

PUBLIC



HIGHWAY INFRASTRUCTURE ASSET MANAGEMENT PLAN FOR STRUCTURES

JANUARY 2020

AN ELEMENT OF THE HIGHWAY INFRASTRUCTURE
ASSET MANAGEMENT SYSTEM

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1. INTRODUCTION

The Code of Practice ‘Well Managed Highway Infrastructure’ states:

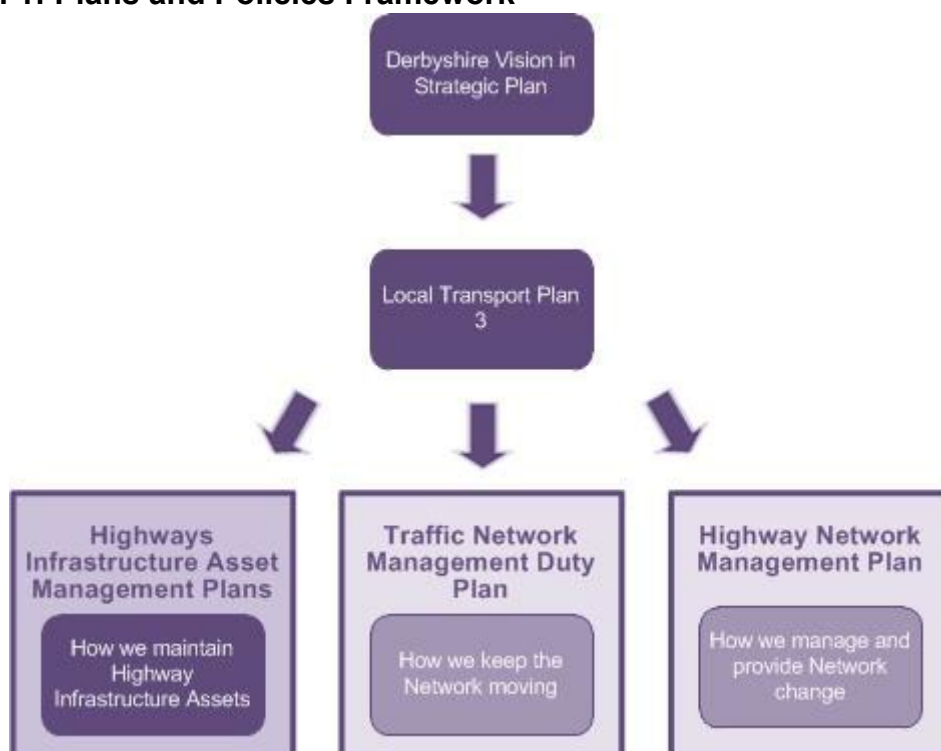
“it is not in the public interest to allow highway structures to deteriorate in a way that compromises the functionality of the highway network, be it through restrictions or closures caused by unsafe structures or the disruption of traffic through poor planning of maintenance work.”

This document provides 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 the delivery of service.

This document also highlights several 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 document in context with other key documents in how the network is managed, maintained and changed:

Diagram 1: Plans and Policies Framework



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2. SCOPE

This document covers all the structures on the Derbyshire highway network that Derbyshire County Council (DCC) have a responsibility to maintain. These include bridges, culverts, retaining walls, highway walls, public rights of way footbridges, landslips, rock faces, gantries, subways/underpasses and bridge chords.

This document also includes the duty of care required by DCC to ensure that those bridges and structures that are maintained by third parties such as Network Rail, Highways England, the Environment Agency, Canal and River Trust, local landowners and businesses do not impact on the safety of the highway.

It should be noted that several structures within the highway are designated monuments/historic structures or are located within a conservation area or world heritage site. This is an important part of the heritage of Derbyshire and DCC ensures that these assets and their locations are maintained in accordance with the associated guidance and relevant legislation.

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3. ASSET CAUSES OF DETERIORATION

The main causes of structures assets deterioration are itemised in the tables below:

Table 1: Deterioration and Associated Defects

A: Bridges/Retaining Walls/Culverts $\geq 0.9\text{m}$ in diameter, Highway Walls (not a retaining wall but a Derbyshire owned boundary wall), Public Rights of Way and Footbridges

Cause of Deterioration	Description	Typical Defects
Wear and tear/ageing.	Action of vehicular traffic, weathering, corrosion and chemical reaction.	Deterioration of structural components. Beyond life expectancy.
Scour (flooding and/or blockage due to debris).	Abrasive action of water and debris.	Partial collapse or destruction of structure. Adjacent flooding effects of other assets, surrounding landscape.
Change in use from initial design.	Excess/unsuitable traffic or excess water leading to other effects such as scour.	Deterioration of structure and reduced life expectancy.
Climate change.	Additional freeze/thaw events. Flooding/scour. Heat damage. Change in water tables.	Acceleration of deterioration effects.
Liquefaction/saturated Backfill.	Over saturation of the material due to excess water (ie statutory failure, leading to undertaker failure).	Cause component failure, leading to structural failure
Vehicle/accident impact.	Vehicle collisions with structure.	Can cause severe damage resulting unsafe structure. Can result in temporary road closures and diversions until the necessary repairs can be made.
Vandalism.	Graffiti and effects of fire etc.	Deterioration of structural components and/or structural failure.

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B. Landslips

Cause of Deterioration	Description	Typical Defects
Scour (flooding and/or blockage due to debris).	Abrasive action of water and debris.	Partial collapse or destruction of structure. Adjacent flooding effects of other assets, surrounding landscape.
Climate change.	Additional freeze/thaw events. Flooding/scour. Heat damage. Change in water tables.	Acceleration of deterioration effects.
Liquefaction/saturated Backfill.	Over saturation of the material due to excess water (i.e. statutory undertaker failure).	Cause component failure, leading to structure failure.
Vehicle/accident impact.	Vehicle collisions with structure.	Can cause severe damage resulting in unsafe structure. Can result in temporary road closures and diversions until the necessary repairs can be made.
Vandalism.	Graffiti and effects of fire etc.	Deterioration of structural components and/or structural failure.

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C. Rockfaces and Gantries

Cause of Deterioration	Description	Typical Defects
Wear and tear/ageing.	Action of vehicular traffic, weathering, corrosion, and chemical reaction.	Deterioration of structural components. Beyond life expectancy.
Climate change.	Additional freeze/thaw events. Flooding/scour. Heat damage. Change in water tables.	Acceleration of deterioration effects.
Vehicle/accident impact.	Vehicle collisions with structure.	Can cause severe damage resulting in unsafe structure. Can result in temporary road closures and diversions until the necessary repairs can be made.
Vandalism.	Graffiti and effects of fire etc.	Deterioration of structural components and/or structural failure.

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4. NATIONAL/LOCAL GUIDANCE AND RELATED DOCUMENTS

The maintenance of structures is governed by a series of national documents and guidance including:

- Well-managed Highway Infrastructure: A Code of Practice 2016
- Inspection Manual for Highway Structures Volume 1: Reference Manual (May 2007)
- Inspection Manual for Highway Structures Volume 2: Inspector's Handbook (May 2007)
- CSS Bridge Condition Indicators Vol2: Bridge Inspection Reporting (April 2002)
- Addendum to CSS Bridge Condition Indicators Vol2: Bridge Inspection Reporting (Aug 2004)
- DMRB, CS450 Inspection of Highway Structures
- CIRIA Rock netting systems – design, installation and whole-life management (C775)
- Design Manual for Roads and Bridges.

These documents are either available online or are stored locally by the section. It is the responsibility of all relevant staff to ensure that any guidance is the latest available.

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.

In some circumstances national standards either do not exist or have had to be adapted to meet local requirements within the County.

DEVELOPMENT AREA 1: Local Standards

The following areas have been identified as requiring the development of local standards:

- Structures Design Guide for Development Control.
- Retaining Walls.
- Competency of Bridge Inspectors.

The Head of Structures Management has the role of technical lead within the Authority. This role co-ordinates all aspects relating to highways assets and their continuing safe functionality including consultation with relevant sections that maintain these assets and 3rd party asset owners, such as Network Rail.

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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 (RN). These can be found online [here](#). There are two levels of service regarding safety on the network due to budgetary constraints. Levels of Service will be reviewed and amended regularly to consider the budgetary position.

Critical Assets

Critical highway infrastructure are those assets where failure would result in significant impact to the local, and potentially the national economy. They have a high consequence of failure, but not necessarily a high likelihood of failure. The structures critical assets are currently defined as those located on the resilient network and will be detailed in [Appendix B](#) once Development Area 2 is complete.

DEVELOPMENT AREA 2: Critical Asset Definition

Work is required to refine the criteria to define the critical assets, as not each structure identified on the resilient network may have the same level of impact in terms of effect on the network resilience.

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The table below shows how the Levels of Service relate to the different network hierarchy levels.

Table 2: Bridges Specific Levels of Service

Structures on Resilient Network and Critical Assets

Level of Service 1: Safety + Serviceability + Sustainability + Customer Service

(20% of total structures)

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.

Standard: Comply with Code of Practice and apply asset management techniques.

Impact/Risks:

- Programme of inspections and determination of condition.
- Lifecycle planning leading to 3-10 year forward programme with prioritised annual programming.
- Routine maintenance and planned works including some investment in structural maintenance leading to improvements in condition, reduction in backlog and further reducing dependence on reactive maintenance.
- Safety inspections and identified safety defects prioritised according to risk-based approach.
- Officer observation and all other non-safety repair requests added to the programme to be dealt with in accordance with the timescales set out in the HIAMP.
- A BSCI crit and BSCI ave intervention level of 65.

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Structures on Network Hierarchies 1 - 7

Level of Service 2: Provision of safety related issues and Customer Service only

(80% of total structures)

Objective: 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.

Impact/Risks:

- Programme of inspections and determination of condition.
- Lifecycle planning leading to 3-10 year forward programme with prioritised annual programming.
- Predominantly reactive maintenance.
- Minimal intervention to prevent asset deterioration.
- Safety inspections and identified safety defects prioritised according to risk-based approach.
- Likely increase in non-safety defects with potential for increase in third party insurance claims.

Table 3: Other Structures – Retaining Walls

Retaining Walls on Resilient Network and Critical Assets.

Level of Service 1: Safety + Serviceability + Sustainability + Customer Service

814 miles walls (this relates to retaining walls on the entire network)

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.

Standard: Comply with Code of Practice and apply asset management techniques to optimise whole life costs.

Impact/Risks:

- New assets to be identified through a combination of desktop analysis and survey work. New asset data to be captured and asset condition to be assessed.
- Inspection programme to be developed based on risk.
- Maintenance to be initially reactive, but a programme of planned works to be developed based on risk.
- A programme of improvement works to be undertaken only if funds can be obtained and identified. Safety inspections and identified safety defects prioritised according to risk-based approach.

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Retaining Walls on Network Hierarchies 1 – 7.

Level of Service 2: Provision of safety related issues and Customer Service Only

814 miles walls (this relates to retaining walls on the entire network)

Objective: 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.

Impact/Risks:

- Programme of inspections and determination of condition.
- Lifecycle planning leading to 3-10 year forward programme with prioritised annual programming.
- Predominantly reactive maintenance.
- Minimal intervention to prevent asset deterioration.
- Safety inspections and identified safety defects prioritised according to risk-based approach.
- Likely increase in non-safety defects with potential for increase in third party insurance claims.

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6. IDENTIFICATION OF NEW ASSETS – DATA CAPTURE

The following table highlights the ongoing process for identifying new assets.

Table 4: Processes to Identify New Assets

Structure Type	Level of Service 1 Resilient Network and Level of Service 2 Network Hierarchies
Bridges	On a reactive basis only.
Culverts $\geq 0.9\text{m}$ in diameter and associated trash screens barring ones that have been identified as needing specialist treatment	Provided in the HIAM Part 2 for Drainage and now all trash screens are included in the Structures Asset Management System and updated as required.
Retaining Walls	Retaining wall assets are recorded on the Structures Asset Management System. Developer built retaining walls would have to come to structures via development control for technical approval in the first instance then adoption. Once the developer has satisfied all of these criteria then we adopt the wall and put it in Structures Asset Management System with its own unique reference number, construction details, ownership etc. See Development Area 3.
Rock Faces	Rockfaces data is captured in AMX with their own unique reference number including construction details and ownership etc.
Landslips	On a reactive basis only
Highway Walls (not a retaining wall but a Derbyshire owned boundary wall)	On a reactive basis only
Public Rights of Way Footbridges	Public Rights of Way Footbridges (PROWs) are currently being digitised by Countryside and are being added to the Asset Management System when issues are identified
Gantries	All have been recorded
Bridge chords	On a reactive basis only

All data is to be recorded and stored within the Asset Management System in accordance with the [Data Management Strategy](#) and Quality Management System, shown in [Appendix C](#). Any new assets will be risk assessed and put into a programme of re-inspection if required. Process Maps for Inspection can be found in Appendix C.

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7. INVENTORY UPDATE AND ASSET CAPTURE

Retaining Walls Inventory Update

DEVELOPMENT AREA 3: Retaining Wall Inventory Update

Retaining Wall Asset Capture is to continue as part of an ongoing inspection regime.

Rock Faces Inventory Update

All rockfaces that Derbyshire are aware of have been added to the Structures Asset Management System and are continually updated as part of business-as-usual activities.

Footbridge Inventory Update

All highway footbridges and most Public Rights of Way footbridges have been added to the structure management system and are continually updated as part of business-as-usual activities.

Trash Screen Asset Capture

All trash screen information has been added to the structures asset management system and are continually updated as part of business- as- usual activities.

DEVELOPMENT AREA 7: Historic and Conservation Factors

Update the Asset Management system to embed the following information for each structure:

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

Additionally, there are numerous historic/conservation structures that are located at the boundaries between Derbyshire and its neighbouring authorities. Currently the boundary agreements that exist between Derbyshire and adjacent authorities require consolidation and updating to reflect changes within the network. Discussions have been completed with Derby City which has resulted in an informal agreement.

DEVELOPMENT AREA 8: Boundary Agreements

Derbyshire County Council legal services are required to draft a new boundary agreement with Derby City. This agreement which is to include responsibility, ownership and levels of service for each structure is to form the model agreement for each of the remaining authorities. Discussions are to be undertaken with the remaining authorities.

Those structures with special engineering difficulties that can either affect NRSWA equipment or be affected by NRSWA equipment have been identified and the information is available within the asset management system and in Geoplace.

DEVELOPMENT AREA 9: Auxiliary Assets

To append a plan in the Asset Management System detailing the location of the relevant additional assets such as traffic signing, lining etc that relate to the restrictions currently in place for a structure. There is a need to ensure inspection processes are followed with regard to checking the existing traffic signage is compliant.

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8. AS-BUILTS PROCESS AND DATA CAPTURE

Assets Generated Through Development Control

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 departmental asset management system as detailed in the Quality Management System.

DEVELOPMENT AREA 10: 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 during construction and then sent to the asset owner for inclusion in the database. 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 our Single Asset Management System.

Assets Generated Through Internal Capital Schemes

Where new assets are provided by the internal design and construction services, the design brief is to include the production of a Health and Safety File of each new asset to the asset owner as detailed in the Quality Management System. If the number of new assets is small then the necessary update to the asset management system is to be completed by the asset owner.

DEVELOPMENT AREA 12: Update Inventory – Internal Capital Schemes

This process needs developing and implementing.

Assets Generated Through 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 a health and Safety File for the completed work so that the asset owner can update the asset database accordingly.

DEVELOPMENT AREA 12: Update Inventory – Internal Revenue Schemes

This process needs developing and implementing.

9. INSPECTIONS AND SURVEYS

Highway structures are routinely inspected to ensure they remain safe for public use. The inspections also provide the data required to support good asset management practice. Paragraph C5.2.2 Inspection within the 2016 Well-managed Highway Infrastructure states it should be sufficient to:

- Identify condition, defects and signs of deterioration that are significant to highway structure safety and management.
- Identify any significant changes in condition, loading or environment that have occurred since the last observation.
- Assess or provide information for the assessment of stability and serviceability.
- Determine or assist the determination of the cause, extent, and rate of deterioration.
- Provide information that can be used to support highway structures management, i.e. the identification of needs and associated maintenance works.

Structural inspections with the County are conducted by either of the two methods below:

- Visually by the inspector with evidence gathered using photographs.
- Remotely using video cameras/or static camera attached to a drone.

The procedures to complete an inspection of highway structures by these methods and to input the resultant data are found in [Appendix C](#).

DEVELOPMENT AREA 13: Improvement to the Structures Asset Management System/Departmental Asset Management System Connection

Connection/interface between Structures Asset Management System and Departmental Asset management System will be improved.

The following documents are to be referenced and followed when undertaking any site inspection work and are accessible on EDRM or on the drive.

- DCC Emergency Information Handbook
- DCC document GCP11: Structures.
- DCC document General Risk Assessment: Structures Site Visits.
- DCC document General Risk Assessment: Use of Hand Tools for access to structures and retaining walls.
- DCC document General Risk Assessment: Structures Drone Flying Procedure.
- DCC Structures Lone Working Procedure
- CAA Operation Manual.

Consent will be sought from the appropriate regulatory body before work commences where it involves a listed structure.

DCC will consider assets as singular items that incorporate numerous elements together.

Routine Surveillance

This is undertaken via highway infrastructure asset safety inspections which are undertaken by Highway Inspectors and are designed to identify, assess, record and prioritise the repair of identified safety defects which may present an immediate danger or significant inconvenience

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to users of the highway. The information detailing the processes involved in completing safety inspections and the risk based approach to safety defect assessment and repair are detailed in the [Highway Infrastructure Asset Safety Inspections Manual](#).

Any queries raised are forwarded through the Single Asset Management System to the structures department for action.

Initial Asset Identification Inspection – Data Capture

At the point where a new asset of any structural type has been identified an initial inspection will be undertaken. The information gathered will depend on the structure type held within the asset management system.

As part of this inspection process a risk assessment will be undertaken to establish the appropriate interval time for re-inspection.

Superficial Visual Inspection

This type of inspection applies to those structures for which a public right of way exists across it but are not maintained by Derbyshire County Council and are the responsibility of a third party. There are two elements to this inspection outlined below:

- those where the owner is deemed responsible such as Network Rail or Highways England – these structures are subjected to an inspection regime by the relevant authority and limited access is available by Derbyshire County Council to these structures due to the restrictions in place in accessing their network. Therefore, the visual inspection is restricted to those structural elements that can be seen from the Derbyshire County Council network and their effect on the highway carriageway or footway surface.
- those where the responsibility of the owner is unknown – at these locations permission to examine the structure can be obtained from the owner and it is possible for a visual inspection of the structure.

The methodology for this type of inspection is shown in [Appendix C](#).

Enquiry/Ad hoc Inspection

As a result of a highway safety inspection requesting additional investigation into the underlying cause of a safety defect or due to a customer enquiry, an ad hoc inspection may be undertaken of any structure type. The process can be found in [Appendix C](#).

General Inspection

A general inspection applies to a bridge structure only and has been risk assessed to be undertaken every two years. This is a visual inspection of the bridge structure. The general inspection process flow is shown in [Appendix C](#).

Principal Inspection

A principal inspection applies to a bridge structure only and requires a close examination, i.e. within touching distance of all inspectable parts of the structure using access scaffolds, ladders or hoists. It determines the condition of all parts of the structure, the extent of any significant change or deterioration since the last Principal Inspection and any information relevant to the stability of the structure. The principal inspection process flow is shown in [Appendix C](#).

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Enhanced General Inspection

These are completed in accordance with DMRB guidance on a risk based approach.

Special Inspection

These can occur for a number of different reasons on a reactive basis:

- pre or post a significant event such as flooding, abnormally heavy loads or bridge strike.
- as part of the handover/acceptance process from development control.
- when a particular problem is detected during an earlier inspection.
- on structures that have loading or other forms of restrictions on use i.e. look at specific elements.
- where a post tensioned bridge has a regime of Special Inspections implemented because of an earlier investigation.

DEVELOPMENT AREA 15: Flooding

A desk top exercise is required to define the criteria for when/where/what levels of flooding must occur to trigger this special inspection. Additionally, the high-risk structures that could be affected need to be identified.

DEVELOPMENT AREA 16: Abnormal Loads

Links need to be established between Network Planning and Structures for height or weight restrictions to be available for appropriate routing of abnormal loads.

Post Tensioned Special Inspections

These inspections are carried out on a risk-based priority in accordance with the relevant codes of practice.

All condition data should be recorded and stored within the departmental management system. An overview of this asset data is stored in the single asset management system to provide relevant access to all required users. Data is controlled in accordance with the Data Management Strategy.

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10. ASSET CONDITION AND ASSESSMENT

Condition – Bridges

The County Council monitor the condition of all bridge structures for which it is responsible. All bridge inspections are carried out to a nationally agreed format which allows the calculation of Bridge Condition Indicators (BCIs). A Bridge Condition Index is determined for each individual bridge, based on its condition at the time of the inspection. The BCI system is a nationally developed method, with two BCI values calculated for each bridge:

- BSCI crit – the value when only the critical load-carrying elements are considered.
- BSCI av – the value when every element of the bridge is considered.

As a guide the BSCI values represent the following:

Table 5: National Guidance for Asset Conditions

Condition Categories	Description
Excellent (BSCI 90-100)	No functional or structural defects
Good (BSCI 80-89)	Some minor defects that have limited impact on the structure
Fair (BSCI 65-79)	Minor to moderate defects that may impact on the durability of the structure and may impact on function
Poor (BSCI 40-64)	Moderate to major defects that are likely to impact on the function of the structure
Very Poor (BSCI 0-39)	Major structure defects and some components on the bridge may be failed, requires attention

The above is based on national standards and Derbyshire has agreed to act when Structures on the Resilient Network and Critical Assets reduce to a BSCI of 65 (see Table 2 - Bridges Specific Levels of Service).

Condition – Other Structures

The County Council monitor the condition of the structures identified including retaining walls, landslips and rock faces. However, there are no nationally agreed condition indicators for these other structures, and a locally based relevant system is required.

Condition – Landslips

There are a variety of approaches that we take manage the condition of landslips including topographical, 3D surveys, laser scanning, implementation of inclinometers and piezometers. Every site will be assessed on his own individual basis to determine the best approach.

DEVELOPMENT AREA 19: Condition – Non - Designed Retaining Walls

Derbyshire will be using the nationally recognised retaining wall scoring system devised by ADEPT which brings parity with the system currently in use for bridges. There is a need to develop a risk-based inspection programme for these assets. This will consider height, proportion that is considered retaining, proximity to the carriageway/footway etc. The overall risk factor will establish the requirement for inspections to be undertaken and the condition of inspected structures will be used to prioritise the future works programme.

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DEVELOPMENT AREA 20: Condition – Rock Faces

The condition of Derbyshire's rockfaces will be developed through analysing the overall risk factor to the neighbouring highway. This will use a Rock Slope Hazard Index (RoSHI).

No condition data is collected for highway walls and bridge chords.

Assessment of Structures – Bridges

The bridge stock is managed for structural capacity through structural assessment reviews every 12 years and monitoring of abnormal loads. There are bridges that are classed as sub-standard in their loading capacity and these are managed through a monitoring regime and, where appropriate, with weight restrictions. It should be noted that a number of these bridges are historical monuments and therefore it is not possible or desirable to strengthen them. However, where this does not apply it is intended to reduce the number of bridges defined as sub-standard through a strengthening programme where funding allows.

11. LIFECYCLE PLANNING

All condition data is stored within asset management system for bridges and structures. This computer system enables the management of all assets and provides lifecycle. However currently lifecycle planning is only provided for bridges and gantries using the approved structures toolkit. Lifecycle planning is provided for 30 years allowing a timeline to be produced for when works/interventions will be required. There is no national provision to provide lifecycle planning for retaining walls, rock faces and landslips, these would have to be provided at a local level and would have limited use.

This program also allows the DfT valuation calculations to be undertaken along with the Gross Replacement Costs and Depreciated Replacement Costs. It also produces and reports both national and local performance data.

12. MAINTENANCE PROCESSES AND DESIGN

There are three types of maintenance works undertaken on those structures maintained by Derbyshire County Council:

- (a) **Reactive maintenance:** Is attending to defects and other safety matters, reacting to concerns from inspections or other information, to ensure that a structure is fit for purpose and safe to use.
- (b) **Routine maintenance :** The departmental asset management system is used to prioritise the minor maintenance works identified by the routine inspections and from this an annual programme of maintenance work is drawn up. Typical minor works include:
 - Painting of parapets
 - Vegetation removal
 - Parapet and barrier repair
 - Graffiti removal
 - Minor masonry repairs and re-pointing
 - Minor concrete repairs
 - Mechanical and electrical – servicing, cleansing and repair

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- (c) **Planned or programmed works:** These works are dependent upon information gained from detailed inspections, life-cycle planning, network importance and other information developed within the departmental asset management system. Such works are implemented to improve the longevity and overall condition of structures. Works could include the strengthening or replacement of complete structures that have reached the end of their serviceable life. Typical works include the following:

- Replacement
- Strengthening
- Refurbishment
- Masonry repairs and re-pointing
- Concrete repairs
- Parapet replacement
- Bearing replacement
- Waterproofing or re-waterproofing

DEVELOPMENT AREA 22: Development of Planned Works Process Maps

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

The design processes will be shown in [Appendix C](#). These include the consideration of the following:

- The protection of protected species, e.g. bats and otters in the maintenance of bridges and structures.
- Any statutory undertaker's equipment within or near the structure.
- Any relevant local standards, policies relating to heritage and consistency with character, carbon reduction, environmental impact, nature conservation and biodiversity.

Private Structures: For those structures requiring remedial works and are not maintained by Derbyshire County Council, liaison and cooperation with the structure owner is the preferred methodology to rectify any identified issues. This should initially be to make the structure safe, by either signing/guarding or applying to close the highway but also to determine the remedial works required. The structure owner will be given an appropriate length of time to react and organise the required works, however this should be in proportion to the risk to the users of the structure and its location on the hierarchy. If no response is forthcoming from the structure owner, then [Section 56](#) and [59](#) of the Highways Act 1980 should be used to complete the works using the enforcement process outlined in [Appendix C](#).

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13. BACKLOG

DEVELOPMENT AREA 23: Creation of the Back-Log Record

A short-term aspiration of Derbyshire is to create useful records of the structures back log.

This is the outstanding backlog and is a database of all work that is currently outstanding on the network. It includes the following:

- Planned/programmed works.
- Routine/cyclic maintenance.
- Reactive maintenance. (It is recognised that these cannot be planned in detail in advance but should still include a volume of work.)

The table below show the amount required by year to support required investment in bridges across the Resilient Network.

Table 6: Amount required over the next 6 years for Resilient Network bridge investment

Year	Amount required to support investment on RN for bridges
2021 (Year 1)	£19.01m
Year 2	£0.246m
Year 3	£1.52m
Year 4	£1.07m
Year 5	£1.79m
Year 6	£3.26m

For bridges on the rest of the network approximately £130m would be required.

DEVELOPMENT AREA 24: Retaining Wall Backlog

The estimated value for all retaining walls is approximately £1.75billion. Further work needs to be completed to estimate the backlog financial amount.

14. VALUE MANAGEMENT/ENGINEERING APPROACH

DEVELOPMENT AREA 26: Adopting a Value Management/Engineering Approach

The structures section uses a value management approach to its assets. Assessments are carried out into the benefits and risks of undertaking or delaying maintenance works respectively, providing prioritisation for Value Engineering. This ensures the optimal solution to ongoing maintenance needs are met while reducing waste and inefficiencies. However, for non-bridge structures Derbyshire would aspire to improve related documentation.

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

The forward programme of work for bridges is available in [Appendix D](#).

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

DEVELOPMENT AREA 27: Forward Programme – Other Structures

The forward programme needs to be extended to include retaining walls and footbridges.

17. ANNUAL PROGRAMME

This is formed from the first year of the forward programme depending on the capital allocation available. This can be found in [Appendix D](#).

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 well-established risk management processes for all service areas and a specific one for highways. By applying risk management principles, the council will be able to target resources more appropriately and to deliver services and projects in a way that ensures the council's overall exposure to risk is minimised.

The risk register overleaf identifies risks and appropriate mitigation measures.

Table 7: Risk Register Strategic Risks

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.	Derbyshire have a good understanding of its structures asset stock. The asset inventory is complete for the Resilient Network. Identifying potential concerns in advance of incidents occurring.
Budget Concerns	The absence of relevant finances will mean asset condition will deteriorate and as such resilience of structures infrastructure could be compromised.	Budget management. Apply for funding funding where feasible. Lifecycle Planning.
Changes to Traffic	Changes to traffic patterns and the usage of road may lead to changes in budget prioritisation for assets.	Pre-empt network changes or travel patterns at the design and planning stage.
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

Derbyshire County Council has an internal competency specification for all bridge inspectors which is an HNC qualification in civil engineering with 5 years’ experience of working with structures. This requirement allows an inspector to inspect alone, though it can be relaxed dependant on the complexity of the structure.

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All inspection procedures, toolbox talks and risk assessments are reviewed, updated and implemented as required. The departmental code of practice is reviewed when required.

All external contractors undertaking condition inspections are required to meet Derbyshire specifications as a minimal requirement.

All competency and training requirements are summarised within the skills matrix in [Appendix K](#) once Development Area 28 is completed and managed through the Derbyshire County Council PDR system.

The skills matrix will link to the competency framework for asset management.

DEVELOPMENT AREA 28: Creation of a skills matrix

A skills matrix across the Highways department is required. See [Appendix E](#). ADEPT East Midlands are looking at a simplified bridge inspection competency framework.

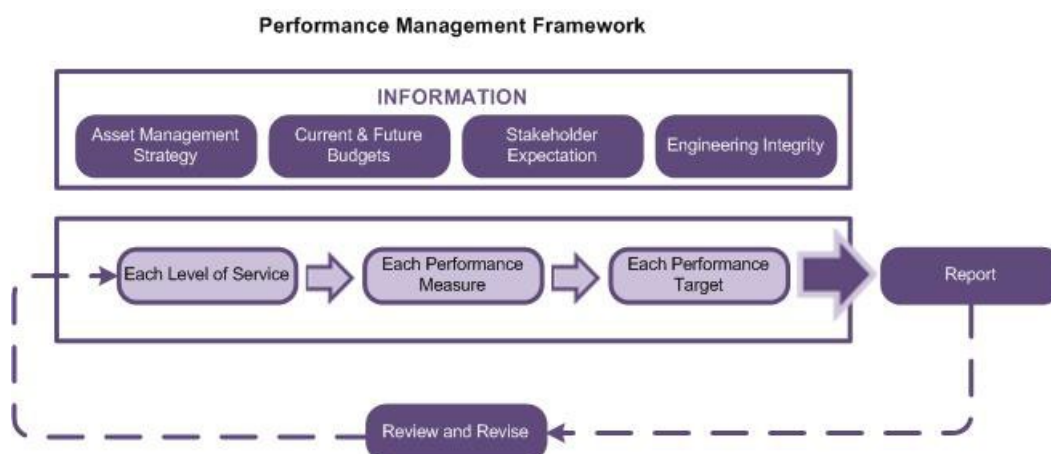
20. PERFORMANCE MANAGEMENT FRAMEWORK

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 diagram 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 service performance.

Diagram 2: Performance Management Framework



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

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Table 8: Performance Indicators
Safety Performance Measures

Performance Measure	Level of Service 1 and 2 Target
% 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%
BSCIav (Bridge Structural Condition Indicator Average).	>65 (Level of Service 1 RN) >50 (Level of Service 2 Network Hierarchy 1 - 7)
BSCICrit (Bridge Structure Condition Indicator Critical Element).	>65 (Level of Service 1 RN) >50 (Level of Service 2 Network Hierarchy 1 - 7)
% of general inspections completed with tolerance levels.	100%
% of principal inspections completed with tolerance levels.	100%
Number of bridges with a BSCIav below intervention level.	0
Number of bridges with a BSCICrit below intervention level.	0

Serviceability Performance Measures

Performance Measures	Level of Service 1 and 2 Target
Number of structures restricted due to works being required.	0

Sustainability Measures

Performance Measures	Level of Service 1 and 2 Target
Backlog	Part of Development Area 24
% of as-builts provided.	100%
% of asset inventory provided.	100%

Customer Service Performance Measures

Performance Measures	Level of Service 1 and 2 Target
NHT % of residents satisfied with highway maintenance.	44%
NHT % of residents satisfied with the condition of the highway.	26%

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21. COMMUNICATIONS

All information relating to communication will be contained within the Highway Communication 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

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

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 and climate change documentation](#).

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

Structures can use several avenues to procure resources to ensure service delivery. A framework has been established in which geotechnical or specialist works can be procured. The Midlands Highway Alliance facilitates access to both consultants and contractors under a framework agreement. Derbyshire County Council has established a term service contract with a national consultant to ensure delivery of technical issues. Open tender under Derbyshire's procurement guidelines is also used to procure services.

27. DELIVERY

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

28. PROCUREMENT

Procurement guidance is detailed in the supply chain section of this document.

29. OPERATIONAL POLICIES

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

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30. APPENDICES

APPENDIX A DEVELOPMENT AREA BREAKDOWN

Table 9: Development Areas Breakdown

Development Area Number and Title	Action Taken
1 Develop certain local standards	
2 Critical Asset Identification	
3 Retaining Wall Inventory Update	Retaining wall assets are recorded on AMX. Developer built retaining walls would have to come to structures via development control for technical approval in the first instance then adoption. Once the developer has satisfied all of these criteria then we adopt the wall and put it in AMX with its own unique reference number, construction details, ownership etc. Retaining Wall Asset Capture is to continue as part of an ongoing inspection regime.
4 Rock faces Inventory Update.	All rockfaces that Derbyshire are aware of have been added to the structures Asset Management System and are continually updated as part of business-as-usual activities.
5 Footbridge Inventory Update.	All highway footbridges and most Public Rights of Way footbridges have been added to the structure management system and are continually updated as part of business-as-usual activities.
6 Trashescreen Inventory Update.	All trash screen information has been added to the structures asset management system and are continually updated as part of business- as- usual activities.
7 Including historic data in asset information.	The asset information relating to historic structures and scheduled monuments within each specific curtilage has been added to the asset information in the management system.
8 Formalise boundary agreements	Discussions with Tameside Metropolitan Borough Council have started.
9 Auxillary Assets.	This Development Area has been amended from Bridge Champion to Auxiliary Assets. This is because DCC now has a technical lead for structures but we still need to ensure our data for structures is all encompassing.
10 Creation of development control processes.	
11 Update Inventory – Internal Capital Schemes.	
12 Update Inventory – Internal Revenue Schemes.	
13 Improvement to the Structures Asset Management System/Departmental Asset Management System Connection.	
14 Enhanced General Inspection.	These are now completed in accordance with DMRB guidance on a risk basis.
15 Desktop exercise to define flooding criteria.	
16 Creation of links between network planning and structures to support abnormal load planning.	The recruitment of an abnormal loads' specialist has improved this area of work but further work is still required.
17 Post tensioned special inspections.	These inspections are carried out on a risk-based priority in accordance with the relevant codes of practice.
18 Landslip Condition Testing.	There are a variety of approaches that we take manage the condition of landslips including topographical, 3D surveys, laser scanning, implementation of inclinometers and piezometers. Every site will be assessed on his own individual basis to determine the best approach.
19 Methodology to define condition of non – designed retaining walls.	

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Development Area Number and Title	Action Taken
20 Rock faces condition testing.	
21 Creation of a prioritised programme for assessment.	A prioritised assessment programme is now in place.
22 Development of Planned Work Process Maps.	
23 Development of work bank.	
24 Retaining Wall Backlog.	
25 Lifecycle Plan for Network Hierarchy.	Through our principal and general inspections Derbyshire have been able to develop a hierarchy need for each structure which will enable lifecycle planning.
26 Adopting a value management/engineering maintenance approach.	The structures section uses a value management approach to its assets. Assessments are carried out into the benefits and risks of undertaking or delaying works respectively, providing prioritisation for Value Engineering. This ensures the optimal solution to ongoing maintenance needs are met while reducing waste and inefficiencies. However, for non-bridge structures Derbyshire would aspire to improve related documentation.
27 Extending forward programme to other structures.	Footbridges are now on the forward programme.
28 Creation of a skills matrix and collaboration with ADEPT and MHA + for inspector competency framework	
29 Creation of new procurement and supply chain works processes	Structures can use several avenues to procure resources to ensure service delivery. A framework has been established in which geotechnical or specialist works can be procured. The Midlands Highway Alliance facilitates access to both consultants and contractors under a framework agreement. Derbyshire County Council has established a term service contract with a national consultant to ensure delivery of technical issues. Open tender under Derbyshire's procurement guidelines is also used to procure services.
30 Creating a road materials policy	The Materials Policy was approved in August 2021 alongside standard forms for departures. These documents will be reviewed on a regular basis.

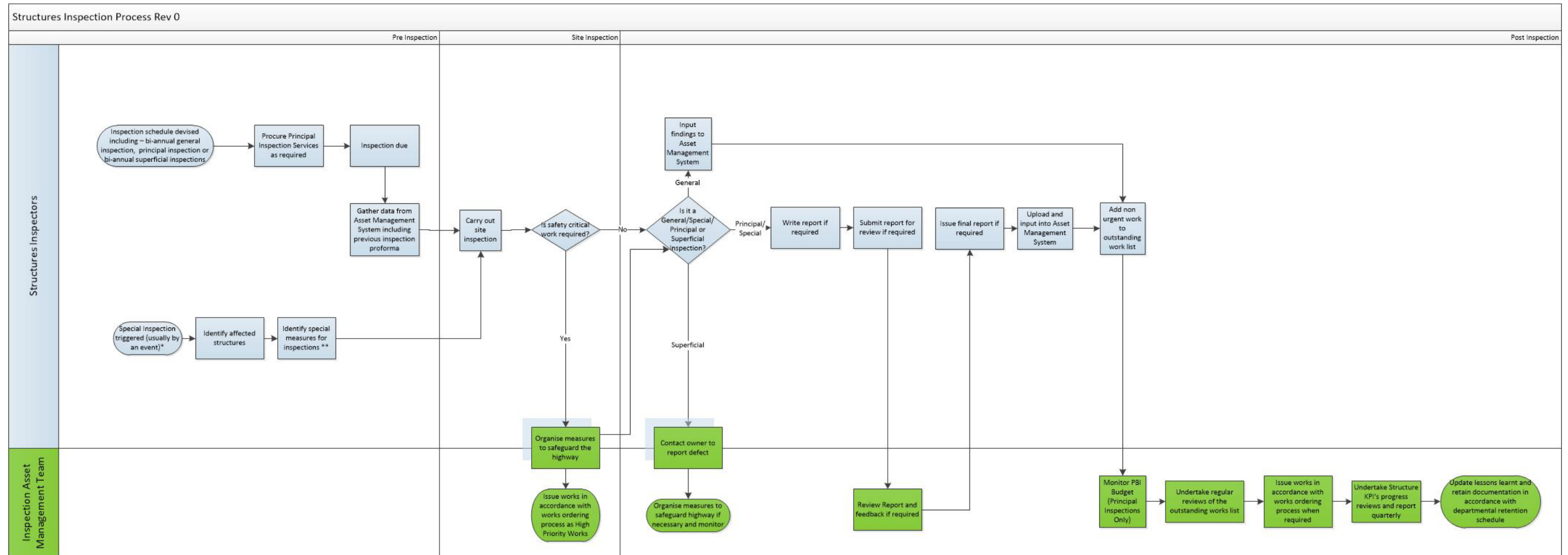
APPENDIX B: PLAN OF CRITICAL ASSETS

This will be added once [Development Area 2](#) is completed

APPENDIX C: PROCESS MAPS

The procedure for inspection of highway structures including entering data on to the departmental asset management system is stored locally.

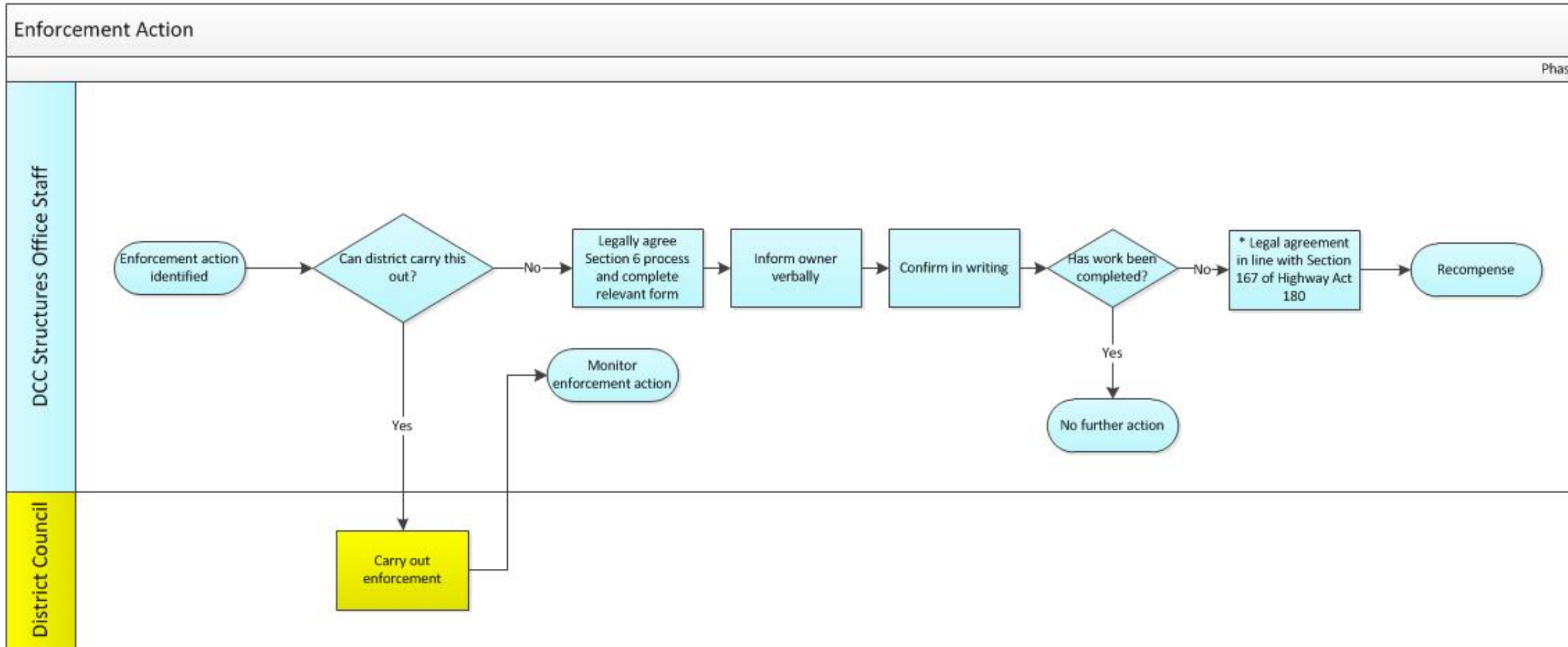
The procedure for inspecting by drone is stored locally.



*Structures could be made aware of this by:
 - Weather Alert
 - Highways Hub/Duty Officer

** Special Measures could include:
 - Divers required
 - 2 man crew for flooding events
 - External Provider
 - Access equipment

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*Can ultimately be put in home deeds and recompense when sell

APPENDIX D: FORWARD PROGRAMME

The forward programme can be found on our website [here](#).

APPENDIX E: SKILLS MATRIX

This will be added once [Development Area 28](#) is completed.