

PUBLIC



HIGHWAY INFRASTRUCTURE ASSET MANAGEMENT PLAN FOR HIGHWAYS

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AN ELEMENT OF THE HIGHWAY INFRASTRUCTURE
ASSET MANAGEMENT SYSTEM

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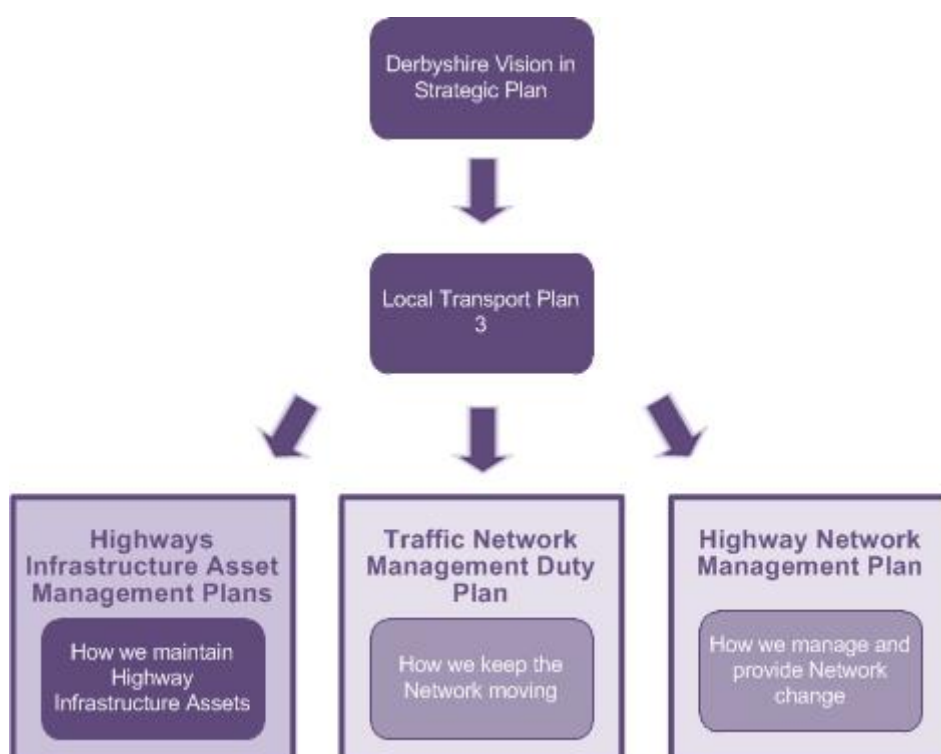
1. INTRODUCTION

This document provides the technical details that supports the Highways Infrastructure Asset Management Strategy and Plan and forms part of the Highways Infrastructure Asset Management suite of documents. It is a working document that provides the processes and information used internally by staff undertaking roles in delivery of service.

This document will recognise a number of Development Areas where Derbyshire has recognised potential improvements to the service they deliver. These development areas are aspirations only and will be reviewed on an annual basis to assess whether they are deliverable from a financial and resource perspective. A breakdown of these Development Areas can be found in [Appendix A](#).

The following figure shows this documents context with other key documents in how the network is managed, maintained and changed:

Diagram 1: Plans and Policies Framework



2. SCOPE

This document covers the carriageways, footways, kerbs, road markings, road studs, highway fences and verges on the Derbyshire highway network. However, public rights of way are covered in more detail in the Rights of Way Charter and the Rights of Way Improvement Plan for Derbyshire and the HIAM Rights of Way.

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3. ASSET CAUSES OF DETERIORATION

The main causes of carriageway/footway/kerb/road markings/road stud deterioration are itemised below:

Table 1: Assets and causes of deterioration

a. Carriageways/Footways/Cycleways

Cause of Deterioration	Description	Typical Defects
Wear and tear/ageing	Action of vehicular traffic and weathering	Loss of colouration, binder becoming brittle leading to surface aggregate loss and finally to surface failure
Utility installations/trenching	Loss of structural integrity, settlement, or unevenness due to poor reinstatement	Local settlement, sunken reinstatements and joint failure leading to major cracking and potholing
Constant vehicle loading in the same line on the carriageway	Plastic deformation in bituminous layers	Wheel track rutting – moderate to deep depressions with mounding to either side typically 300mm to 400mm wide
Water ingress	Saturation of subgrade and subbase, in extreme cases causing pumping in surfacing layers	Wash out of fines from formation layers, voids, cracking, crazing, potholes
Edge deterioration	Non-kerbed carriageways offer little or no edge restraint	Rutting in verges adjacent to carriageway, cracking and loss of material
Spalling in cementitious materials	Surface breaks up in layers or small pieces	Potholes in concrete, exposed joints
Differential settlement in concrete slab	Typically a concrete slab will fail and sink below the level of the adjacent bay	Stepping between slabs, exposed and damaged joints
Loss of skid resistance	Polishing of surface course by vehicle action, loss of aggregate, fattening up of bitumen	Slippery surface with low resistance to skidding/low texture depth.
Depressions and/or inadequate drainage	Ponding	Areas of standing water on the carriageway leading to accidents and deterioration of the surface course
Oxidisation of bitumen causes it to become brittle, resulting in loss of aggregate from the surface course	Fretting of bituminous materials	Potholes, loose material on the surface, loss of skid resistance
Damage by vegetation	Tree roots and weeds causing uneven surface	Cracked and depressed flags. Linear cracking of bituminous layers along root line, leading to potholes and surface failure. Overgrowth of weeds on top of bituminous surfacing

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Structural landslips, sinkholes and subsidence	Provided in the HIAM Part 2 for Structures	Provided in the HIAM Part 2 for Structures
Theft	Theft of manhole and gully covers and stone flags	Missing manhole and gully covers and stone flags
Underuse	Carriageways which have very low traffic volumes	Weed growth, verge encroachment, deterioration of surface course as soil and detritus accumulates

b. Road Markings and Studs

Cause of Deterioration	Description	Typical Defects
Wear/ageing road markings	Action of vehicular traffic and weathering	Markings become faint and loose reflectivity
Utility installations/trenching	Excavation by utilities with poor reinstatement/no replacement of lines/studs	Loss of marking or stud
Loss of skid resistance	Action of vehicular traffic	Road markings can become slippery for cyclists and motor cyclists
Road stud wear	Action of vehicular traffic and weathering	Loss or damage to stud
Structural landslips, sinkholes and subsidence	Provided in the HIAM Part 2 for Structures	Provided in the HIAM Part 2 for Structures
Theft	Theft of road studs	Missing road studs
Loss of aggregate/thermoplastic in coloured surfacings	Action of vehicular traffic, weathering	Bare patches, loss of colour

c. Kerbs

Cause of Deterioration	Description	Typical Defects
Vehicle/accident impact	Severely damaged kerbs in a specific location	Broken or sunken kerbs
Constant vehicle override	Failing concrete kerb race	Kerb misalignment vertically or horizontally
Wear and tear and ageing	Ageing and general wear and tear can cause deterioration of kerbs	Spalling and loss of aggregate in concrete kerbs. Brittleness in plastic kerbs
Utility installations	Loss of structural integrity, settlement, or unevenness due to poor reinstatement	Local settlement broken or badly chipped kerbs
Damage by vegetation	Tree roots and weeds causing kerb lines to be uneven	Misaligned or sunken kerbs, leading to potholes on footways and surface failure. Overgrowth of weeds on top of kerbs
Structural landslips, sinkholes and subsidence	Provided in the HIAM Part 2 for Structures	Provided in the HIAM Part 2 for Structures
Theft	Theft of kerbstones	Missing kerbstones

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d. Grass Verges

Cause of Deterioration	Description	Typical Defects
Constant vehicle override	Rutting of the verge below the level of the carriageway	Edge deterioration and excess mud
Structural landslips, sinkholes and subsidence	Provided in the HIAM Part 2 for Structures	Provided in the HIAM Part 2 for Structures
Damaged by vegetation/infestation	Verges overgrown	Verges overgrown leading to obscured visibility

4. NATIONAL/LOCAL GUIDANCE AND RELATED DOCUMENTS

The maintenance of the highway is governed by a series of national/local documents and guidance including:

- [Well-managed Highway Infrastructure: A Code of Practice 2016](#)
- [DFT Potholes A Repair Guide March 2019](#)
- [HMEP: The Potholes Review \(first published by HMEP in April 2012\) and subsequent associated guidance](#)
- [Derbyshire County Council Highway Infrastructure Assets Safety Inspection Manual](#)
- [Derbyshire County Council Reactive Maintenance Teams Operational Manual](#)
- [Highway Sector Scheme 13 Particular Requirements for the Application of ISO 9001:2015 for the Supply and Application of Surface Treatments to Road Surfaces](#)
- [Road Note 39](#)
- [Design Manual for Roads and Bridges](#)
- [Manual of Contract Documents for Highway Works - Volume 1](#)

These documents are stored on the Derbyshire website, relevant internet site for external documents and EDRM. Links are provided above.

This document is a live document that will be reviewed biennially or whenever a significant change is required to any of the processes or procedures documented within it.

5. LEVELS OF SERVICE AND CRITICAL ASSET IDENTIFICATION

The Highways Infrastructure Asset Management Policy, Strategy and Plan have developed and documented the overarching Levels of Service derived from the authority's statutory duties, the national and regional guidance, the management and mitigation of risk both to the service user and the authority and the volume and type of traffic using the network

The Levels of Service that define the Council's approach to the management of the highway assets have been defined against the Network Hierarchy and the Resilient Network. These can be found online [here](#). There are two levels of service in regards to safety on the network due to budgetary constraints. Levels of Service will be reviewed and amended regularly to take into account the budgetary position. The critical assets are defined as those on the resilient network. The table below shows how the two levels of service relate to the network levels.

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Table 2: Carriageways and on-road cycleways assets and levels of service

	Resilient Network and Critical Assets (9% of total network) Level of Service 1 Safety + Serviceability + Sustainability + Customer Service	Network Hierarchies 1 to 7 inclusive (91% of total network) Level of Service 2 Provision of safety related issues and Customer Service only
Objective	Comply with statutory obligations and to provide Network Safety and customer service RN to be prioritised to ensure availability and minimise costs where budgets allow	Comply with statutory obligations and to provide Network Safety and customer service
Standard	Comply with Code of Practice and apply asset management techniques to optimise whole life costs.	Comply with Code of Practice and apply asset management techniques to optimise whole life costs.
Impact/ Risks/ What it means	<p>Programme of inspections and determination of condition.</p> <p>Lifecycle planning leading to 3-10 year forward programme with prioritised annual programming.</p> <p>Predominantly reactive maintenance Minimal intervention to prevent asset deterioration</p> <p>Safety inspections and identified safety defects prioritised according to risk based approach.</p> <p>Likely increase in non-safety defects with potential for increase in third party insurance claims.</p> <p>A total of 99.86% of the resilient network is salted. This includes: Primary routes: 98.2%, Secondary routes: 0.76% Salted externally: 0.89%</p>	<p>Programme of inspections and determination of condition</p> <p>Lifecycle planning leading to 3-10 year forward programme with prioritised annual programming.</p> <p>Predominantly reactive maintenance Minimal intervention to prevent asset deterioration</p> <p>Safety inspections and identified safety defects prioritised according to risk based approach.</p> <p>Likely increase in non-safety defects with potential for increase in third party insurance claims.</p> <p>A total of 50.9% the network hierarchy is salted. This includes: Primary routes: 31.3% Secondary Routes: 15% Tertiary Routes: 4.5% Salted externally: 0.1%</p>

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Table 3: Footways and segregated cycleways assets and levels of service

	Footway Hierarchy 1 and 1A (9% of total network) Level of Service 1 Safety + Serviceability + Sustainability + Customer Service	Network Hierarchies 1 to 7 inclusive (91% of total network) Level of Service 2 Provision of safety related issues and Customer Service only
Objective	Comply with statutory obligations and to provide Network Safety and customer service RN and 1/1a to be prioritised to ensure availability and minimise costs where budgets allow	Comply with statutory obligations and to provide Network Safety and customer service
Standard	Comply with Code of Practice and apply asset management techniques to optimise whole life costs.	Comply with Code of Practice and apply asset management techniques to optimise whole life costs.
Impact/ Risks/ What it means	<p>Programme of inspections and determination of condition</p> <p>Lifecycle planning leading to 3-10 year forward programme with prioritised annual programming.</p> <p>Predominantly reactive maintenance Minimal intervention to prevent asset deterioration</p> <p>Safety inspections and identified safety defects prioritised according to risk based approach.</p> <p>Officer observations and all other non-safety repair requests risk assessed and where possible added to the programme to be dealt with in accordance with the timescales set out in the HIAMP.</p> <p>Reactive salting only for winter service.</p>	<p>Programme of inspections and determination of condition</p> <p>Lifecycle planning leading to 3-10 year forward programme with prioritised annual programming.</p> <p>Predominantly reactive maintenance Minimal intervention to prevent asset deterioration</p> <p>Safety inspections and identified safety defects prioritised according to risk based approach.</p> <p>Likely increase in non-safety defects with potential for increase in third party insurance claims.</p>

Adopted Cycleways Assets and Levels of Service

Adopted cycleways will adopt the level of service associated with the asset they sit on. For example, if the cycleway is on the carriageway it will have the same levels of service associated with carriageways. See [Table 2](#).

Service Strips Levels of Service

Service strips will be maintained to the standard and type that they currently are. For example, if they are grass they will remain grass.

Table 4: Kerbs/road markings/road studs assets and levels of services

	Resilient Network and Critical Assets (9% of total network) Level of Service 1 Safety + Serviceability + Sustainability + Customer Service	Network Hierarchies 1 to 7 inclusive (91% of total network) Level of Service 2 Provision of safety related issues and Customer Service only
Objective	<p>Comply with statutory obligations and to provide Network Safety and customer service</p> <p>RN to be prioritised to ensure availability and minimise costs where budgets allow</p>	<p>Comply with statutory obligations and to provide Network Safety and customer service</p>
Standard	<p>Comply with Code of Practice and apply asset management techniques to optimise whole life costs.</p>	<p>Provision of reactive based approach to maintenance only.</p>
Impact/Risks/What it means	<p>Safety inspections and identified safety defects prioritised according to risk based approach.</p> <p>Road Markings: Officer observations and all other non-safety repair requests risk assessed and where possible added to the programme to be dealt with in accordance with the timescales set out in the HIAMP.</p> <p>Road Studs/Kerbs: Comply with statutory obligations and to provide Network Safety. Predominantly reactive maintenance with only safety issues addressed</p> <p>Likely increase in non-safety defects with potential for increase in third party insurance claims</p>	<p>Programme of inspections and determination of condition</p> <p>Lifecycle planning leading to 3-10 year forward programme with prioritised annual programming.</p> <p>Predominantly reactive maintenance Minimal intervention to prevent asset deterioration</p> <p>Safety inspections and identified safety defects prioritised according to risk based approach.</p> <p>Likely increase in non-safety defects with potential for increase in third party insurance claims.</p>

DEVELOPMENT AREA 1: Service Level Agreement

Most grass verges are maintained by district councils on behalf of Derbyshire agency agreements. Service Level Agreements to be developed with agents outlining expected levels of service.

6. IDENTIFICATION OF NEW ASSETS – DATA CAPTURE

The following table highlights the ongoing process with regard to identifying new assets:

Table 5: Process for identifying new assets

Asset Type	Resilient Network & Critical Assets Level of Service 1	Network Hierarchy 1 – 7 inclusive Level of Service 2
Carriageway/Footway	See Development Area 2,4,5 and 6	See Development Area 3,4,5 and 6
Kerbs	Derbyshire are not going to be doing an initial video capture for kerbs as we have about 95% of the network mapped already.	Derbyshire are not going to be doing an initial video capture for kerbs as we have about 95% of the network mapped already.
Road Markings	See Development Area 2 and this data is also held in Park Map	See Development Area 3 and this data is also held in Park Map
Road Studs	See Development Area 2	See Development Area 3
Rural Paths	New assets are identified by GIS asset capture.	New assets are identified by GIS asset capture.
Verges	There is a need to capture this asset information. Strategy and Network Planning will meet with agencies to collect this data. Currently we have some agency information but others hold their data remotely. Prioritisation of data capture will be on the Resilient Network. The data capture needs to also include weed killing and a memo of understanding for all visibility splays.	There is a need to capture this asset information. Strategy and Network Planning will meet with agencies to collect this data. Currently we have some agency information but others hold their data remotely. Prioritisation of data capture will be on the Resilient Network. The data capture needs to also include weed killing and a memo of understanding for all visibility splays.

7. INVENTORY UPDATE AND ASSET CAPTURE

DEVELOPMENT AREA 2: Update Inventory on Resilient Network

Complete driven asset capture survey of resilient network by end of 2021 (Highway Strategy). The process is in [Appendix B](#).

DEVELOPMENT AREA 3: Update Inventory on Network Hierarchy

Complete driven asset capture survey of network hierarchy. The process in [Appendix B](#).

8. AS-BUILTS PROCESS AND DATA CAPTURE

Development Control Process

Where new assets are provided through the development control/planning process, the as-builts are to be provided by the developer and sent to each asset owner, who is responsible for entering them onto the Single Asset Management System as detailed in the Quality Management System. If the number of assets is small in number then this task is to be completed by the asset owner, however if the number of assets to be added is likely to be significant then this data capture process will be completed by the Highway Strategy team using the driven asset capture survey. See [Appendix B](#) for the detailed process. It is the asset owner's decision as to which process is to be adopted, if it is the latter process, then development control will include this item in the brief for the developer to contribute to the cost.

DEVELOPMENT AREA 4: Development Control Process

The Development Control process needs to ensure that developer schemes (S278 and S38) should produce an as built drawing which is checked by the Clerk of Works in construction and then sent to the asset owner for them to input. This task will be carried out by 1 person to complete all assets at the same time which is funded by developer control budget. Discussion with Development Control needs to occur to establish if fees need to be increased to cover this additional cost and to ensure the as built output meets the requirements of the asset management system.

Internal Capital Schemes

Where new assets are provided by the internal design and construction services, the design brief is to include the production of an as-built/photograph of each new asset to the asset owner as detailed in the Quality Management System. If the number of new assets is small in number then the necessary update to the asset management system is to be completed by the asset owner, however if the number of new assets to be added to the database is likely to be significant then this data capture process will be completed by the Highway Strategy team using the driven asset capture survey. See [Appendix B](#) for the detailed process. It is the asset owner's decision as to which process is to be adopted. However, if it is to be the latter process, then a percentage of the overall scheme cost is to be allocated to the capital scheme to complete this task.

DEVELOPMENT AREA 5: Update Inventory – Internal Capital Schemes

This process needs developing and implementing.

Internal Revenue Schemes

Where ad-hoc new assets are provided by the asset owners' design team and internal construction services, it is the responsibility of the construction service team or the design team to provide the asset owner with an as built drawing and photo of the completed work so that the asset owner can update the asset database accordingly.

DEVELOPMENT AREA 6: Update Inventory – Internal Revenue Schemes

This process needs developing and implementing.

9. INSPECTIONS AND SURVEYS

Highway inspections include inspections through either visual or mechanical forms of survey. Highway inspections are conducted to either maintain a safe network, or to establish the condition of the assets within the network.

There are currently no specific condition inspections undertaken for kerbs, white lining and road studs and these are inspected as part of routine safety inspections.

Routine Surveillance

Safety inspections are designed to identify, assess, record and prioritise the repair of identified defects which may present an immediate danger or significant inconvenience to users of the highway. Information related to completing safety inspections and the risk based approach to defect assessment and repair are detailed in the [Highway Infrastructure Asset Safety Inspections Manual](#). The process map for inspections can be found in [Appendix B](#).

Annual Engineers Inspection (AEI)

The Annual Engineer's Inspection (AEI) survey is the County Council's preferred choice of visual survey of carriageways and footways providing essential data on condition to maximise the effectiveness of the highway maintenance programmes of work.

The AEI gathers the surface condition visually and records it through a treatments option list (see [Table 7](#) below). The AEI reports the carriageway condition, including those cycleways located within the carriageway through a Pavement Condition Index (PCI) and the information is expressed as the percentage of roads reported as "Need Maintenance Now" for Resurfacing/ Reconstruction/Surface Dressing. This includes any locations with high friction surfacing.

A separate AEI for the footway reports the footway condition, including those of footways that have shared use with cycleways through a Footway Condition Index (FCI) and as with the PCI the information is expressed as a percentage of footways reported as "Need Maintenance Now" for Resurfacing/Reconstruction.

These surveys are either conducted by in-house surveyors or awarded to Contractors via Tender and executed to prescribed instructions, alongside a prescribed method of audit.

The UK Roads Board (UKRB) has approved the AEI survey as a method for establishing road condition, however it would not be accredited to UKPMS as it is a bespoke survey unique to each authority. Although this survey is not specified as accredited by UKPMS it is audited and can therefore be used.

We are working towards transitioning from the current survey timetable which prioritises the A and B roads to prioritising those that are on the RN and are developing a risk based approach for the remaining routes according to the NH. The AEI survey is completed on a five year cycle. The current survey timetable is shown in [Table 6](#).

Table 6: AEI survey timetable

A. Carriageway/On Road Cycleway

Location	Survey Type	Class	Network Cycle	Survey Network Details	Season / Cycle
Carriageway/ On road cycleway	AEI (Annual Engineers Inspection) visual survey	A, B, C & U roads	5 years	100% A & B roads pa 20% C & U roads pa Plus the 3 - 5 yrs treatments suggestions for 'Surface Treatment' & 'Resurface' identified in the previous year's survey	Spring

B. Footway/Segregated Cycleway

Location	Survey Type	Survey Network Details
Footway/ Segregated cycleway	AEI (Annual Engineers Inspection) visual survey	Methodology currently under review while Derbyshire carry out their initial footway asset capture.

The Treatments listed in [Table 7](#) have been categorised as part of the AEI assessment and can be easily edited or updated, if required, based on local rules and needs. The AEI Treatments Options List (detailed in [Table 7](#)) has been agreed by Highways Maintenance Section, the Laboratory and Asset Management Section with advice from the asset management software provider.

Table 7: Treatment options list

As New	Maintenance Patch
Up to Standard	Patching (Machine Laid)
Surface Dress 10/6 Racked in	Concrete Repairs
Surface Dress 6mm	Joint Repairs
Surface Dress with <10% Patch	Micro Asphalt
Surface Dress with >10% Patch	Micro Asphalt >10% Patch
Surface Dress with >20% Patch	Preventative Treatment 3 – 5 Years
Surface Dressing Remedial Works	Reconstruction
Edge Haunch	Resurface + Binder
Edge Haunch + Surface Dressing	Resurface
HFS	Resurface 3 – 5 Years
Overband Sealing	Track - Unmade
Junction Deterioration	Not Present

Sideways Force Coefficient Routine Investigation Machine (SCRIM)

The County Council's Skid Policy is currently informed using the SCRIM survey. The machine is a surface friction tester which accurately measures skidding resistance under constant load and at a constant speed on a wet road. It makes continuous measurements

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following a single line, typically along the inside wheel path and it provides survey data at ten metres intervals. Roads are tested in both directions unless the road layout dictates otherwise and on multi-lane roads, measurements are taken in lane one.

The SCRIM sites are processed and stored in county council's asset management software systems. The County Council's skid policy is then applied which prioritises sites below investigatory level against the previous three year's relevant collision data. This then produces a list of sites requiring further investigation.

The [Skid Policy](#) has been reviewed based on the guidance within the Road Surface Treatments Association document Guidance on Road Skid Resistance Policy/Strategy. High Friction Surface Treatments are also measured as part of the SCRIM Survey (where they are present on the relevant hierarchy).

The SCRIM survey is delivered by external contractor through a tender process and the SCRIM survey Technical Note is available using the following link:

<http://www.standardsforhighways.co.uk/ha/standards/dmr/vol7/section3/hd2815.pdf>

The SCRIM survey covers Network Hierarchies 1 to 4 and also any remaining A or B roads outside of these hierarchies. These remaining roads have been retained until it is felt that the public are more informed about the new risk based approach, of which traffic usage hierarchies is fundamental, rather than the more traditional network of A, B, C and Unclassified roads.

As this public awareness is increased the survey network will be refined further to reflect the new hierarchies with the removal of any road not contained within the relevant category.

Derbyshire has adopted the Single Annual Skid Survey method for SCRIM surveys. This means that surveys are rotated in an early, mid and late season sequence and three years of survey results are used to provide Seasonal Variation Correction. The survey timetable is outlined in [Table 8](#) below:

Table 8: Scrim survey timetable

Survey Type	Class	Network Cycle	Survey Network Details	Season / Cycle
SCRIM Survey	Hierarchy 1, 2, 3 & 4 and any remaining A or B roads	3 years	Hierarchy 1, 2, 3 & 4 and any remaining A & B Roads 100% both ways per annum	Year 1 - Late Year 2 - Mid Year 3 - Early

Skidding Resistance Investigatory Levels

Investigatory Levels are set using the process set out in Chapter 6 of the [County Council's Skid Policy](#). Once established these Investigatory Levels will be reviewed every 3 years as outlined in the Skid Policy and any necessary changes will be implemented.

DEVELOPMENT AREA 8: Explore Correlation Between Various Methods of Measuring Skidding Resistance

Explore other methods of measuring skidding resistance, in conjunction with the County Council's Highways' Laboratory, to establish a correlation between them.

Night-time Reflectivity

DEVELOPMENT AREA 10: Night-time Safety Inspection

Derbyshire do not currently carry out night-time inspections to assess the reflectivity condition of both road studs and road markings due to financial constraints. Consideration may be given to carrying out these inspections if the financial situation improves in the future.

Pre Scheme Coring Survey

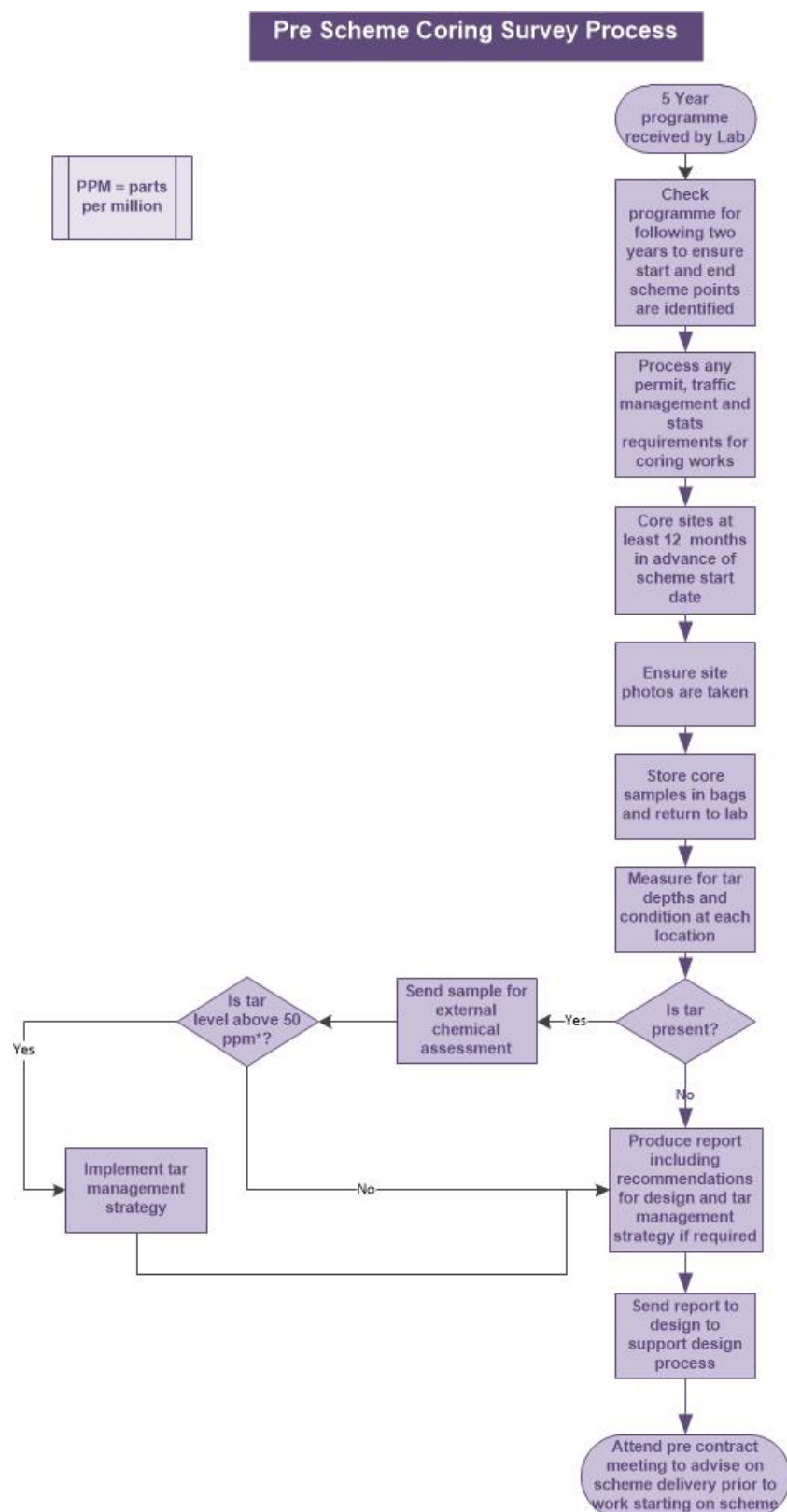
Pre scheme coring surveys are carried out on all schemes identified on the 5 year forward programme barring surface dressing schemes. They are carried out ideally 12 month prior to the planned start date of a scheme. The purpose of these surveys is to identify the presence of tar under the surface of the road and assess the general condition of the road. The information gathered during a survey is used to produce a report which will advise the design team on the most efficient way to design a scheme. If tar is found to be above 50 ppm (parts per million) then a tar management strategy will be required.

Coring surveys involve the use of a coring machine which will take samples of the road at varying intervals as follows:

- a. Every 250 metres, or;
- b. Where there is a variation in the road surface, or;
- c. Either side of an existing joint in the road, or;
- d. Where there is a site specific issue for example, a trench in poor condition.

The process below shows how pre scheme coring surveys are carried out:

Diagram 2: Pre Scheme Coring Survey Process



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10. ASSET CONDITION AND ASSESSMENT

The County Council's Pavement Management System is a computer based software produced to the national standard known as UK Pavement Management System (UKPMS).

It breaks down the highway network into individual section lengths which hold a range of information about the highway asset including some inventory data, condition data and results of inspections.

The system also has the functionality to issue electronic works orders directly to the contractor and provides a customer services module to accurately log and position service enquiries to assist in the efficient response to service requests.

In conjunction with the PMS the Council also uses an asset management software system. This also uses the same network as in the PMS but has more detailed condition survey data attached to it (AEI, SCRIM, Deflectograph).

In addition to the technical surveys, the asset management software has been programmed with deterioration models and treatment lifecycles and it can predict the current and future maintenance need of the highway asset, works backlog calculation and allows decisions for highway maintenance investments and suggestions for future works based on a structured and consistent basis.

Also bids, through the LTP and APR processes, to the Department for Transport (DfT) for Local Transport Capital Finance are made using supporting data from the PMS.

Derbyshire anticipates that UKPMS will form an integral part of highway management arrangements. In particular, the Council expects UKPMS to deliver the following:

- Best Value performance indicators;
- Local budget setting and needs identification;
- Local performance indicators;
- Road condition information to support the LTP;
- Comparable information to benchmark with others;
- Local identification and prioritisation of treatments.

11. LIFE CYCLE PLANNING

Life Cycle Planning is part of an effective asset management process as it identifies maintenance need over the life of the asset and provides an overall maintenance backlog.

In 2017, the 22 member Authorities of the MSIG (Midlands Service Improvement Group) agreed that a specific asset management software system provider would work with MSIG to produce a Framework document for Life Cycle Planning.

Derbyshire County Council was a main contributor to the process. The resulting document was accepted by the MSIG in October 2017 as their High Level Life Cycle Planning Framework document.

Treatment Baskets for Lifecycle Planning

The MSIG Authorities use the following “baskets” of treatments

- Basket A - Planned Works Structural Intervention – These treatments are sometimes classed as reconstruct;
- Basket B - Planned Works Major Intervention – These treatments are sometimes classed as resurfacing;
- Basket C – Preventative Maintenance Works – These are generally associated with surface treatments like surface dressing, micro-asphalts or patching;
- Basket D – Reactive Maintenance – These treatments are generally associated with emergency works to ensure that the road is safe for its users.

Derbyshire has used this as a basis for its lifecycle planning development.

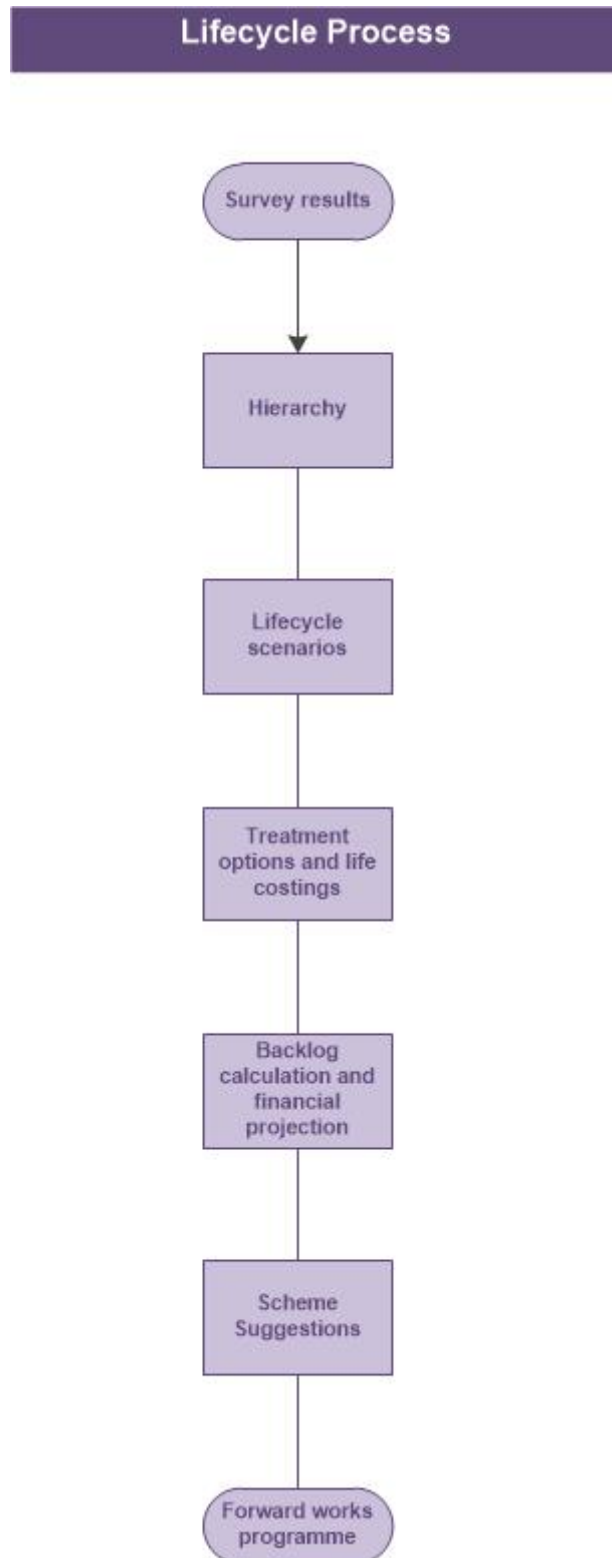
Key Principles

Derbyshire County Council identified the following key principles as required for providing a robust Life Cycle Planning system:

- Network Hierarchy
- Survey Regimes
- Treatment Options
- Treatment Costs
- Treatment Lives
- Life Cycle Options
- Baskets of Treatments
- Allocation Life Cycle Positioning
- Life Cycle Scenarios
- Backlog and Maintenance Need calculations

The lifecycle process is shown in the process overleaf:

Diagram 3: Lifecycle Process



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Carriageways

As discussed above, the AEI treatments listed in [Table 7](#) have been categorised as part of the AEI assessment and can be easily edited or updated, if required, based on local rules and needs.

Treatment Costs

In order to provide accurate treatment cost projections to inform the life cycle planning process and scheme estimates, the County Council has developed unit rates for each maintenance treatment. These are programmed into the County Council's asset management software and produce the figures for maintenance need and works backlog.

The unit rates are based on a total price per square metre specific to each treatment type and is inclusive of works and design costs.

For budgeting purposes treatments can be classified as either Preventative or Structural. Preventive treatments are processes to prolong the life of a road surface such as surface dressing, micro-asphalt and patching and structural treatments tend to be treatments where a road is at the end of its life, such as resurfacing or reconstruction.

Treatment Life in Years

To accurately life cycle plan the highway asset, it is necessary to know how long a material will last in a given location. A table detailing expected Materials Life in years has been developed and approved, based on the historic performance of each material in Derbyshire and lists Maintenance Hierarchy, Treatment Type and the Expected Lifecycle of Treatment by material type.

Footways

DEVELOPMENT AREA 11: Footway Life Cycle Planning

Once the footway inventory is completed and condition survey undertaken an agreed processing procedure will be implemented.

Kerbs/Road Markings/Road Studs

Currently there is no lifecycle planning undertaken for any of these assets. All defects are reported and resolved through the safety inspection process.

Highway Assessment

The highway assessment is driven by the principles and policy of the Highway Infrastructure Asset Strategy and Plan.

The survey data for SCRIM and AEI is converted into coloured mapping layers for displaying in PMS. The colours are determined by the national condition ranges and are generally referred to as the RAG maps (Red/Amber/Green). However, other colours are used where there are more (or less) ranges. These mapping layers enable Scheme Designers to view all of the condition survey data relating to the section they are designing.

Table 10: Current state of the network**DEVELOPMENT AREA 12: Current State of the Network**

This will be reported on once the AEI Carriageway Survey has been accredited by the UK Roads Liaison Group (UKRLG).

12. MAINTENANCE PROCESSES

There are three types of maintenance works undertaken:

- (a) **Reactive maintenance** is attending to defects and other safety matters that require urgent action arising from inspections or user information in accordance with the locally determined levels of response. Reactive Maintenance Process Maps can be found in the [Reactive Maintenance Teams Operational Manual](#).
- (b) **Routine or cyclic maintenance** such as minor road and footway works such as small patching repairs, weed control, renewing road markings, grass cutting (for visibility and safety). Additionally, during the winter period salting and snow clearance are carried out on a routine basis. Rural swathing is partly covered by an agency agreement and covers 1 metre mowing annually and a full width every triennially. Winter Service processes will be covered in the Winter Service Plan.
- (c) **Planned or programmed works**, this will include resurfacing and reconstruction of roads and footways, including associated drainage, road markings and signs, preventative treatments such as surface dressing and slurry sealing (also known as micro – asphalt). This also includes in-situ recycling which is covered in more detail [here](#).

DEVELOPMENT AREA 13: Development of Planned Works Process Maps

Planned works process maps are currently under review and need to be developed in the future.

Maintenance of Sites of Special Scientific Interest (SSSI) and local specific interest**DEVELOPMENT AREA 14: Creation of Maintenance Plans for SSSI's and Local Specific Interest**

There are 12 – 14 sites which meet the SSSI and local specific interest criteria within Derbyshire and each has its own maintenance plan. These included 36 verges that came into Derbyshire's control in 2006 as a result of a cabinet report. Biodiversity stipulates that Derbyshire must legally have written maintenance plans for these assets. These need to be written with the support of Derbyshire's Conservation and Design Team.

DEVELOPMENT AREA 15: Historic and Conservation Factors

Update the Asset Management system to embed the information overleaf for highway assets:

- Historic Structures and Scheduled Monuments information for those assets within each specific curtilage
- World Heritage Site extents
- Conservation Area extents

- Ecological issues
- SSSI information

13. BACKLOG

For carriageways the County Council asset management software has predicted that to maintain our current network we would need £25.9 million per annum. It has also calculated that the current maintenance need in 2019 is £107 million increasing to £376 million in 10 years times if there is no increase in highway funding.

DEVELOPMENT AREA 16: Identifying the Footway Backlog

Recently the Lifecycle Planning process was undertaken which gave Derbyshire the backlog figure for carriageways. When the footway data is received a similar process will provide the backlog for footways. Short term investment financial requirements will be able to be calculated once this process is complete.

14. VALUE MANAGEMENT/ENGINEERING APPROACH

DEVELOPMENT AREA 17: Adopting a Value Management/engineering Approach

Derbyshire would like to adopt a value management approach whereby we take into account the benefits of undertaking maintenance and the risks of not undertaking maintenance which then provides a prioritised list for Value Engineering to ensure we choose the optimal solution to ensure maintenance need is met while reducing waste and inefficiencies.

15. CROSS ASSET CONSIDERATION

When considering financial requirements Derbyshire will consider allocating budget to those assets that require more financial input regardless of where the money was originally allocated.

16. FORWARD PROGRAMME

By developing financial models associated with lifecycle planning, this strategy will enable a 1 – 5, 10 and 15 year forward works ‘strategic’ budget to be identified for all transport assets.

It will also provide clear indications as to the nature of planned maintenance required to maintain the network, as a whole, by considering asset condition and lifecycle costs against the provision of the desired levels of service, and ultimately, deliver the budget and works programme.

The Forward Works Plan is currently focused on the Carriageway asset group, with a developing Footways and Structures Programme. Street lighting is subject to a Light Emitting Diode (LED) replacement programme and other assets are being captured and surveyed to be incorporated over time. The Forward Works Plan will provide a work bank that can be prioritised in the Highways Service Plan within the available budget.

The Forward Works Plan will show the collective works backlog, it shall make clear what level of funding is required to reduce the backlog and provide the agreed Levels of Service. Thus making a better case for additional funding to maintain this vital asset.

The prioritisation of the schemes identified within the forward programme will be determined annually by available budget, condition and risk.

17. ANNUAL PROGRAMME

The first year of the [5 year forward works programme](#) forms the annual programme.

The programme is decided in the previous year for all asset groups and at this point it provides some opportunity for co-ordination of works. The co-ordination of works is carried out at the quarterly New Roads and Street Work Act (NRSWA) co-ordination meeting. This included all relevant utility companies and representatives from Derbyshire. Larger schemes which encompass several asset groups naturally lead to better co-ordination.

18. RISK REGISTER

A risk can be defined as an uncertain event which influences the desired performance of an asset. A risk factor is the produce of the severity of an event and the likelihood of its occurrence. Derbyshire County Council has a well-established risk management process that overarches all service areas.

The risk management process concentrates on four main issues, by applying these risk management principles, the council will be able to more appropriately target resources and to deliver services and projects in a way that ensures the council's overall exposure to risk is minimised.

The following risk register identifies risks and appropriate mitigation measures.

Table 10: Strategic Risk register

Identify Risks	Evaluate Risk	Manage Risk
Understanding the Asset	The absence of asset information compromises the ability to provide lifecycle planning and consider budgetary allocations	Identify the current state of the network to enable lifecycle planning and budgetary allocation.
Budget Concerns	The absence of relevant finances will mean highways may deteriorate compromising the road safety of road users and damage the infrastructure surrounding the highway	Budget management and apply for additional funding where feasible Lifecycle planning Budget Management
Changes to Traffic	Changes to traffic patterns and the usage of road may alter network prioritisation of asset stock	Pre-empt network changes or travel patterns at the design and planning stages
Climate Change	Climate change can increase deterioration causes, affecting the lifecycle of some assets and their components meaning intervention will be required sooner than expected	Lifecycle planning/inspections to encompass climate predictions

19. COMPETENCY AND TRAINING

Contractors undertaking condition inspections and surveys are required to prove the competency of their vehicles and surveyors by providing Accreditation Certificates and Employee Qualifications annually.

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Competency/training of enumerators who will be adding assets to SAMs including an assessment of their condition. This will be addressed as part of [Development Area 19](#).

All inspection procedures, toolbox talks and risk assessments are reviewed, updated and then trained on an annual basis. The departmental code of practice is reviewed on a five yearly basis. In 2019/20 Derbyshire introduced the Highway Inspector Competency Framework (UKRLG) which will enable our inspectors to meet the requirements of the Code of Practice.

All competency and training requirements are summarised within the skills matrix in [Appendix C](#) and managed through the Derbyshire County Council MyPlan system.

Identify the appropriate AM competencies for all staff engaged in Highways Infrastructure Management. Require contractors to provide evidence of appropriate competencies.

DEVELOPMENT AREA 18: Enumerator Training

Training will be developed and delivered for key staff to be able to undertake the driven asset capture survey and data capture process.

DEVELOPMENT AREA 19: Creation of the Skills Matrix

Skills matrix needs to be developed which will support the Councils MyPlan system. This will be added to [Appendix C](#).

20. PERFORMANCE MANAGEMENT FRAMEWORK

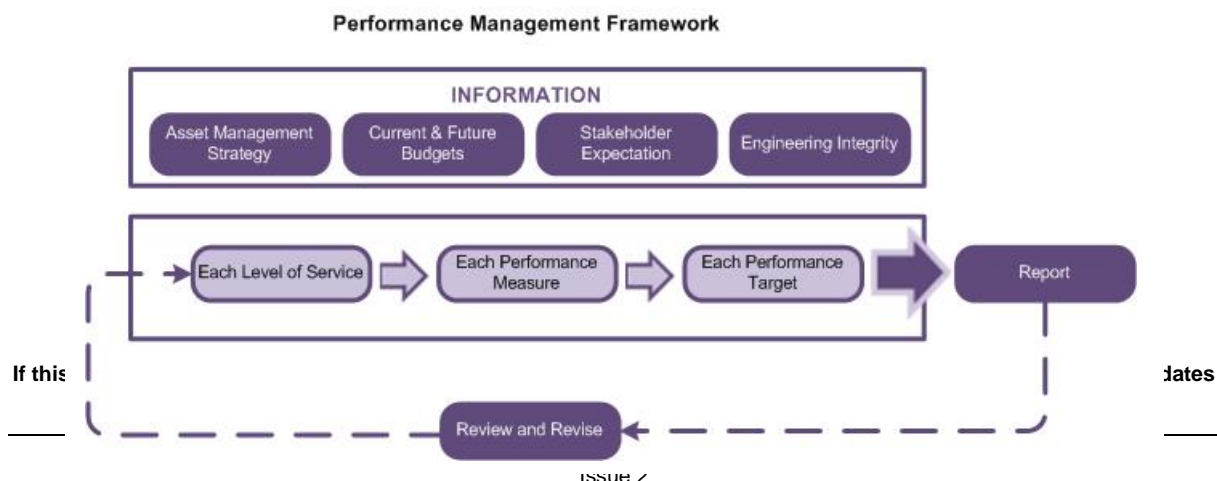
The Performance Framework is used as a tool to inform, measure, review and drive the management and decision-making processes associated with implementing corporate changes and day-to-day decisions relating to the delivery of services, linked to the network hierarchy. The figure below shows the performance management framework.

It is not intended that the Council creates a host of measurements that serve little purpose other than to demonstrate the presence of a framework. At any level, external-facing performance measures should show how well services are being delivered and whether objectives are being achieved.

Internally, a range of input and output measures may be used for monitoring purposes but the key indicators should reflect performance in key service areas to inform senior managers as well as corporate and stakeholders of the service as a whole.

The Performance Management Framework diagram is shown below:

Diagram 4 Performance Management Framework



The table overleaf shows the performance measures and targets for carriageway.

Table 11: Carriageways/on-road cycleways performance measures

Performance Measure	Level of Service 1 and 2 Target
Safety Performance Measures (Highways and Carriageways are classed together so will report identical results)	
% of dangerous potholes repaired in target time	100%
% of urgent defects repaired in target time	100%
% of 32 hour defects repaired in target time	90%
% of 9 day defects repaired within target time	90%
% of 28 day defects repaired within target time	80%
% of network at or below SCRIM intervention	This will be completed once the latest results are released
% of safety inspections completed with tolerance levels	100% (90% in LOS 2)
Serviceability Performance Measures	
% network salted in target time	90%
Sustainability Performance Measures	
Backlog	<u>See Section 13</u>
% requested as-builts provided	100%
% asset inventory updated	100%
Customer Service Performance Measures	
NHT % of residents satisfied with highway maintenance KBI 24	50%
NHT % of residents satisfied with the condition of the highway KBI 23	36%
NHT % of residents satisfied with condition of road surfaces HMBI 01	36%

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The table below shows the performance measures and targets for footways/shared use cycleways:

Table 12: Footways/shared use cycleways performance measures

Performance Measure	Level of Service 1 and 2 Target
Safety Performance Measures (Highways and Carriageways are classed together so will report identical results)	
% of dangerous potholes repaired in target time	100%
% of 32 hour defects repaired in target time	90%
% of 9 day defects repaired within target time	90%
% of 28 day defects repaired within target time	80%
% of safety inspections completed with tolerance levels	100% (90% in LOS 2)
Sustainability Performance Measures	
% as-builts requested and provided	100%
% asset inventory updated	100%
Backlog	See Development Area 16
Customer Service Performance Measures	
NHT % of residents satisfied with pavement and footpaths KBI 11	57%

21. COMMUNICATIONS

All information relating to communication is contained with the [Highways Communications Plan](#).

22. CLIMATE CHANGE ADAPTION AND CIVIL EMERGENCIES AND SEVERE WEATHER EMERGENCIES PLANS

All plans relating to this area of work are included on the [Derbyshire Prepared](#) website and Derbyshire have taken or are taking action against all of the recommendations raised in the 2009 3 Counties Alliance Partnership The Effects of Climate Change on 3CAP's Highway Network Policies and Standards.

The Severe Weather Plan details Derbyshire's response to weather warnings. This is available internally.

The corporate climate change manifesto can be found [here](#).

As part of the Derbyshire's measures to reduce climate change by reducing our carbon emissions we will continue to monitor how our works impact on the environment. In view of this the Department's preferred method of treatment for reconstructing a worn out road where two or more layers require reconstruction is in-situ recycling.

This is a process which strengthens the condition of a road by reusing the existing worn out structural layers. The process involves planing the existing layers to the required depth and

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then adding a calculated amount of bitumen to produce new asphalt. The process can be either shallow, approximately 75mm in depth, or deep which is anything deeper than 75mm.

By reusing the existing road construction in this way, the process has the advantages of requiring less lorry movements to and from site and reduces the amount of virgin aggregates being quarried and processed. It also has the added benefit of locking in any tar contamination within the existing road surface without the need to take away for disposal.

Not all sites are suitable to be recycled in this way, either because of the size of the scheme or insufficient depth of the existing construction and therefore other methods of treatment will be considered with a view to reducing the Council's carbon emissions. These other measures could be the use of ex-situ recycling - where road planings are taken away from a site and turned into new asphalt or the use of warm mix asphalt, which is a material that is manufactured at a lower temperature than a conventional asphalt and consequently uses less energy in the process.

23. HERITAGE AND CONSISTENCY WITH CHARACTER

Generic information that will relate to all assets and crosses all HIAM Part 2 documents and therefore are included in the [Highway Network Management Plan](#).

24. CARBON REDUCTION

Generic information that will relate to all assets and crosses all HIAM Part 2 documents and therefore are included in the corporate [Carbon Reduction Policy](#).

25. ENVIRONMENTAL IMPACT, NATURE CONSERVATION AND BIODIVERSITY

Generic information that will relate to all assets and crosses all HIAM Part 2 documents and therefore are included in the Highway Network Management Plan.

26. SUPPLY CHAIN COLLABORATION AND COLLABORATION IN SERVICE DELIVERY

Highways have a number of service level agreements in place with external providers and district councils. These include but are not limited to gully cleansing, white lining and grass cutting.

27. DELIVERY

Delivery is primarily completed through the Derbyshire County Council Construction Services. The construction process is currently under review.

28. PROCUREMENT

Derbyshire use a variety of suppliers according to service need and locality requirements. We have an in-house service provider for construction works and we also use external providers which are sourced via a framework system.

DEVELOPMENT AREA 20: Creating road materials policy

Derbyshire would like to create a Road Materials Policy which states what should be used on different sections of the hierarchy. This should be referenced in all procurement documents.

29. OPERATIONAL POLICIES

Operational Policies are covered in the [Highway Network Management Plan](#).

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30. APPENDICES

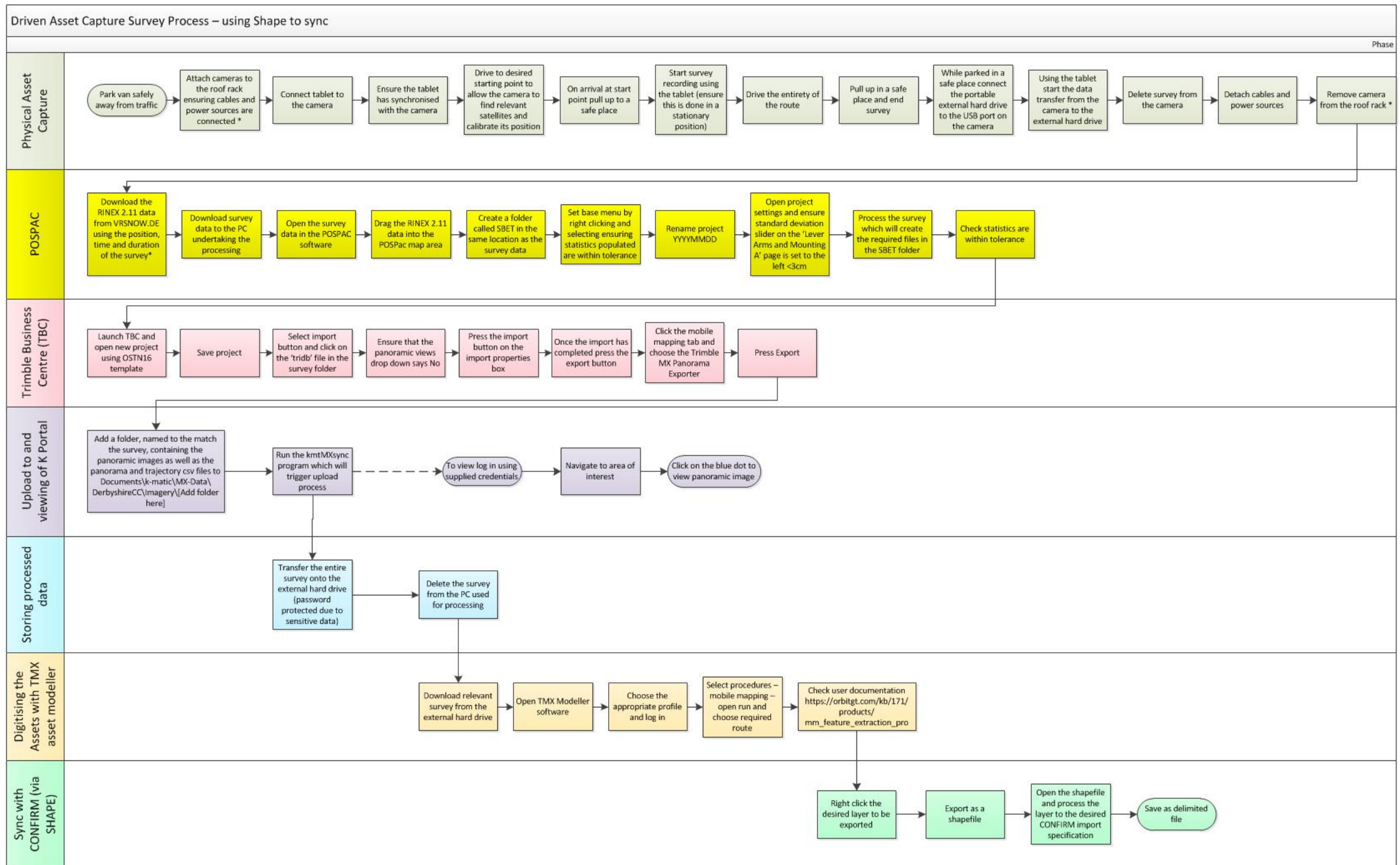
APPENDIX A DEVELOPMENT AREA SUMMARY

Table 13: Development Area Summary

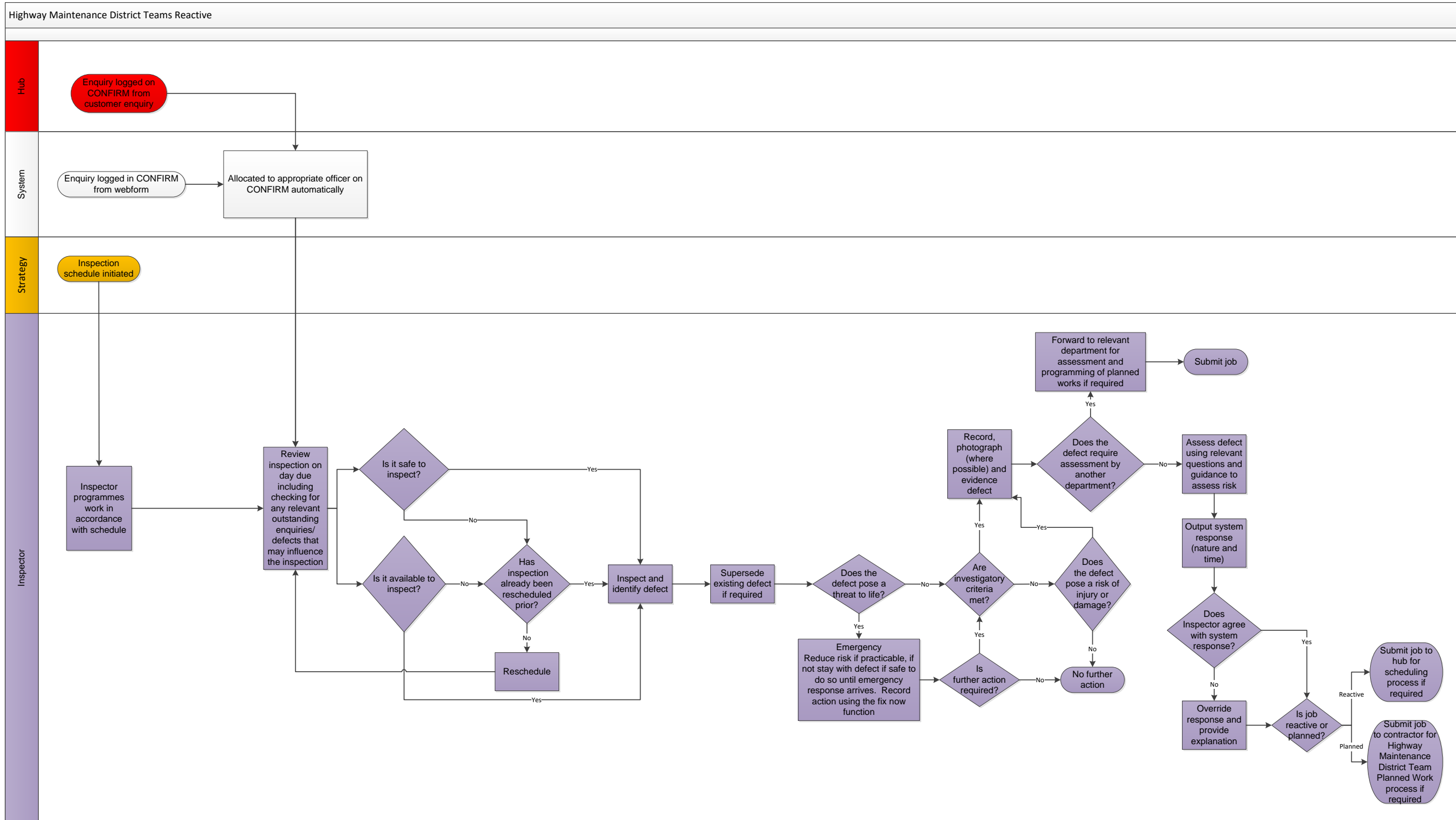
Development Area Number	Development Area Title	Action Taken
1	<u>Service Level Agreements</u>	
2	<u>Update Inventory on Resilient Network</u>	
3	<u>Update Inventory on Network Hierarchy</u>	
4	<u>Development Control Process</u>	
5	<u>Update Inventory Internal Capital Schemes</u>	
6	<u>Update Inventory Internal Revenue Schemes</u>	
7	<u>Amending the mapping layer</u>	One single base layer is now in use for asset information and is updated regularly.
8	<u>Explore correlation between various methods of measuring skidding resistance</u>	
9	<u>Review of Deflectograph Survey</u>	Derbyshire no longer use the Deflectograph Survey
10	<u>Night time Safety Inspection</u>	
11	<u>Footway life cycle planning</u>	
12	<u>Current State of the Network</u>	
13	<u>Development of Planned Works Process Maps</u>	
14	<u>Creation of maintenance plans for SSSI's and local specific interest</u>	
15	<u>Historic and Conservation Factors</u>	
16	<u>Identifying the footway backlog</u>	
17	<u>Adopting a value management/engineering approach</u>	
18	<u>Training of enumerators</u>	
19	<u>Creation of the skills matrix</u>	
20	<u>Creating road materials policy</u>	

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APPENDIX B PROCESSES



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Highways Infrastructure Assets Safety Inspections Manual
 All inspection activities to be carried out in accordance with the guidance provided in the above document.

Change Management
 If a change to the requirements is identified a change control request (QMS standard form on EDRM) is to be completed in writing. Acceptance or non-acceptance of change must be in writing and recorded on relevant file.

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APPENDIX C SKILLS MATRIX

This will be added once [Development Area 19](#) is completed.