

PUBLIC



HIGHWAY INFRASTRUCTURE ASSET MANAGEMENT PLAN FOR STREET LIGHTING

JANUARY 2020

AN ELEMENT OF THE HIGHWAY INFRASTRUCTURE
ASSET MANAGEMENT SYSTEM

Document Information

Title	Highway Infrastructure Asset Management Plan for Street Lighting
Author:	Teri Ford/Bronwen Terry
Reviewed:	Julian Gould

Document Issue Status**Table of Amendments**

NO	APPROVAL DATE	SECTION	DETAILS	AUTHOR
1	23/01/2020	All	First Issue	TF/BT
2	01/01/2021	All	See Review Schedule 1	BT
3	09/04/2021	All	See Review Schedule 2	BT

If this document is printed or copied it must be treated as an uncontrolled version as it will only be correct at the dates published in the document when it was printed or copied.

Contents

1. INTRODUCTION	4
2. SCOPE	5
3. ASSET CAUSES OF DETERIORATION.....	6
4. NATIONAL/LOCAL GUIDANCE AND RELATED DOCUMENTS	6
5. LEVELS OF SERVICE AND CRITICAL ASSET IDENTIFICATION.....	7
6. DESIGN.....	9
7. CONSTRUCTION	9
8. IDENTIFICATION OF NEW ASSETS/IMPROVEMENT OF ASSET DATA – DATA CAPTURE.....	9
9. INVENTORY UPDATE AND ASSET CAPTURE.....	10
10. AS BUILTS AND DATA CAPTURE	10
11. INSPECTIONS AND TESTING	10
12. ASSET CONDITION AND INSPECTION.....	12
13. LIFECYCLE PLANNING.....	15
14. MAINTENANCE PROCESSES	15
15. BACKLOG.....	16
16. VALUE MANAGEMENT/ENGINEERING APPROACH.....	16
17. CROSS ASSET CONSIDERATION	16
18. FORWARD PROGRAMME	17
19. ANNUAL PROGRAMME	17
20. RISK REGISTER.....	17
21. COMPETENCY AND TRAINING.....	20
22. PERFORMANCE MANAGEMENT FRAMEWORK.....	20
23. COMMUNICATIONS.....	22
24. CLIMATE CHANGE ADAPTION AND CIVIL EMERGENCIES AND SEVERE WEATHER EMERGENCIES PLANS	22
25. HERITAGE AND CONSISTENCY WITH CHARACTER	22
26. CARBON REDUCTION.....	22
27. ENVIRONMENTAL IMPACT, NATURE CONSERVATION AND BIODIVERSITY	22
28. SUPPLY CHAIN COLLABORATION AND COLLABORATION IN SERVICE DELIVERY	22
29. DELIVERY	22
30. PROCUREMENT	23
31. OPERATIONAL POLICIES.....	23
32. APPENDICES	24

If this document is printed or copied it must be treated as an uncontrolled version as it will only be correct at the dates published in the document when it was printed or copied.

1. INTRODUCTION

The Well Managed Highway Infrastructure Code of Practice sets out the approach to the maintenance of street lighting assets and states:

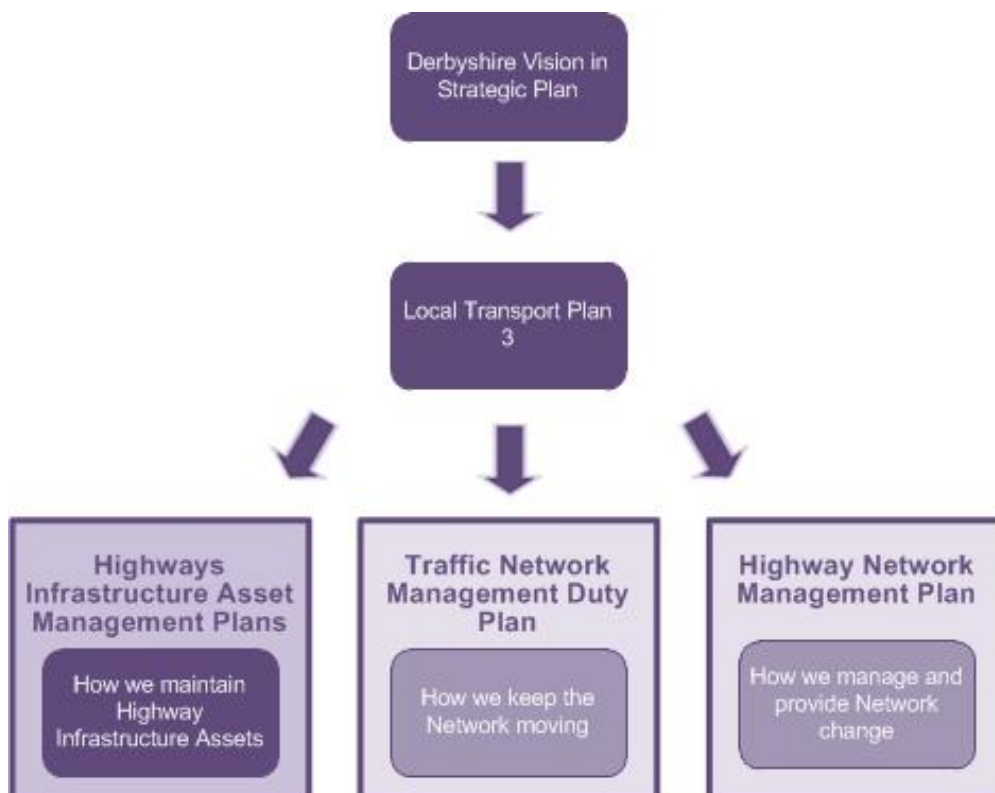
“A lighting system requires inspection and maintenance to ensure that it is safe, operates correctly, continues to provide the designed performance and in order to maximise its useful life.”

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

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

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

Diagram 1: Plans and Policy Framework



If this document is printed or copied it must be treated as an uncontrolled version as it will only be correct at the dates published in the document when it was printed or copied.

2. SCOPE

This document covers the street lighting assets on the Derbyshire highway network that Derbyshire have a responsibility to maintain. Street lighting assets include street lighting columns, which can be constructed of either aluminium, steel or concrete, lighting units (including those mounted onto telegraph poles), associated cables/ducting, subway lighting units, parking meters, illuminated signs, bollards and beacons. All assets have unique asset ID which is applied by adhesive label or spray painted on. This is how Derbyshire fundamentally identify one asset from another. Guidance on attachments to street lighting columns is included in the Network Management Duty Plan and further information can be found on the [Derbyshire website](#).

Lighting Columns on Non-DCC Highway Network

This document does not cover those street lighting elements maintained by third parties such as District/Parish/Town councils, local land owners and businesses.

DEVELOPMENT AREA 1: Identifying Street Lighting Assets Located on Non – DCC Highway Network

There are a number of lighting columns that are currently maintained by Derbyshire County Council that are not located on the Derbyshire County Council highway network which is maintainable at public expense. The following needs to take place:

- 1) Those street lighting columns located on non-DCC highway network are to be identified by a desktop exercise.
- 2) Continuing liaison with district and borough councils regarding ownership of street lighting assets
- 3) For those assets identified as located on non-DCC highway network, the number, location and current energy cost liability are to be documented for each location.
- 4) Where there is a possibility of transferring to another more relevant owner for maintenance (such as another authority) this is to be investigated and potential cost savings identified. The risks issues of implementation are also to be outlined.

DEVELOPMENT AREA 2: Boundary Agreements

There are currently no boundary agreements in place with neighbouring authorities. Derbyshire would like to instigate boundary agreements for street lighting assets.

3. ASSET CAUSES OF DETERIORATION

The main causes of street lighting deterioration are itemised below

Table 1: Asset Causes of Deterioration

A. Lighting Columns

Cause of Deterioration	Description	Typical Defects
Accident	Vehicle Impact	Deformation or destruction of lighting columns
Loading	Wind loading or attachments such as planters, cameras etc	Leaning columns or loose in the ground
Winter de-icing salts, water ingress, weathering, dog fouling	Corrosion	Corrosion of steel lighting columns generally at joins, welds and bases
The internal mortar bungs in type 1805 concrete lighting columns become loose and fall out allowing corrosion to take place	Corrosion of reinforcing bars occurs which creates a stress area then cracking internally occurs migrating through and outward in the structure	Catastrophic failure
Vandalism	Third party damage to columns and lanterns	Removal of access panel, graffiti, breaking of lanterns

B. Illuminated Signs

Cause of Deterioration	Description	Typical Defects
Trees	Dirt and dust adhere to sign face due to leaf sap and other residues	Illegible, loss of reflectivity
Lack of cleaning	General dirt and dust accumulation from vehicular traffic	Illegible, loss of reflectivity
Impact usually vehicle damage	Bending of sign face, disconnection from posts	Destruction or severe impairment of the sign
Loading	Poor design of posts/wind loading	Leaning of sign and posts/sudden structural failure
Ageing	Assets approaching end of design life, affected by sunlight	Fading/sign illegible
Vandalism/graffiti	Spray painted words, bending of sign face, damage to brackets	Sign illegible
Winter de-icing salts, water ingress, weathering, dog-fouling	Corrosion	Corrosion of steel lighting columns generally at joins, welds and bases

4. NATIONAL/LOCAL GUIDANCE AND RELATED DOCUMENTS

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

- [Well-managed Highway Infrastructure: A Code of Practice \(October 2016\)](#)
- [GN22/19 Asset-Management Toolkit: Minor Structures](#)

If this document is printed or copied it must be treated as an uncontrolled version as it will only be correct at the dates published in the document when it was printed or copied.

- [BS 7671:2018 IET Wiring Regulations \(valid from 1 January 2019\)](#)
- [The Electricity at Work Regulations 1989](#)
- [The Work at Height Regulations 2005 SI 2005/735](#)
- [CEN 13201 Road Lighting. Selection of lighting classes](#)
- [BS 5489 Code of practice for design of road lighting](#)
- [BS EN 12767:2019 Passive safety of support structures for road equipment](#)
- [NHSS 8 installation & Maintenance – Highway Electrical Works](#)
- [Construction \(Design and Maintenance\) Regulations 2015](#)
- [Traffic Management Act 2004](#)

These documents are either available online (and links provided from this document) or held within the Street Lighting Technical Library.

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.

Internally a number of quality management processes have been created to control the work in the following areas and where applicable these are discussed at appropriate points and referenced. A number of industry guidance documents that are held internally online [here](#). There are highway electrical standard drawings, a street lighting specification and a lighting policy based on the road hierarchy also used and these will be stored on EDRM.

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, stakeholder views, 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 in regards to safety on the network due to budgetary constraints. Levels of Service will be reviewed and amended regularly to take into account the budgetary position. The policy for determining light levels based on the Road Hierarchy can be found in [Appendix B](#).

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 highway critical street lighting assets were previously defined as those that over 8 metres in height. This definition has been amended to include those assets that are over 8 metres tall and that are located on the resilient network, those assets that are located at safety critical locations such as on bridge decks, near level crossings or near zebra/pedestrian crossings and in town centres. A list showing the street lighting critical assets on the RN is provided in [Appendix C](#).

DEVELOPMENT AREA 3: Other Safety Critical Lighting Column Assets

A definition of the criteria is required to identify which lighting columns on the approach to a zebra/ pedestrian crossing are considered safety critical. A desktop study is required to identify these assets and those located on bridge decks and near level crossings by cross referencing with information held on structures including non-Derbyshire structures.

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

Table 2: Street Lighting Levels of Service

	Street Lighting on Resilient Network and Safety Critical Assets (13% of total assets)	Street Lighting on Network Hierarchies 1 to 7 inclusive (87% of total network)
	Level of Service 1	Levels of Service 2
	Safety + Serviceability + Sustainability + Customer Service	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 Code of Practice and apply asset management techniques to optimise whole life costs.
Standard	Comply with Code of Practice and apply asset management techniques to optimise whole life costs.	Provision of reactive based approach to maintenance only.
Impact/ Risks/ What it means	Lifecycle planning and programme to tackle backlog of improvements. To convert assets to LED technology and replace assets where deterioration is present. Safety inspections and identified safety defects prioritised according to risk based approach. Customer reported failures completed within target period both under the control of Local Authority and under the control of the DNO. Faults on Street Lighting at zebra crossings to be rectified within 24 hours.	Predominantly reactive maintenance with only safety issues addressed. Lifecycle planning, however due to funding an annual programme of works will not be prioritised. Little or no repairs for non-safety defects outside of the programme to convert assets to LED technology and replace columns where deterioration present. Safety inspections and identified safety defects prioritised according to risk based approach. No cyclic maintenance. Lamps allowed to burn to extinction resulting in high number of faults. Growing backlog of obsolete columns. Replacements restricted to potential hazards. Customer reported failures completed in average of 28 days.

If this document is printed or copied it must be treated as an uncontrolled version as it will only be correct at the dates published in the document when it was printed or copied.

6. DESIGN

A lighting design for new developments must be approved by Derbyshire prior to any street lighting works commencing on site. Derbyshire have outlined the requirement in the street lighting specification ([Appendix G](#)).

7. CONSTRUCTION

All street lighting construction works on new developments must comply with Sector 8 of The National Highways Sector Scheme (NHSS) and with Derbyshire's Highway Electrical Standard Details (HESD). The electrical element of the installation shall comply with the IET Regulations BS7671 and every other element of the installation shall comply with the relevant Regulations and British Standards.

Derbyshire have outlined the requirements in the street lighting specification ([Appendix G](#)).

8. IDENTIFICATION OF NEW ASSETS/IMPROVEMENT OF ASSET DATA – DATA CAPTURE

The following table highlights the ongoing process with regard to identifying new assets and improving the data we have on existing assets:

Table 3: Identification of New Street Lighting Assets

Structure Type	Level of Service 1 and 2
Street Lighting Column – steel	On a reactive basis only
Street Lighting Column – concrete	On a reactive basis only
Street Lighting Column – cast iron	On a reactive basis only
Illuminated Signs	See Development Area 5
Illuminated Bollards	See Development Area 5
Subway Lighting Units	Improvements to data required
Parking Meters	Identify assets and record with SAMS. Create smart parking meter asset that can be remotely monitored and managed providing data on revenue income and parking occupancy at sites across the County
Refuge Beacons	Audit and identify those for which illumination can be removed

All data is to be recorded and stored within the Asset Management System in accordance with the [Data Management Strategy](#) and Quality Management System.

DEVELOPMENT AREA 4: Updating the QMS Process Maps

The Quality Management System processes require an update and will be added to [Appendix D](#).

9. INVENTORY UPDATE AND ASSET CAPTURE

DEVELOPMENT AREA 5: Illuminated Signs and Bollards

Changes in national guidance has reduced the requirement for illumination depending on the sign/bollard type and its location. A desktop audit exercise will be conducted to establish those signs/bollard which no longer requiring illumination.

Subway Lighting Units

Subways lights are identified as such within the Asset Management System as the feature type “Subway Lighting 3m” each fitting within each subway has a unique number and asset record on the Asset Management System. Current maintenance programme is to repair when they fail and this is likely to continue until funding can be secured to convert to LED. Failures will be repaired on the standard 28 day programme.

10. AS BUILTS AND DATA CAPTURE

Development Control processes will support the gathering of new as built information for new developments.

Guidance for developers on how Derbyshire require new development lighting to be installed can be found in the Street Lighting Specification document ([Appendix G](#)).

11. INSPECTIONS AND TESTING

Visual Inspection

All lighting columns are visually inspected each time an asset is attended for reactive maintenance. If an asset is found to be in a dangerous condition this is reported to the clerk of works for follow up action. Highway Inspectors are also carrying out brief visual inspections of lighting assets and where safety concerns arise these are added to the asset management system and passed to asset owner for action programme. Inspections provide the data required to support good asset management practice and meet the requirements of the GN22/19.

DEVELOPMENT AREA 6: Inspection Interval Development

Inspection intervals will be developed on a risk based approach following initial inspections and the recommendations of GN22/19 and this will be added to [Appendix E](#).

The following documents are to be referenced and followed when undertaking any site work:

- [DCC Emergency Information Handbook \(Version 2.0\)](#)
- [Street Lighting Generic Risk Assessment](#)
- [COSHH](#)
- [BS7671 Requirements for electrical installations](#)
- [All relevant GCP document](#)
- [Street Lighting Operations Guidance](#)

Indicative Testing

Loss of section monitoring or ultra-sonic testing can determine the presence of localised corrosion either above or below ground. If it is determined that there is no significant loss of section no further action may be required. However, if significant corrosion is detected, the strength of the column would need to be determined by a strength test.

Structural Condition Inspection and Testing

All 8m + lighting columns are routinely inspected as part of the structural testing contract. The structural testing contract is currently been processed via the YPO framework. Where lighting columns show signs of structural deterioration, a strength test should be carried out to determine if it has sufficient strength to withstand its design windloading. Only strength testing that guarantees that a lighting column is structurally sound and should not fail within a certified period should be undertaken.

The procedures to complete a structural condition inspection of street lighting assets by these methods and to input the resultant data are found in [Appendix D](#).

Electrical Inspection and Testing

Electrical testing is carried out in accordance with BS7671 and guidance note 3. Derbyshire has an aspiration to increase the testing of assets on a risk based approach.

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 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](#).

The repairs identified are categorised as the operational asset management and includes the day to day reactive maintenance attending repairs and emergency situations. The timescale for repair is 28 days and there is not currently a central management system for this area of work.

Fault/failed lighting is reported either through the highway asset safety inspections or via members of the public who report issues to the generic street lighting email address etc.streetlighting@derbyshire.gov.uk which is monitored by three business support officers.

Initial Asset Identification Inspection – Data Capture

At the point where a new street lighting asset has been identified through either routine inspections or through new assets being provided through capital/revenue schemes an initial inspection will be undertaken.

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

New assets will be given a new asset record on the asset management system and a unique asset number displayed on the asset. New assets will only be added in accordance with the [Derbyshire Investment Protocol](#).

If this document is printed or copied it must be treated as an uncontrolled version as it will only be correct at the dates published in the document when it was printed or copied.

Enquiry/Adhoc Inspection

These inspections will occur as a result of:

- a highway safety inspection reporting dangerous condition of an asset;
- due to a customer enquiry reporting a dangerous condition of an asset;
- an adhoc inspection may be undertaken of any street lighting asset type to ascertain action to be taken.

The process for this type of inspection can be found in [Appendix D](#).

12. ASSET CONDITION AND INSPECTION

Condition Assessment

Assessment of the lighting column condition enables any deterioration to be determined and the physical integrity of the lighting column to be managed. There currently is no previous data to base risk against. The structural testing Derbyshire are carrying out will see every $\geq 8\text{m}$ column inspected. The outcome of that inspection will become the basis for the frequency of future inspections. Once we have a programme in place, new columns will only be inspected once they are 10 years old as there is no need prior to this. This ties into the corrosion protection system for lighting columns which states no maintenance for up to 10 years, minor maintenance from 10 years and major maintenance after 20 years.

Routine Column Inspection

To be carried out on every occasion that the column is visited, but at least once every two years. The biannual inspections should be fulfilled by the highway safety inspections.

Detailed Inspection

New assets will be inspected 10 years after installation and then as required following reports from routine inspections. Assets will be inspected once every 5 years for standard installations and 3 years for flange plate mounted columns. The inspection intervals should be reduced as the asset ages and begins to show signs of corrosion or other problems.

Table 4: Street Lighting Condition Assessment

Priority	Condition Definition/Criteria	Action	Recommended Treatment
Red – High Risk	Category 5 (GN22/TR22 Category 2U)	Immediate or programmed for replacement within a safe time so as not to endanger the highway user	<ul style="list-style-type: none"> • Immediate replacement/action or works within a maximum of 12 weeks
Amber – Medium to High Risk	Category 4 (GN22/TR22 Category 1U)	Programmed remedial works so as not to endanger the highway user	<ul style="list-style-type: none"> • Immediate replacement/action or works within a maximum of 24 weeks
Yellow – Medium to Low Risk	Category 3 (GN22/TR22 Category 2G)	Monitored and re-inspected within an 18 month period or as identified by the condition assessment. Asset should be re-categorised	<ul style="list-style-type: none"> • Detailed inspection to evaluate/Asset Management System assessment • Instigate a programme of specialist assessment • Check assessment against support specification and re-categorise or add to the strategic works programme
Green – acceptable condition	Category 1 and 2 (GN22/TR22 Category 3G and 5G)	No Action	<ul style="list-style-type: none"> • Re-test in 5 years

All data recorded at any of the above inspections is recorded and stored within the SAMS computer program. Data is controlled in accordance with the Data Management Strategy.

This live data is constantly updated by work on the asset either operational or strategic.

Invest to Save Approach

Part Night Lighting Conversion

Part night street lighting is where some lamps are turned off between midnight and 5.30am or switched off completely. It was introduced between 2012 and 2015. During this time Derbyshire surveyed and risk assessed approximately 26,000 street lights. 8041 street lights were converted to part night operation.

If this document is printed or copied it must be treated as an uncontrolled version as it will only be correct at the dates published in the document when it was printed or copied.

Dimming Lighting

We also intend to dim lights in most locations unless a reduced level of lighting wouldn't be appropriate, for example in areas with an above average record of crime or safety concerns. Dimming of lights would be as follows:

Dusk to 21:30: 100% output

21:30 to 00:00: 75% output

00:00 to 05:00: 50% output

05:00 to 06:00: 75% output

06:00 to dawn: 100% output

Switching is achieved by a one part electronic photocell operating at 20lux on 20lux off, unless an alternative switching arrangement is more suitable, for example a zebra crossing where it would be advantageous for the lighting to operate longer a 35lux on and 35lux off. One part cells will fit the three pin NEMA socket standard unless there is a history of vandalism or the luminaire is heritage style, in which case a mini-cell will be incorporated as part of the luminaire.

Conversion of all Street Lighting Assets to LED Technology

This should result in a total energy consumption of 15,500,000kWh by 2020. The residential element of this is to be completed by December 2019. Assets that are above 8m in height will be delivered April 2022. This includes 12,000 assets. This process includes:

- Visual inspection for condition
- Electrical testing inspection
- Assessed and either:
 - Replaced completely with a new tubular steel column and LED luminaire
 - Converted to LED where an LED luminaire is installed to the existing column
 - Highlighted for a formal structural inspection, and then based on the outcome will be subject to either of the above

Column Replacement Programme

Assets are replaced when they have reached the end of their serviceable life. The publication of GN22/19 will enable improvements in asset lifecycle planning for street lighting.

Safety Critical Refurbishment Programme

DEVELOPMENT AREA 7: Safety Critical Refurbishment Programme

Derbyshire are looking at starting a refurbishment programme for these assets, based on 5 per year, over the next 11 years.

13. LIFECYCLE PLANNING

DEVELOPMENT AREA 8: Creation of Lifecycle Planning

With the publication of GN22/19 Derbyshire would like to develop lifecycle planning.

Column information if currently held against each asset in the asset management system including lantern install date.

Table 5: Street Lighting Asset Lifecycle Planning

Component	Typical Lifecycle
LED driver	12 year warranty from provider. Anticipated that it would burn to extinction and be more cost effective than cyclic replacement
LED luminaire for non-dimmed assets	25 years based on calculation of 100,000 total hours with dusk to dawn burning hours for East Midlands of 4101 per annum
LED luminaire for F02 dimmed assets	34 years based on calculation of 100,000 total hours and F02 dimming regime equates to 2971 burning hours per annum
Steel Lighting Column	To be completed as part of <u>Development Area 8</u>
Concrete Lighting Column	To be completed as part of <u>Development Area 8</u>

14. MAINTENANCE PROCESSES

There are three types of maintenance works undertaken:

- (a) **Reactive maintenance**, is attending to defects and other safety matters that require urgent action arising from inspections or user information in accordance with the locally determined levels of response.. The relevant responses are itemised within the documents; [Highway Infrastructure Asset Safety Inspection Manual](#) and the Customer Road Fault Reporting. Reactive Maintenance Process Maps can be found in the [Reactive Maintenance Teams Operational Manual](#).

Derbyshire are currently running a Burn to Extinction programme which will increase our revenue costs.

DEVELOPMENT AREA 9: Rationalisation of Replacement Programme

Before commissioning of work can occur Derbyshire are going to introduce a rationalisation approach whereby rationalisation occurs when there is no community or safety benefit. This will involve consultation with local parish council and member. This development area is subject to the writing of a business plan and securing funding.

- (b) **Routine or cyclic maintenance** is a process of preventative maintenance carried out on a cyclical basis to help reduce or eliminate failures and to ensure the system is operating at its intended design outputs.

There are no current cyclic maintenance programmes in place.

- (c) **Planned or programmed works** occur when a need for an asset to be replaced has been identified. This could be via condition assessment, improvement schemes, LED invest to save project or following a RTC.

DEVELOPMENT AREA 10: Development of Planned Works Process Map

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

DEVELOPMENT AREA 11: Cast Iron Column Policy

Street Lighting and Conservation are looking to devise a policy on the future maintenance of cast iron columns as they are more costly to maintain and may have an historical interest.

15. BACKLOG

There are 850 cast iron lighting columns in Derbyshire. Conversion to LED has been undertaken in some locations where possible, however as of June 2019, 550 have not been converted. Restoration of a cast iron lighting column and replacement LED luminaire costs significantly more than that of a standard specification column and LED luminaire.

Liaison with colleagues in conservation is necessary to ascertain which cast iron lighting columns are of significant historical interest and devise a restoration process. Those that are deemed to have little or no historical interest will be replaced with a standard specification lighting column and LED luminaire.

Estimating £2,000 for the restoration of the cast iron lighting column and £550 for a heritage style LED luminaire equates to a funding gap of £1,402,500.

There are currently 1,468 street lights mounted to third party assets, such as telegraph poles owned by local distribution network operators. These tend to be in more rural areas where there are no underground electricity cables. The DNO, Electricity North West have requested that third party attachments are removed from their assets. This equates to 550 pole mounted street lights, with an approx. replacement cost of £2,000 per pole bracket to lighting column. This equates to a funding gap of £1,100,000

16. VALUE MANAGEMENT/ENGINEERING APPROACH

DEVELOPMENT AREA 12: Adopting a Value Management/engineering Approach

Derbyshire would like to adopt a value management approach where by 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.

17. 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.

18. FORWARD PROGRAMME

The forward programme is available on the [Derbyshire website](#).

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

19. ANNUAL PROGRAMME

There is not currently an annual programme in place.

20. RISK REGISTER

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

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

The following risk register identifies risks and appropriate mitigation measures.

Table 6: Street Lighting Risk Registers

A. Strategic

Identify Risks	Evaluate Risk	Manage Risk
Understanding the Asset	All street lighting assets have a unique identification number applied to the asset. The asset records holds comprehensive information on the asset which aligns with the requirements of Well Managed Highway Infrastructure.	The asset record is updated whenever works are undertaken, by either operatives on site or by business support and Engineering and Technical officers.
Budget Concerns	Reducing revenue budget and increasing energy costs. Additional assets are obtained when developments are adopted.	County wide roll out of LED technology is underway to reduce energy consumption. LED street lights are pre-set to dim when footfall and traffic movements are reduced, further reducing the energy consumption.
Changes to Traffic	As roads become busier, it is harder to safely undertake maintenance during the day without temporary traffic management. This reduces productivity and increases cost.	Trials of night shifts to undertake maintenance on traffic sensitive areas has proven successful. Increased productivity has off set the additional pay for overtime.
Climate Change	Energy consumed by the street lighting asset will add to the effects of climate change.	The energy payments includes a Climate Change Levy payment. The installation of LED technology has significantly reduced the energy consumption and reduced the effect of the asset on climate change.

If this document is printed or copied it must be treated as an uncontrolled version as it will only be correct at the dates published in the document when it was printed or copied.

B. Operational

Identify Risks	Evaluate Risk	Manage Risk
Increase to asset stock due to developments	Increase in asset stock while revenue funding is decreasing. This will incur net gain on maintenance and energy liabilities.	Specification is to only install LED luminaires to reduce the energy liability, the column specification calls for galvanised steel columns with either a painted or thermoplastic coating to prolong column life.
Electrical faults leading to lights out, electrical shock/fire risk	Poor/unauthorised workmanship on Derbyshire County Council assets. Christmas light attachments poses the most significant risk.	The Street Lighting Service operates an ISO9001 QMS. All wiring is carried out by trained competent operatives registered under NHSS8 HERS to the requirements of BS7671. No third party operatives are to carry out electrical work on Derbyshire County Council assets who are not registered with HERS. The street lighting service is a member of the NICEIC and audits of the workmanship is regularly undertaken
Deterioration/corrosion resulting in structural failure of the asset		Programme of structural inspections to identify lighting columns requiring replacement.
Unable to repair lamps due to manufacturer ceasing to manufacture low pressure sodium lamps in 2019	Increase cost of low pressure sodium lamps as they become harder to source, this could lead to delay in repairing assets with low pressure sodium lamps, in turn having a negative effect on KPI's	Invest to Save Project underway to remove low pressure sodium lamps from service
Crank root lighting columns http://www.hse.gov.uk/safetybulletins/lampcolumns.htm	Crank root columns are used in locations where other underground services prevent a standard root column being installed. It can sometimes not be evident to other services and utilities that underground steel work is structural and any damage may result in column collapse.	Location of crank root columns recorded on the Asset Management System. Warning notice applied on site to warn other utilities of the presence of a crank root column.
Bridge deck columns	Shallow or flange plate foundations. Failure from deterioration or RTC could impact on the road/railway/watercourse beneath. If the column is sited the other side of any safety fence	Design out the risk wherever possible by not placing lighting columns on bridge decks. Where this is not possible, site the column on the same side of the safety barrier as the road above. Consider utilising additional protection to mitigate the risk of vehicular impact.

If this document is printed or copied it must be treated as an uncontrolled version as it will only be correct at the dates published in the document when it was printed or copied.

	maintenance cannot be undertaken without a closure on the road/railway beneath.	Carry out structural testing on existing assets where safe.
--	---	---

21. COMPETENCY AND TRAINING

Derbyshire County Council has an internal competency specification for all highway inspectors. This includes a tool box talk for street lighting requirements.

Derbyshire Street Lighting electricians are required to hold the competencies of Test 01 and Test 02 as well as having full membership and registration with Highway Sector Scheme 8 through the Highway Electrical Association (HEA) and The Department for Communities and Local Government (DCLG) competent person's scheme for highway electrical installations.

All membership cards must be carried on site by relevant staff.

For structural testing Derbyshire use an UKAS accredited structural testing contractor who are also HERS registered for structural testing.

Visual inspections require no underlying training and is based on experience only.

All external contractors undertaking condition inspections are required to meet the same minimum Derbyshire specifications. Derbyshire have outlined the requirement in the Street Lighting Specification ([Appendix G](#)).

Guidance for the competency requirement for Contractor Designer's can be found in the Street Lighting Specification ([Appendix G](#)).

All inspection procedures, toolbox talks and risk assessments are reviewed, updated and then trained on an annual basis. The departmental code of practice is reviewed on a five yearly basis.

All competency and training requirements are based on the HERs competency framework which is referenced in [Appendix F](#) and managed through the Derbyshire County Council MyPlan system.

22. PERFORMANCE MANAGEMENT FRAMEWORK

The Performance Framework is used as a tool to inform, measure, review and derive 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.

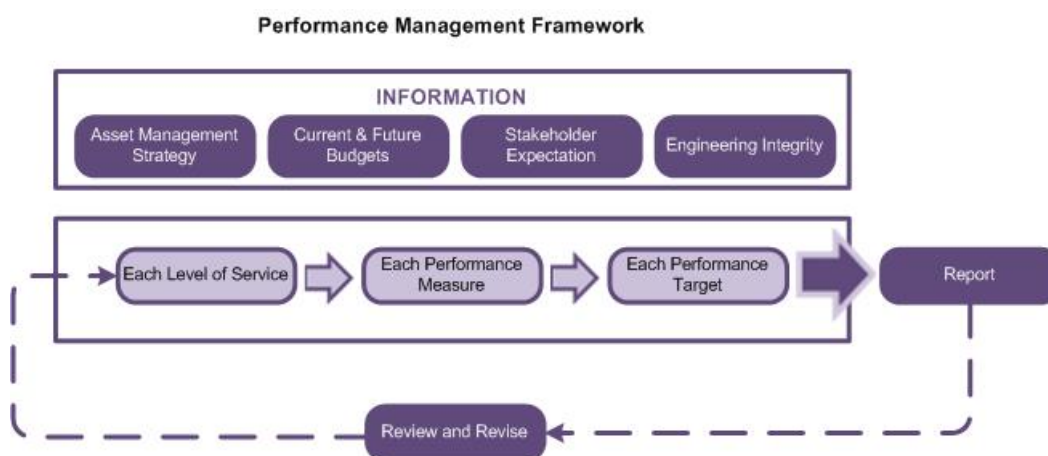
It is not intended that the Council creates a host of measurements that serve little purpose other than to demonstrate the presence of a framework. At any level, external-facing performance measures should show how well services are being delivered and whether objectives are being achieved.

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 overleaf:

If this document is printed or copied it must be treated as an uncontrolled version as it will only be correct at the dates published in the document when it was printed or copied.

Diagram 2: Performance Management Framework



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

Table 7: Street Lighting Performance Indicators

Performance Measure	Level of Service 1 and 2
Safety Performance Indicators	
Street light average repair time (response time is under control of DNO)	28 days
Street light average repair time (response time is under local authority control)	28 days
% of columns older than design life	30%
% of street lighting assets working at any given time	99%
% of condition inspections completed with tolerance levels	90%
Serviceability Performance Indicators	
Emergency response times (2 hours)	90%
Sustainability Performance Indicators	
Street Lighting General Maintenance ET10	£666,250
CO2 emissions	7000
Total energy usage (kWh)	14,850
Backlog	£0 (Level of Service 1 Resilient Network) £2,502,500 (Level of Service 2 Network Hierarchies 1 – 7)
% as-builts provided and inventory updated	100%

If this document is printed or copied it must be treated as an uncontrolled version as it will only be correct at the dates published in the document when it was printed or copied.

Customer Service Performance Indicators	
NHT % of residents satisfied overall with street lighting KBI 25	65%
NHT % of residents satisfied with the provision of street lighting HMBI 05	64%
NHT % of residents satisfied with the speed of repair to street lights HMBI 06	60%

23. COMMUNICATIONS

This is covered within the separate [Highways Communications Plan](#).

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

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

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

25. 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.

26. 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](#).

27. ENVIRONMENTAL IMPACT, NATURE CONSERVATION AND BIODIVERSITY

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

The Street Lighting Specification document in [Appendix G](#) outlines how Derbyshire aim to reduce environmental impacts and improve sustainability.

28. SUPPLY CHAIN COLLABORATION AND COLLABORATION IN SERVICE DELIVERY

Street Lighting have tenders and frameworks in place for the procurement of goods and services. These have been developed alongside ETE or Corporate Procurement to ensure Derbyshire meet the requirements of Financial Regulations 2019.

Specifications for street lighting design and equipment is detailed in [Appendix G](#).

29. DELIVERY

Street Lighting works are carried out by a combination of the in-house construction services and external contractors. Specific guidance can be found in the Street Lighting Specification Document in [Appendix G](#).

If this document is printed or copied it must be treated as an uncontrolled version as it will only be correct at the dates published in the document when it was printed or copied.

30. PROCUREMENT

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

Unless excluded from the Construction Products Regulations and Declarations of Conformity, all products shall be CE marked.

It will be necessary to provide details of materials throughout the different stages of a scheme e.g. passive safe equipment before purchase, lanterns on adoption inspection etc.

Further details can be found in the Street Lighting Specification Document in [Appendix G](#).

DEVELOPMENT AREA 14: 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

31. OPERATIONAL POLICIES

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

32. APPENDICES

APPENDIX A: DEVELOPMENT AREA SUMMMARY

Table 8: Development Area Summary

Development Area Number	Development Area Title	Action Taken
1	<u>Desktop exercise of lighting columns on non DCC highway network</u>	
2	<u>Development of cross boundary agreements</u>	
3	<u>Defining other safety critical lighting column assets</u>	
4	<u>Updating the QMS Process Maps</u>	
5	<u>Desktop audit of illuminated signs and bollards</u>	
6	<u>Inspection Interval Development</u>	
7	<u>Safety critical refurbishment programme</u>	
8	<u>Creation of lifetime planning</u>	
9	<u>Rationalisation of replacement programme</u>	
10	<u>Development of Planned Works Process Map</u>	
11	<u>Cast Iron Maintenance Policy</u>	
12	<u>Adopting a value management/engineering approach</u>	
13	<u>Communications between staff via email</u>	All tablets now have access to office 365 and email communication is no longer an issue
14	Creation of Road Materials Policy	

APPENDIX B: NETWORK HIERARCHY FOR DETERMINING LIGHT LEVELS

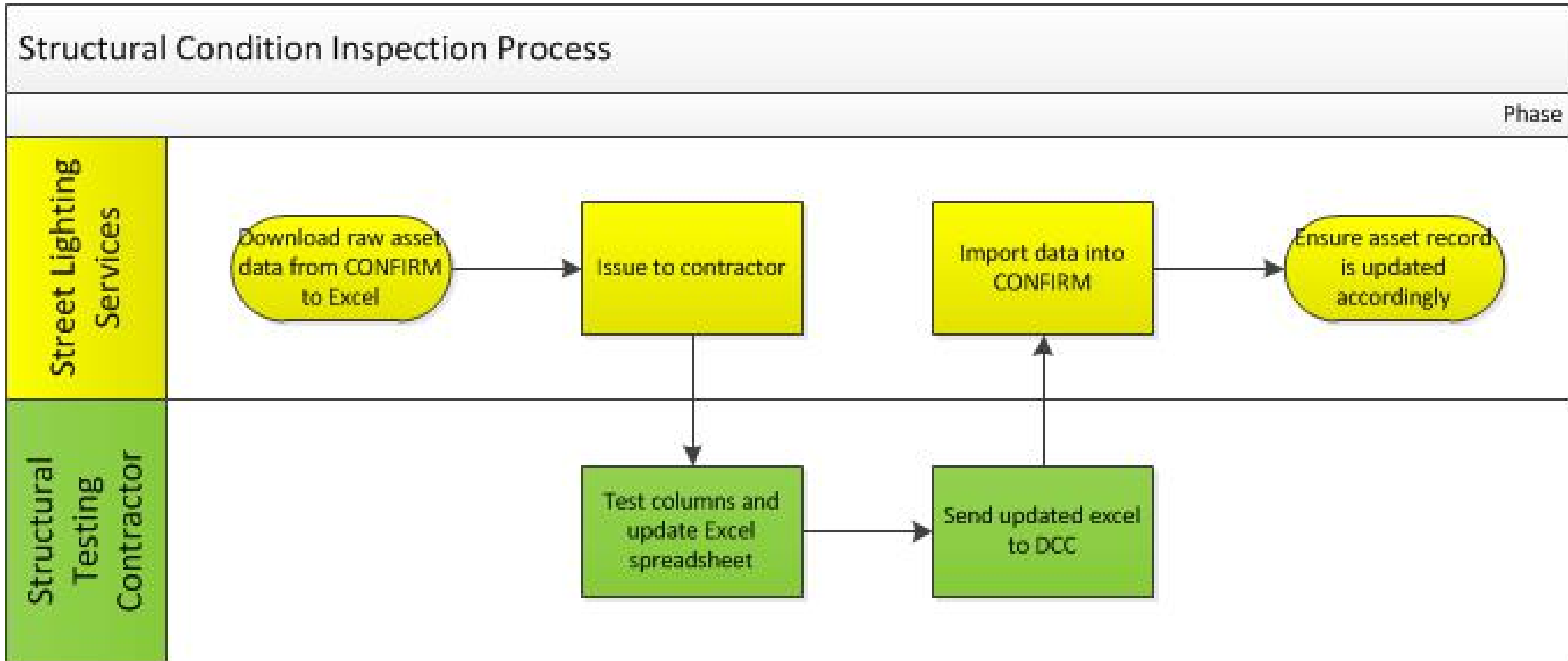
This can be found internally [here](#).

APPENDIX C: CRITICAL ASSETS ON THE RESILIENT NETWORK

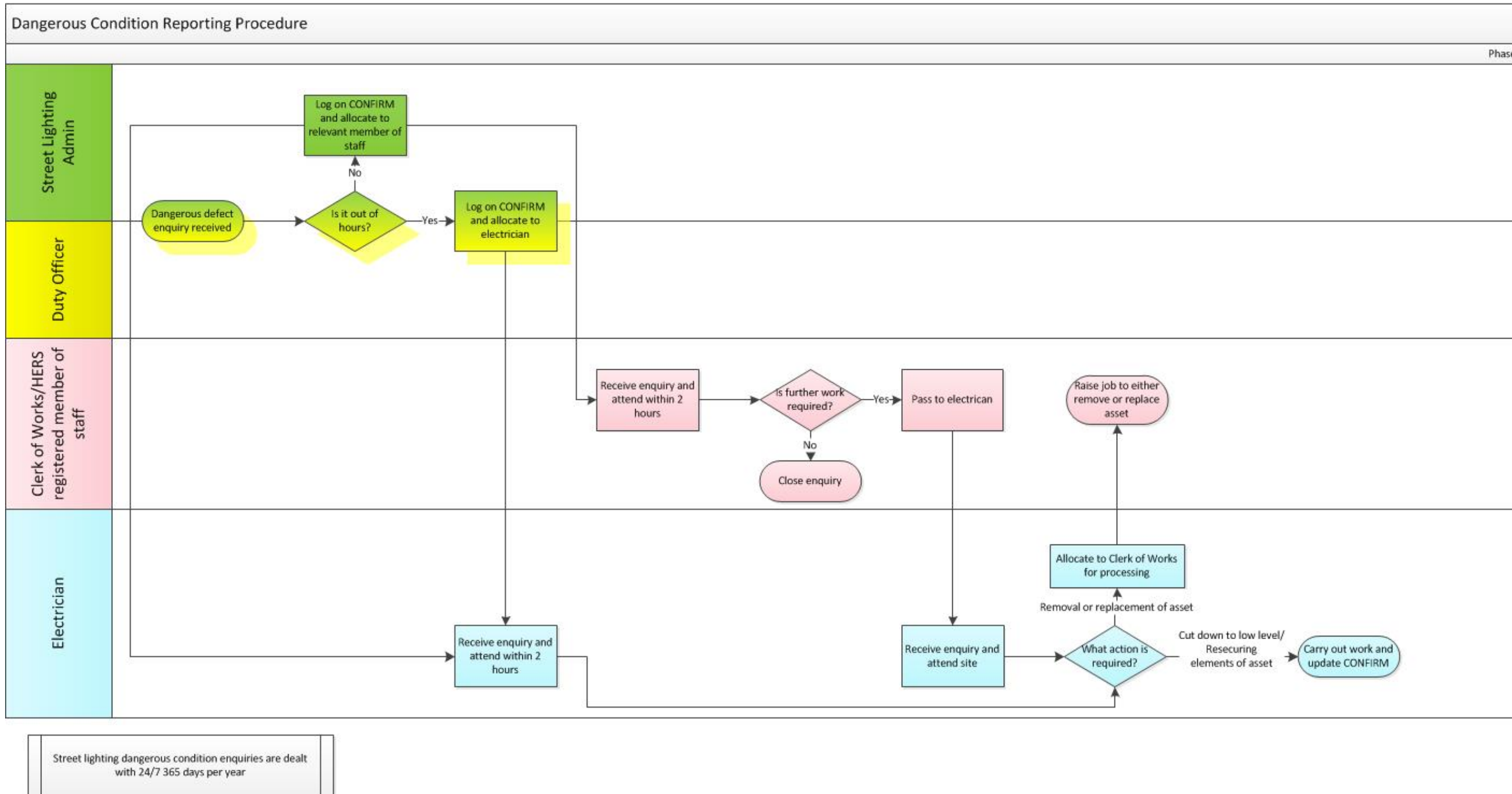
Asset Type	Number on the RN
SL: DCC Circuit	1487
SL: Feeder Pillar	333
SL: Illuminated Bollard	925
SL: Illuminated Plate Attach	444
SL: Illuminated Sign	1426
SL: Lighting Column	9300
SL: Non-Illuminated Plate Attach	155
SL: Non-School Flasher	2
SL: Pedestrian Zebra Crossing	69
SL: Refuge Beacon	129
SL: School Amber Flasher	64
SL: Sign on a Bridge	9
SL: Subway Lighting	214
SL: Wall Mounted	142
TOTAL	14,699

APPENDIX D: PROCESSES

QMS processes will be added once [Development Area 4](#) is completed.



If this document is printed or copied it must be treated as an uncontrolled version as it will only be correct at the dates published in the document when it was printed or copied.



APPENDIX E: INSPECTION INTERVALS FOR STREET LIGHTING ASSETS

This will be added once [Development Area 6](#) is completed.

APPENDIX F: HERS COMPETENCY REQUIREMENTS

The HERS competency requirements can be found [here](#).

APPENDIX G: STREET LIGHTING SPECIFICATION

The specification can be found [here](#).

If this document is printed or copied it must be treated as an uncontrolled version as it will only be correct at the dates published in the document when it was printed or copied.