain the asset at the required service level.
- indicates the annual budget required to sustain the agreed levels of service.

For most highway infrastructure assets, end-of-life disposal is limited. However, removal should be considered where assets are no longer required, particularly where this reduces future maintenance liabilities and carbon impact.

Highway Infrastructure assets fall into two distinct types, 'finite' and 'infinite'.

Finite assets are those with limited options for extending their life, and that once they have been fully used, they require replacement.

- Finite Assets;
 - Road markings and signs
 - Streetlights
 - Traffic Signals
 - Street Furniture
 - Vehicle Restraint Systems

Infinite assets are those which can be maintained 'ad infinitum', essentially forevermore, provided the appropriate lifecycle plans and the associated reactive and planned maintenance regimes are followed.

- Infinite Assets;
 - Carriageways, Footways & Cycleways
 - Structures - Bridges, subways, retaining walls.
 - Drainage

Lifecycle Management

The components for the management of an asset's lifecycle can be divided into three distinct areas.

Governance

Encompasses all the decision making and project management for the asset and it extends over the whole life of the asset, ensuring the asset is effective in meeting stakeholder and service level needs and understanding the associated benefits and costs. Good governance allows the Council to maximise the value of their asset and is in many ways the most important aspect of Lifecycle Management.

Design

Prior to commissioning the creation or installation of any highway asset, the Council will consider the effective long-term maintenance, replacement, and disposal of the asset at the end of its serviceable life. 'Design' provides the key stage in ensuring assets are compatible with the Council's aims in creating a safe, available, serviceable, accessible, and sustainable highway network that will not be an undue burden on those responsible for its ongoing maintenance. The Council has adopted a policy of a sustainable design for all highway assets to maximise the life of the asset whilst minimising the number of maintenance interventions (e.g., LED street lighting) and to take account of environmental impacts and carbon reduction measures.

Operations

The Council will effectively plan, fund, and facilitate the maintenance treatments and replacements of highways assets in a strategic way to maximise the service life of all assets within the constraints of annual budgets and resource allocations.

Lifecycle Planning

Whilst lifecycle planning may potentially be applied to all highway infrastructure assets, there is a case to apply the Council's limited staff and operational resources to those assets of higher value and risk which would provide the greatest benefit from such an exercise and for which good supporting data is available.

The use of available systems, toolkits, and data to deliver effective lifecycle planning is based on a sound approach to the provision of:

- inventory
- maintenance hierarchy
- condition / inventory survey regimes
- data management
- treatment
 - options
 - costs
- service life

Inventory

A robust inventory covering the Council's strategic highway infrastructure assets, including a programme for the effective update of key inventory data is required to provide effective lifecycle planning for the highway infrastructure assets that the Council has stewardship over.

Maintenance Hierarchy

The highway network is defined in terms of its 'maintenance hierarchy' and this approach is necessary to provide granularity in treatment choice and to be effective in spreading the budget to ensure optimal cost benefit is achieved across the network. Maintenance hierarchy reflects the importance, risk and usage of the highway which in turn supports priority maintenance needs, treatment choices and their effectiveness and longevity. See '*Maintenance Hierarchy Strategy*' and '*Resilient Network Strategy*' as defined in the HIAMP in line with the recommendations of the Code of Practice 2016.

Survey Regimes

The condition of highway infrastructure assets should be recorded in a regular, repeatable, and consistent way using inspection and survey techniques and standards that are nationally recognised for Local Highway Authority assets. Such surveys provide the basis for evaluating the stage that an asset has reached in its maintenance lifecycle and for determining the treatment that may be applied to prolong the service life of the asset.

Data Management

An effective 'Data Management Strategy' is required for the management of the data that the Council collects and for the Asset Management systems in place for managing the assets.

See "Data Management Strategy" as defined in the HIAMS in line with the recommendations of the Code of Practice 2016.

Treatments

Lifecycle plans rely on standard treatment options that are appropriate to asset type, hierarchy, use, risk and desired performance. Each option should be assessed against cost, service life, sustainability, carbon impact and suitability for the asset.

Treatment Options

Maintenance scenarios compare treatment cycles over a defined asset life. These scenarios are developed by highway engineers and may be used in modelling to identify the most effective lifecycle solution for each asset hierarchy

The following management and operational considerations are applied in the execution of this process:

- Cost
- Performance
- Longevity
- Carbon footprint

- Carbon consumption
- Budgets
- Service life
- Sustainability of solution
- Level of Service (varies with hierarchy).
- Reduced interventions...less disruption
- Less traffic management...less delays
- Minimising diversions

Treatment Costs

Treatment costs may be assessed over an appropriate evaluation period, for example 30 years, using Net Present Value where suitable. This enables comparison of options on a consistent whole-life cost basis.

- NPV is the primary criterion for deciding the best course of action to be applied and can be justified. The cheaper the NPV, the better the lifecycle option provides 'Value for Money'.
- NPV calculations are based on a discount rate of 'x' % (Current Interest Rate) and an interest rate of 'y' %. (Current Inflation Rate). This will be reviewed for future modelling with information from the Council's accountants.

NB - the 'Discount Rate' in an NPV calculation is a percentage value based upon a rate of return expected from investing the money elsewhere.

Treatment Service Life

Service life is the expected period between construction, treatment or renewal and the next intervention and is ideally based on best practice, local evidence, historic performance and traffic or environmental conditions.

In terms of highways, surface course replacement is one of the key drivers in this process. Typically, if a surface is very durable then the correct time to review the

surface would be when the skid resistance has greatly diminished (i.e., polishing), and depending on the traffic loading this can be 15+ years. However, in an urban environment the surface performance/durability time can be significantly reduced and hence will need treatment more frequently.

To reflect this possible variation in life span within different hierarchies, the LCP treatment option model may be adapted to apply a range of treatment life spans for each hierarchy, an appropriate treatment milestone point within this serviceable treatment life window may then be applied to the model calculations reflective of maintenance hierarchy.

A constructive by-product of lifecycle planning modelling is its use in the 'Condition Projection' modelling process.

Condition Projection Modelling

Condition projection modelling provides an estimate or forecast of the future condition of an asset based on a study of past and current deterioration trends, reflective of the following criteria...

- Condition
- Location / Environment
- Use

Through condition projection modelling and applying the LCP maintenance solutions aligned to variable budget scenarios, the most effective maintenance plan may be determined to provide a steady state condition or one that gives rise to improving asset condition performance.

‘Condition Projection’ is complementary to lifecycle planning in that it takes into consideration the current condition of each asset, applies a funding scenario, applies a treatment correction to those assets where the most benefit can be gained and it projects the future outcome. This process enables investment scenarios and outcomes to be considered in the light of the Councils’ current goals and objectives as well as the budget limitations they may have.

- **Life Cycle Planning** - provides a cost-effective modelling solution to determine the most appropriate treatments to apply to a network or asset once in a steady state. Prior to achieving this steady state, LCP provides indicative treatment milestones for further consideration of condition and funding needs.
- **Condition Projection Modelling** - provides a forecast of future condition through applying the maintenance solutions reflective of lifecycle planning modelling aligned variable budget scenarios that can be applied to the network in any condition to determine the most effective maintenance plan that gives rise to improving asset condition performance.

Highway Investment Planning Scenarios

Lifecycle Planning and Condition Projection modelling both serve to explore and consolidate the financial and resource investment requirements needed to promote asset stability and improvement.

From a works maintenance management perspective there are two fundamental directions that may be followed.

- Do nothing.
- Do something.

If a 'do nothing' scenario is adopted, the asset will gradually lose its surface and structural integrity and start to decay, this strategy is acceptable providing the asset remains in a serviceable condition for a finite period of its life, and up to the point of condition transition as given by lifecycle planning.

Once past the 'do nothing' point, the 'do something' option indicates that a treatment should be applied to retain the steady state condition or to secure asset condition improvement.

The two treatment components of a 'do something' scenario are.

- Preventative
- Structural

On the highway, a preventative treatment may take the form of road patching and surface dressing to protect and enhance the surface integrity of the asset, whilst a structural process could be in the form of a structural resurfacing treatment which restores the life to the asset close to its 'as new' condition.

Whatever maintenance scenario is chosen, there is a cost in terms of changing condition and financial investment that needs to be apportioned to all parts of the network based on maintenance hierarchy to meet the required outcomes. The Council's approach to asset performance, levels of service, the reduction in maintenance interventions and carbon savings are also considered.

Forward Plans

The outcome from life cycle planning and condition projection modelling when linked with condition survey data analysis is the development of current and future works programmes. A works programme for the current/next year is based on the maintenance priority needs through condition surveys, and it can be further checked against the maintenance milestones denoted through LCP with a high level of confidence of selecting the most appropriate schemes and treatments at the right time. Forward maintenance plans for future years can also be generated via the same process however as the years progress these tend to reduce in confidence and be more indicative in nature and they can be superseded by changing network condition at that time, in particular reflective of annual winter degradation performance or emergency events, e.g., flooding, excessive heat, etc.

Forward plans can be effectively used to understand the indicative investment requirements of assets / asset groups and assist in understanding budget planning and resource implications. The council will promote the future development of long-term forward plans based on the outcomes of lifecycle planning, condition projection, value management modelling, and investment scenarios to provide an understanding of the likely work and the future budgetary requirements of each asset / asset group.

Forward plans provide an indication of the works required to maintain the asset, returning it from its current condition to a validated and costed lifecycle plan allowing the Council to plan its future maintenance strategies based on budget, hierarchy and risk, and to make well-informed decisions for the most effective maintenance and replacement of its assets.

Asset Scheme Prioritisation

Asset scheme prioritisation determines which maintenance and replacement schemes should be progressed and helps to identify the most cost-effective and performance-effective solutions for stakeholders.

The scheme prioritisation methodology provides a focus for determining and delivering the right scheme, at the right time, and in the right place.

It involves:

- developing criteria that define the risk probability and the consequences of asset failure.
- establishing risk tolerance levels.
- applying the resulting guidelines to rank and prioritise the maintenance and replacement schemes derived from the forward plans reflective of lifecycle planning / condition projection modelling.

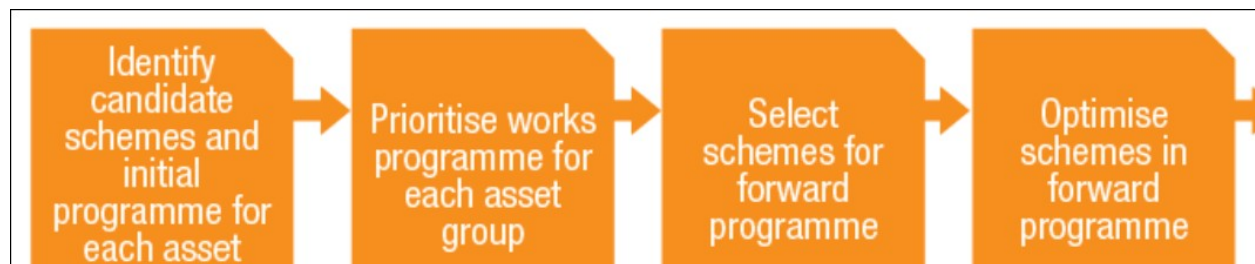
Prioritisation supports the annual works programme by rating schemes against risk, service impact, value for money and wider network benefits. This helps manage maintenance backlogs, service level gaps and performance risks.

Given budget constraints, reliable condition and deterioration data is essential to allocate financial and engineering resources consistently, rationally and transparently.

Where funding is insufficient to deliver a fully funded lifecycle programme or remove the maintenance backlog, available budgets should be targeted to uphold the Council's highway duties, manage identified risks, maintain service levels and reduce deterioration. This is achieved through Value Management, which prioritises schemes to maximise risk reduction and minimise whole-life cost.

The methods used to optimise works programmes are developed from the best practice approaches from the 'Well Manged Highway Infrastructure - A Code of Practice 2016', and from the 'Highway Infrastructure Asset Management Guidance 2014' and also through discussions within National Forums and with other Local Highway Authorities.

The 'Highway Infrastructure Asset Management Guidance' document uses the procedure shown in Figure 2 below to describe the priority works programme development process.



**Figure 2 - Highway Infrastructure Asset Management Guidance 2014
HMEP / UKRLG Developing a Programme of Works**

The process of 'Value Management' is an essential part of the scheme optimisation and prioritisation model for developing the 'Forward Works Programme' and from it for selecting the priority schemes for taking into the Council's asset management 'Annual Works Programme'.

Multi-criteria Value Management techniques balance prioritisation criteria and weightings against asset attributes, treatment options and service objectives.

The scores and weightings used will be reviewed annually to take into account changing requirements and priorities for the Council and the changing condition of the highway's asset reflective of ongoing and progressive deterioration.

The following multi-criteria components provide examples of scheme prioritisation that may be considered.

- **Highway Maintenance & Improvement Issues** – condition data available for each asset is processed and analysed to identify those schemes in need of maintenance and improvement.
- **Network Hierarchy** - greater priority is given to roads and key assets on roads that have the greatest risk, usage or need, reflective of the highway network maintenance hierarchy, and this is balanced against the need to maintain all the assets across the network.
- **Resilient Network** – roads in need of maintenance on the resilient network will be allocated priority consideration for treatment in order to preserve them in a safe and serviceable condition in the event of extreme weather conditions or in support of maintaining critical asset infrastructure.
- **Risk** – higher priority will be given to schemes that pose the greatest risk to public safety.
- **Value for Money** – a whole life cost approach will be used to determine the cost benefit aspects of priority scheme and treatment selection to promote the selection of the right treatments at the right time in order to produce cost effective solutions and programmes of work.
- **Network/Traffic Management** - works will be programmed to minimise disruption to users and to maximise community benefits by combining schemes for different assets together.
- **Socio-Economic & Environmental** – consideration of the benefits and impact of the works on local and regional businesses, vulnerable communities, hospitals, schools, public transport, sustainability, environmental impacts, and carbon footprint.

Each component is modelled and scored in the 'Value Management' prioritisation process to provide an overall VM score for each scheme to reflect the priority needs of the asset.

Multi-Asset Scheme Prioritisation

A multi-asset approach can improve operational efficiency, reduce disruption and deliver better value by coordinating maintenance across asset groups.

This approach distributes resources by considering risk, failure consequence, availability and network benefit across multiple asset classes.

Multi-asset scheme prioritisation combines the following approaches.

- **Cross-asset trade-off** - a decision-making process where funding and engineering resources from one asset class are transferred to another asset class to provide for its priority maintenance in a timely manner. For example, a road maintenance scheme may be deferred with its funding allocated to a bridge safety maintenance scheme which has been identified for priority maintenance on account unavoidable maintenance need, or unforeseen occurrence of impairment, e.g., bridge strike.
- **Cross-asset allocation** - a decision-making process of recognising and adopting the benefits of combined multiple-asset maintenance by integrating one asset class with an ancillary asset class in order to provide for a timely and efficient maintenance package.

This process uses;

- Multi-criteria decision analysis to consider combined factors of risk, safety, and operational efficiencies.
- Value Management to look at the overall cost benefits, priority needs and feasibility of combining dissimilar works programmes into a single works entity to provide economies of scale, engineering resource efficiencies whilst minimising traffic management, disruption, and delays.

All decisions relating to the implementation of multi-asset scheme prioritisation should be documented to demonstrate transparency and credibility, this is particularly important in the case of 'cross-asset trade-offs' when schemes may be deferred, and the funding is allocated to other priority needs.

Annual Works Programme

The annual works programme is the funded priority schedule of schemes for a given year. It is driven primarily by condition and refined through risk, value, deliverability and socio-economic considerations.

The annual works programme supports the objectives of the Council's Corporate Plan into detailed supporting strategies for service delivery, and it takes account of and is consistent with the Council's service budget allocations for asset maintenance.

Forward Programme

The Asset Scheme Prioritisation process also produces a Forward Programme for each asset group, normally covering the following two to five years.

The Forward Programme is an 'indicative' list of projects which has the benefit of bringing into the process...

- the maintenance milestones generated through the process of lifecycle planning in order to consider bringing forward ancillary schemes in the proximity of the main scheme to support economies of scale and engineering and financial efficiencies.
- a knowledge and appreciation of maintenance needs and associated funding requirements over the coming years.
- a consideration of the risks associated with future maintenance needs and the consequences of not delivering the scheme.
- expectations management of Elected Members and stakeholders.
- an appreciation of the engineering design and construction resources required to support the programme over the coming years.
- the ability to coordinate planned works programmes with external organisations, eg, statutory utility, Network Rail, etc, to avoid engineering conflicts and to promote reliable service delivery protocols.

Schemes identified for years two to five may have a reasonable level of confidence, but the programme should remain flexible to reflect updated condition data, severe weather impacts, flooding, heat events or other emergency deterioration.

Longer-term programmes, extending up to ten years or more, may be developed through lifecycle planning and condition projection. These should be treated as indicative and reassessed as new survey data becomes available.

The rationale behind the strategic development of the 'Annual Works Programme' and the 'Forward Programme' should be communicated to elected members and senior decision makers to secure their understanding and buy-in of the process and to enable them to defend any future stakeholder challenges in terms of priority scheme delivery.

Action Plan - Lifecycle Planning and Prioritisation

The Action Plan identifies further measures required to improve lifecycle planning and prioritisation across highway infrastructure assets.

- improve the effectiveness of life cycle planning and works prioritisation extended to carriageways, footways, cycleways, traffic signals and street lighting.
- develop the use of life cycle planning and prioritisation for the remaining highway infrastructure assets.
- implement more effective cross asset prioritisation to support economies of scale, best value and prevent further deterioration.

The action plan is split into short, medium, and long-term objectives.

Short Term Objectives

- Consolidate inventory and condition data for the key infrastructure assets.
- Develop annual and forward works programmes for the key infrastructure assets based on a lifecycle considerations and risk-based approach to generate annual maintenance investment costs.

Medium Term Objectives

- Develop lifecycle plans / condition projection modelling for all assets as applicable.
- Seek member approval of a 'Value Management' approach to asset maintenance prioritisation.
- Investigate the potential for cross asset prioritisation using a simple 'trade off' approach.

Long Term Objectives

- Develop prioritised maintenance regimes for all assets.
- Develop long term forward plans for all assets.
- Embed cross asset prioritisation based on 'Value Management'.

Summary

The Lifecycle Planning and Prioritisation Strategy provides a consistent framework for managing highway infrastructure assets at strategic, tactical and operational levels. It links service levels, performance measures, risk, whole-life cost and stakeholder needs to support informed maintenance decisions.

Effective implementation will support the annual works programme and forward programme, improve transparency in scheme selection, and align maintenance investment with the Council's Highway Infrastructure Asset Management Policy and Strategy.

Appendix 1: Life Cycle Plan (Example: Treatment Milestones)

Network Length	300,288 km							
Network Area	1,592,586 sq m							
Lifecycle Plan	Treatment Plan	Unit Rate (£/sq m)	Treatment Life (Yrs)	Σ Service Life (Yrs)				
New/As New	Implementation Year (New Surface)	£35.00	15	15				
Treatment 1	Patch @ 10% Network Area	£18.00	10	25				
Treatment 2	Surface Dress / Micro Surface	£12.00	20	45				
Treatment 3	Patch @ 10% Network Area	£18.00	10	55				
Treatment 4	Surface Dress / Micro Surface	£12.00	20	75				
	Lifecycle Plan Duration		75					
On Average					Annual Treatment Length (km)	Annual Treatment Area (sq m)	Annual Spend (£)	
1/75 th of the network should be resurfaced 'As New' every year					4,004	21,234	£743,190	
1/75 th of the network should be treated with Treatment 1 every year					4,004	2,123	£38,214	
1/75 th of the network should be treated with Treatment 2 every year					4,004	21,234	£254,808	
1/75 th of the network should be treated with Treatment 3 every year					4,004	2,123	£38,214	
1/75 th of the network should be treated with Treatment 4 every year					4,004	21,234	£254,808	
Total Annual Budget Required =							£1,329,234	