

PUBLIC



HIGHWAY INFRASTRUCTURE ASSET MANAGEMENT PLAN FOR STRUCTURES

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AN ELEMENT OF THE HIGHWAY INFRASTRUCTURE
ASSET MANAGEMENT SYSTEM

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1. INTRODUCTION

The Well Managed Highway Infrastructure states:

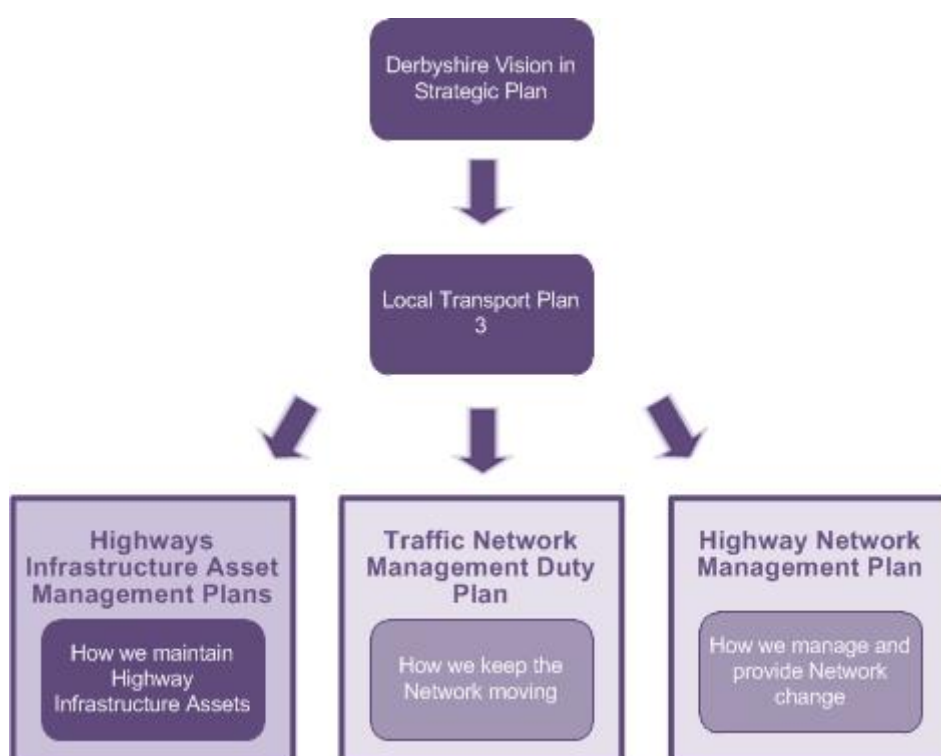
“it is not in the public interest to allow highway structures to deteriorate in a way that compromises the functionality of the highway network, be it through restrictions or closures caused by unsafe structures or the disruption of traffic through poor planning of maintenance work.” Failure of a structure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

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 the 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 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 the structures on the Derbyshire highway network that Derbyshire 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 Derbyshire County Council 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 land owners and businesses do not impact on the safety of the highway.

It should be noted that a number of the structures within the highway are either designated monuments/historic structures or are located within a conservation area or world heritage site. These statuses are an important part of the heritage of Derbyshire and it is vital that these assets and their locations are maintained in accordance with the associated guidance and relevant legislation. These are important factors that require specific consideration as part of the asset management process.

3. ASSET CAUSES OF DETERIORATION

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

Table 1: Deterioration and Associated Defects

A: Bridges/Retaining Walls/Culverts <0.9m 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	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 undertaker failure)	Cause component failure, leading to structure failure
Vehicle/accident impact	Vehicle collisions with structure	Can cause severe damage and leave them in an unsafe condition. 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 and leave them in an unsafe condition. 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 and leave them in an unsafe condition. 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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DEVELOPMENT AREA 1: 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 structures that are located at the boundaries between Derbyshire and its neighbouring authorities. Currently the boundary agreements that exist between Derbyshire and these 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 2: 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.

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)

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.

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DEVELOPMENT AREA 3: 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

Bridge Champion

The Head of Structures has the role of Bridge Champion within the Authority. The primary function of this role is to reduce the risk of bridge strikes within the County. Therefore, this role co-ordinates all aspects of highways infrastructure assets that may affect the functionality of a bridge such as the traffic signage (including electronic signage) and lines relating to the bridge etc. It is responsible for the liaison with other relevant sections that may maintain these associated assets to ensure that the risk of the bridge being compromised is reduced. The role also ensures liaison is held with 3rd party asset owners, such as Network Rail.

DEVELOPMENT AREA 4: Bridge Champion

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.

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 regard 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.

Critical Assets

Critical highway infrastructure is considered to be 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 5 is complete.

DEVELOPMENT AREA 5: 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 (20% of total structures) Level of Service 1 Safety + Serviceability + Sustainability + Customer Service	Structures on Network Hierarchies 1 - 7 (80% of total structures) 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	<ul style="list-style-type: none"> • 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 av intervention level of 70. 	<ul style="list-style-type: none"> • 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

	Structures on Resilient Network and Critical Assets 112.1KM walls Level of Service 1 Safety + Serviceability + Sustainability + Customer Service	Structures on Network Hierarchies 1 - 7 Assets See <u>Development Area 7</u> 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	<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • 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 with regard to 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 <0.9m in diameter	Provided in the HIAM Part 2 for Drainage
Retaining Walls	See Development Area 7
Rock Faces	See Development Area 8
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.

7. INVENTORY UPDATE AND ASSET CAPTURE

DEVELOPMENT AREA 7: Retaining Walls Asset Capture

The development of a targeted programme to capture the remaining retaining walls derived from a risk based matrix which prioritises localised areas based on previous enquiries/defects that have been raised, clusters of scheme locations, local knowledge and route hierarchy. Initially this is to commence in Matlock Bath to test the system. It is anticipated that the locations will be primarily in the north-west of the county in the High Peak and sections of the Derbyshire Dales.

DEVELOPMENT AREA 8: Rock Faces Inventory Update

A desktop exercise is required to examine the existing sites already identified and review the information currently held to align with Ciria C775 guidance. This exercise will also identify new rock face sites.

DEVELOPMENT AREA 9: Footbridge Inventory Update

A desktop exercise to compare and collate current data sets

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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 departmental 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 C](#) 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 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 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 our Single 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 C](#) 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 11: 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 12: Update Inventory – Internal Revenue Schemes

This process needs developing and implementing.

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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 (Version 2.0)
- 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 Nov 2020 V1
- CAA Operation Manual

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

When considering Derbyshire structures the council 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

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inconvenience 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 structure of any structure 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/Adhoc 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 adhoc 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](#).

Enhanced General Inspection

DEVELOPMENT AREA 14: Enhanced General Inspection

After initial PI and GI inspection on all structures are completed consideration may be given to carrying out enhanced general inspections instead of principal inspections.

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 as a result 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 have to 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 in order for height or weight restrictions to be available for appropriate routing of abnormal loads.

DEVELOPMENT AREA 17: Post Tensioned Special Inspections

These are currently not completed and have a high priority to implement.

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 in order to provide relevant access to all required users. Data is controlled in accordance with the Data Management Strategy.

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

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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 take action when Structures on the Resilient Network and Critical Assets reduce to a BSCI of 70 (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.

DEVELOPMENT AREA 18: Condition – Non – Designed Retaining Walls

A locally devised methodology is required to define the condition and its categories for retaining walls with an associated scoring system. For many retaining walls there is no structural design due to the age of the structure. Therefore, the condition will be based on a visual inspection only and an assessment of a number of risk factors. These include height, proportion that is considered retaining, proximity to the carriageway/footway etc. The overall risk factor will establish the condition of the structure and priority into any future works programme.

Landslip condition is currently undertaken through a combination of drone footage, visual examination and recording of changes over time through photographs.

DEVELOPMENT AREA 19: Condition – Landslips

Derbyshire will start to use tilt monitors and webcams to remotely monitor landslips where appropriate.

DEVELOPMENT AREA 20: Condition – Rock Faces

Following on from [Development Area 8](#) Rock faces Inventory Update the condition of the structure will be developed through analysing an overall risk factor to the neighbouring highway.

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

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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.

DEVELOPMENT AREA 21: Assessment of Structures Programme

A prioritised programme based on engineering judgement has been developed to redress the backlog currently experienced in the number of assessment of structures required. This requires implementation, funding and resourcing.

11. LIFECYCLE PLANNING

All condition data is stored within asset management system for Bridges and Structures solution. This computer system enables the management of all structures types 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 that require urgent action arising from inspections or user information in accordance with the locally determined levels of response **Routine or cyclic maintenance** is a do-minimum response, reacting to concerns from inspections to ensure that a structure is fit for purpose and safe to use. This type of maintenance does not improve the general condition of the structure to any large degree but is considered as maintaining the structure in a steady state. departmental management system is used to prioritise the 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

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- Mechanical and electrical – servicing, cleansing and repair
- (b) **Planned or programmed works**, this follows more detailed inspections, which look at all aspects of the structure and the maintenance history, schemes are developed to improve the longevity and overall condition of structures. Dependant on the importance of the structure to the network, 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
 - Safety barrier/railing replacement

Programmes of preventative maintenance are undertaken on component parts of structures that have a finite life e.g. bridge expansion joints, bearings, paint systems. If undertaken in a timely manner they extend the working life of a structure.

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](#), once [Development Area 6](#) is completed. 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 undertakers 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

For those structures requiring remedial works and not maintained by Derbyshire County Council, liaison and cooperation with the structure owner is the preferred methodology to rectify any identified issue with the structure. 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 should 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](#).

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 – although it is recognised that these cannot be planned in detail in advance but should still include a volume of work for these, albeit on unknown structures, based on past experience and engineering judgement

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.

DEVELOPMENT AREA 25: Lifecycle Planning

Develop lifecycle planning for the network hierarchy.

14. VALUE MANAGEMENT/ENGINEERING APPROACH

DEVELOPMENT AREA 26: Adopting a Value Management/engineering Approach

The structures section already use 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. However, for non-bridge structures Derbyshire would aspire to improve related documentation.

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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 1 to 5 year 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 a well-established risk management process that overarches all service areas and also a highway specific one.

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 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 Understanding exceptional risks to specific structures	Derbyshire have a good understanding of its structure's asset stock. The asset inventory is complete for the resilient network. However, further data is required to fully understand Derbyshire's retaining wall asset information. <u>See Development Area 7.</u> 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 and apply for additional funding where feasible Lifecycle planning Budget Management
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 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

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

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

All external contractors undertaking condition inspections are required to meet the same minimum Derbyshire specifications.

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 MyPlan system.

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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

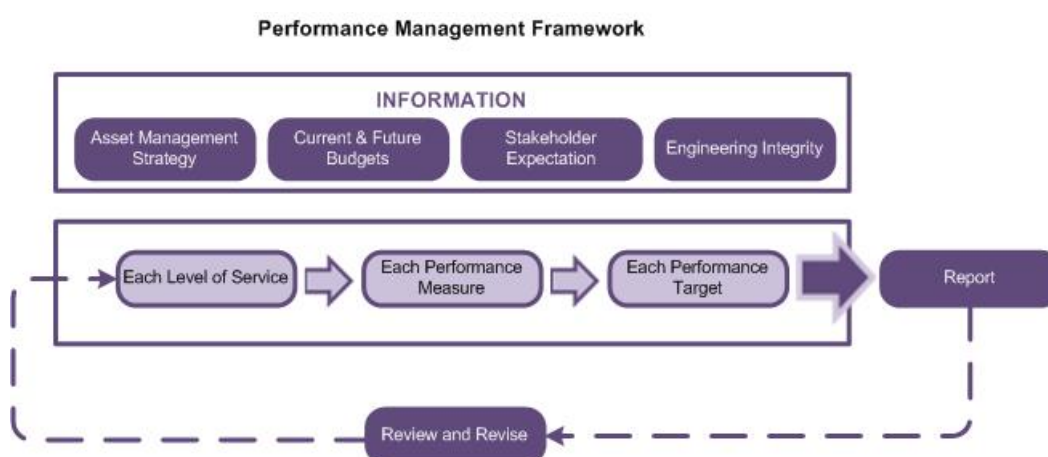
The Performance Framework is used as a tool to inform, measure, review and drive the management and decision-making processes associated with implementing corporate changes and day-to-day decisions relating to the delivery of services, linked to the network hierarchy. The figure below shows the performance 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 2: Performance Management Framework



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

Table 8: Performance Indicators

Performance Measure	Level of Service 1 and 2 Target
Safety Performance Measures	
% 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%
BSClav (Bridge Structural Condition Indicator Average)	>65 (Level of Service 1 RN) >50 (Level of Service 2 Network Hierarchy 1 - 7)
BSClcrit (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 BSClav below intervention level	0
Number of bridges with a BSClcrit below intervention level	0
Serviceability Performance Measures	
Number of structures restricted due to works being required	0
Sustainability Performance Measures	
Backlog	Part of <u>Development Area 24.</u>
% 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%

21. COMMUNICATIONS

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

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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 in the [3 Counties Alliance Partnership \(3CAP\) document](#).

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 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

DEVELOPMENT AREA 29: Creation of new procurement and supply chain processes

Structures do not currently have of their own frameworks. Consideration needs to be given to creating new frameworks for walling, painting and repairing, steel works and geotechnical works.

DEVELOPMENT AREA 30: 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.

27. DELIVERY

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

28. PROCUREMENT

See Development Area 29.

29. OPERATIONAL POLICIES

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

30. APPENDICES**APPENDIX A DEVELOPMENT AREA BREAKDOWN****Table 9: Development Areas Breakdown**

Development Area Number	Development Area Title	Action Taken
1	<u>Including historic data in asset information</u>	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
2	<u>Formalise boundary agreements</u>	Discussions with Tameside Metropolitan Borough Council have started.
3	<u>Develop certain local standards</u>	
4	<u>Bridge Champion</u>	All structures across highways have has scans completed. Data processing is now required.
5	<u>Define critical assets</u>	
6	<u>Updating the QMS Processes</u>	The QMS Processes have now been updated and can be found in Appendix C.
7	<u>Retaining Wall asset capture</u>	Derbyshire have completed asset capture on the Resilient Network and Network Hierarchies 1,2 and 3.
8	<u>Rock faces inventory update</u>	
9	<u>Footbridge Inventory Update</u>	
10	<u>Creation of development control processes</u>	
11	<u>Update Inventory – Internal Capital Schemes</u>	
12	<u>Update Inventory – Internal Revenue Schemes</u>	
13	<u>Improvement to the Structures Asset Management System/Departmental Asset Management System Connection</u>	
14	<u>Enhanced General Inspection</u>	
15	<u>Desktop exercise to define flooding criteria</u>	
16	<u>Creation of links between network planning and structures to support abnormal load planning</u>	The recruitment of an abnormal loads' specialist has improved this area of work but further work is still required.
17	<u>Post tensioned special inspections</u>	A desktop review has been completed, and inspections based on priority will start in 2021.
18	<u>Methodology to define condition of non – designed retaining walls</u>	
19	<u>Landslip condition testing</u>	Derbyshire have stated that they will not use ground sensors.
20	<u>Rock faces condition testing</u>	
21	<u>Creation of a prioritised programme for assessment</u>	
22	<u>Development of Planned Work Process Maps</u>	
23	<u>Development of work bank</u>	
24	<u>Retaining Wall Backlog</u>	
25	<u>Lifecycle Plan for Network Hierarchy</u>	
26	<u>Adopting a value management/engineering approach</u>	
27	<u>Extending forward programme to other structures</u>	Footbridges are now on the forward programme.
28	<u>Creation of a skills matrix and collaboration with ADEPT and MSIG for inspector competency framework</u>	
29	<u>Creation of new procurement and supply chain processes</u>	

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30	Creating a road materials policy	
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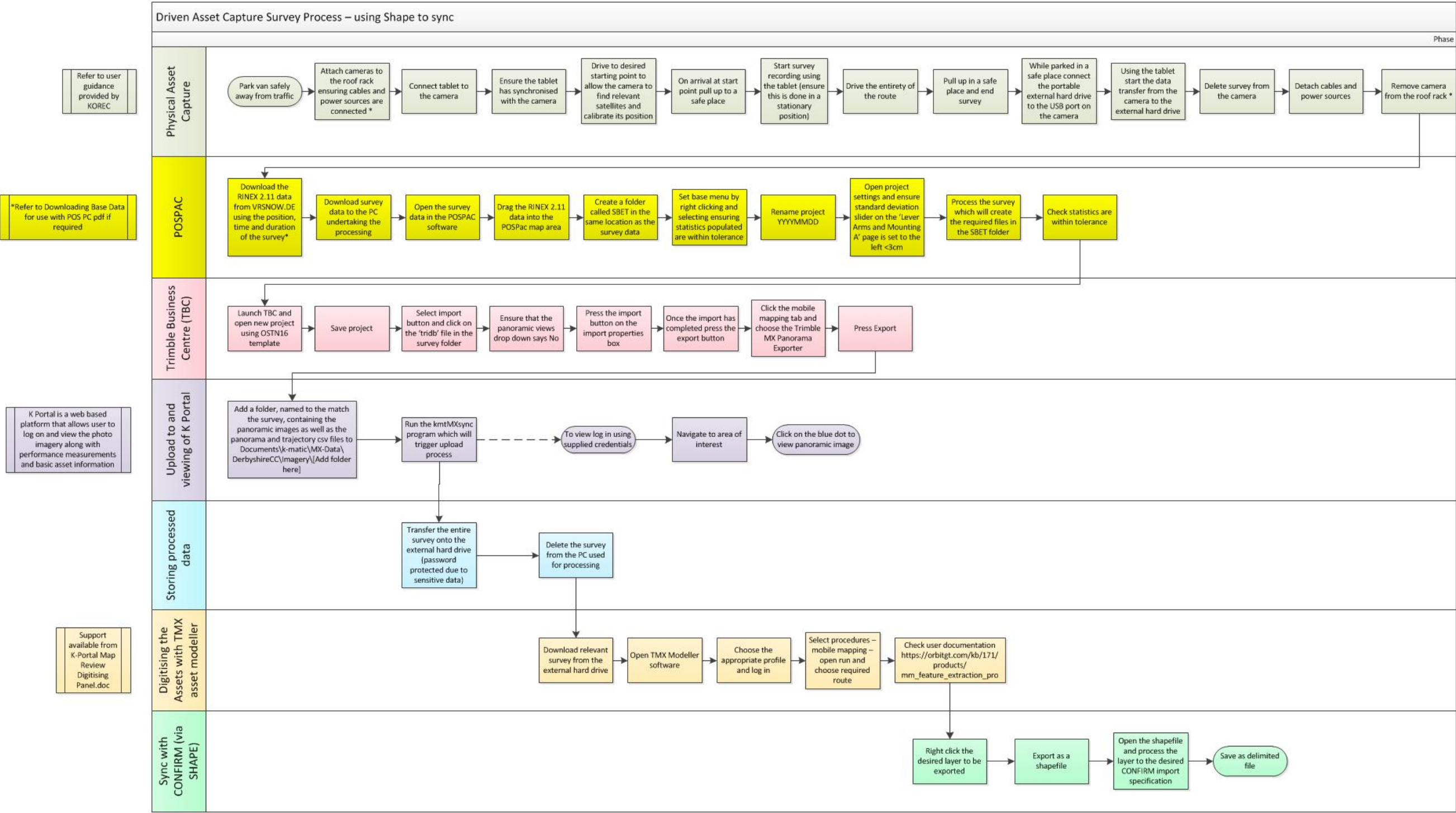
APPENDIX B: PLAN OF CRITICAL ASSETS

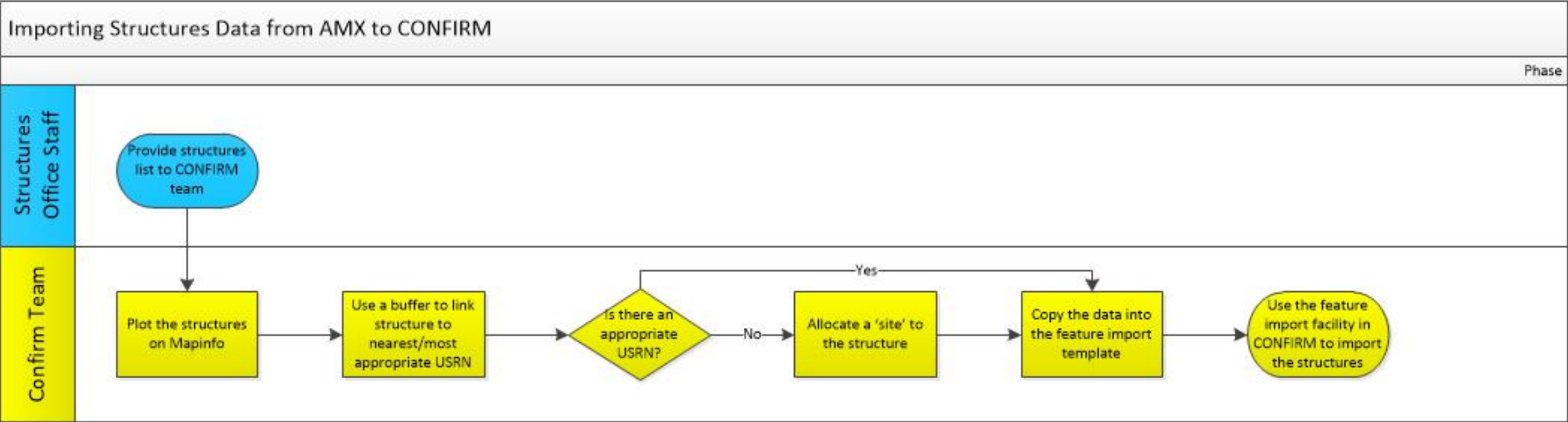
This will be added once [Development Area 5](#) is completed

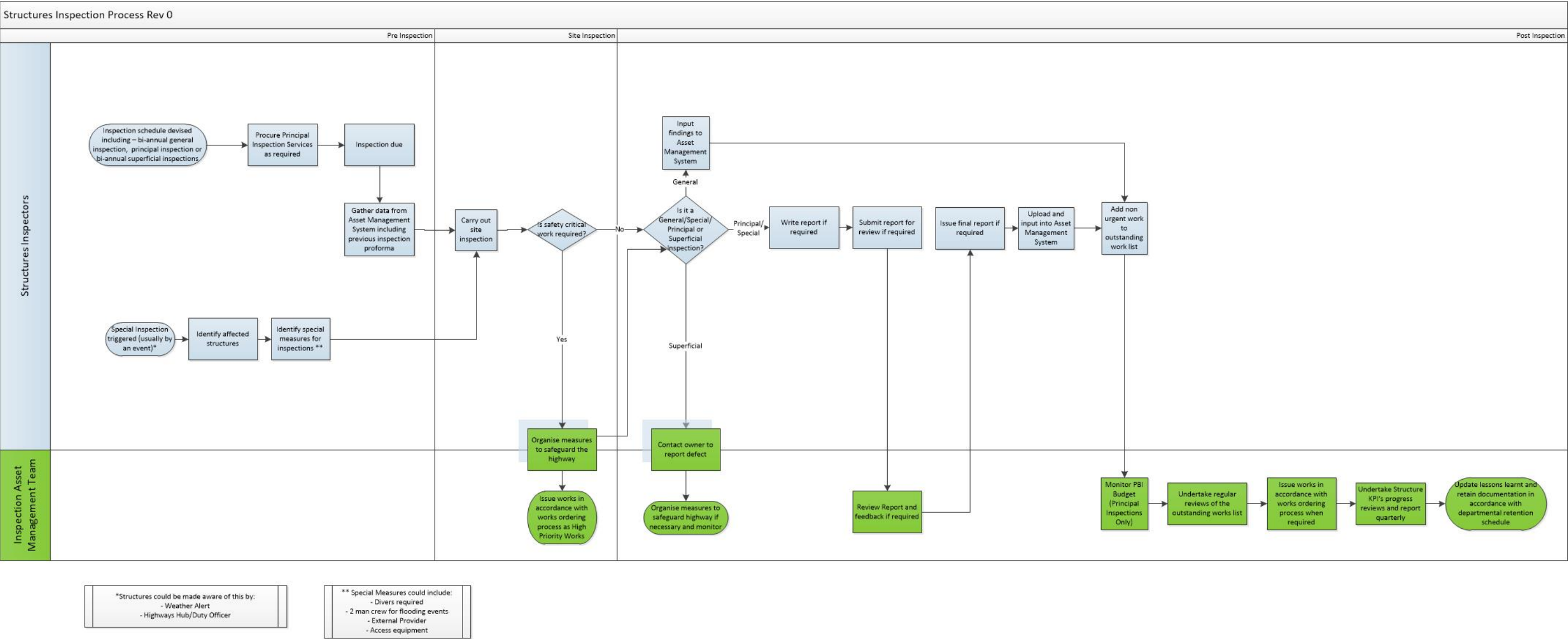
APPENDIX C: PROCESS MAPS

The procedure for inspection of highway structures including entering data on to the departmental asset management system is stored locally and can be found [here](#).

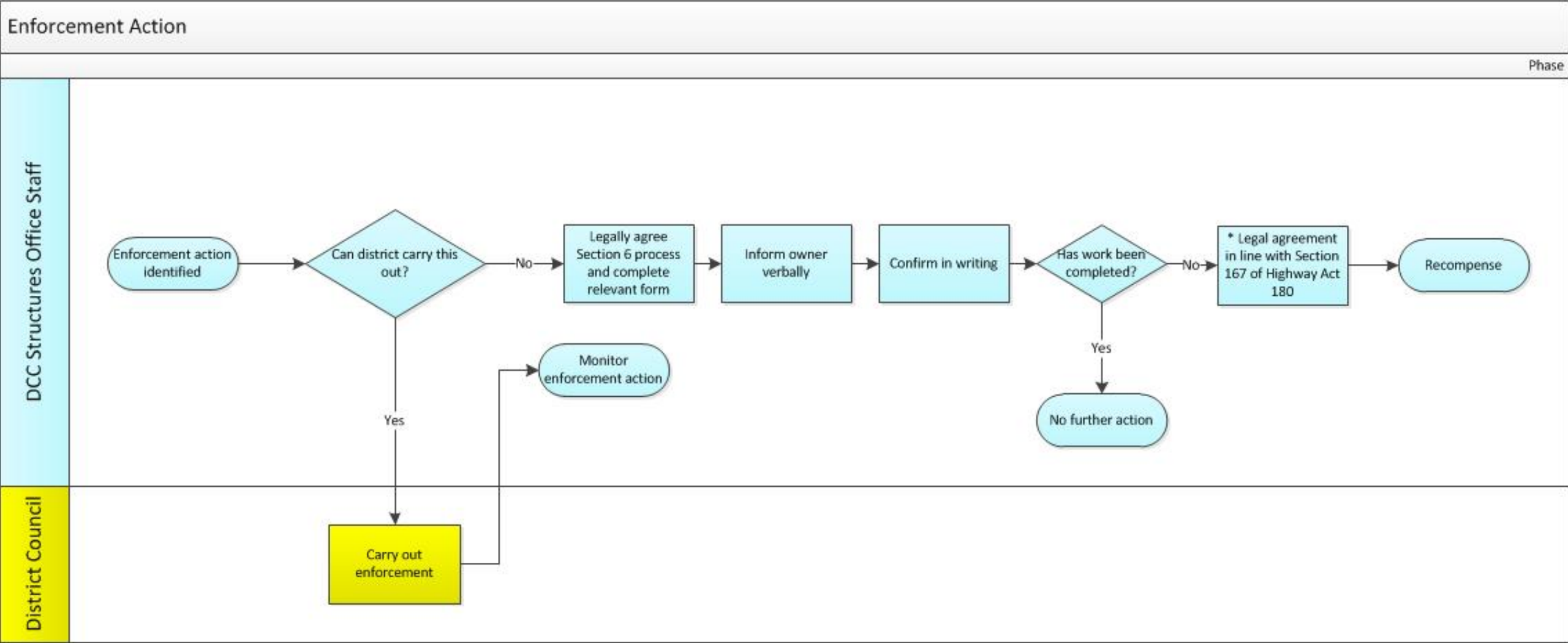
The procedure for inspecting by drone is stored locally and can be found [here](#).







Enhanced General Inspection Process will be added dependent on the outcome of [Development Area 11](#).



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

APPENDIX D: 1 TO 5 YEAR FORWARD PROGRAMME
The forward programme can be found on our website [here](#).

APPENDIX E: SKILLS MATRIX
This will be added once [Development Area 27](#) is completed.