

HIGHWAYS ASSET MANAGEMENT PLAN

ANNUAL STATEMENT REPORT 2021

Environment Directorate,
Highways and Transport
Division

carmarthenshire.gov.wales

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Executive Summary

In July 2018 Council adopted the Highway Asset Management Plan which included an undertaking to present an Annual Statement Report (this report) on the condition and performance of the highway network, one of the most valuable assets managed by the County Council.

The Report discusses how the asset has been managed over the past twelve months (2020-2021) and includes a discussion of the key issues and changes which have impacted its condition.

The Report provides detailed commentary on the following three key highway asset areas:

- Highways (carriageways, footways, and cycleways)
- Bridges and Structures
- Highway Lighting and Traffic Signals

For each asset category the report details its condition, how its condition has changed since the last report and how it will change into the future depending on funding scenarios which are set out within the report.

Highways

The Highway network in Carmarthenshire is the second largest in Wales and extends to over 3500Km. Although much of the County is predominantly rural in nature it nevertheless has the third highest level of traffic in Wales.

In common with highway authorities around the country Carmarthenshire has a backlog of highway maintenance and that backlog is unfortunately growing. This has necessitated a risk-based approach to its management to focus on the higher priorities for resource allocation. This approach has focused resources towards the higher class roads and as a result their condition has been relatively stable over the period. Deterioration will be more noticeable in the more lightly trafficked lower class roads.

The highway network carries a range of road users from cyclists and pedestrians through to 44 tonne heavy goods vehicles and operates through weather conditions ranging from hot sunny summers to sub-zero winters with snow and ice. The highway network is also being increasingly impacted by storm events which can lead to highway flooding and undermine the support for our highways. All of these are detrimental to the fabric of the highway asset and continuous investment is required to ensure it is fit for purpose.

In recent years additional funding has been available and Welsh Government grant funding (£1.5M) combined with County Council funding (£1.55M) has helped to maintain the asset with approximately 25km of roads resurfaced in 2020/21. This has helped to keep our higher-class roads in a relatively stable condition. However, an overall annual investment of £6M per year is required to keep all Carmarthenshire's roads in a stable condition. Consequently, the minor road network will have suffered

the greatest deterioration and overall it is calculated that there is a highway maintenance backlog of over £38M.

The authority's footway and cycle network exceed 1000km in length, investment in maintenance has been modest and is mainly focused on local priorities. The division has submitted a Capital bid of £500k pa to develop a modest footway and cycleway refurbishment programme.

Bridges and Structures

Our highways are supported by almost 1,900 structures which includes around 800 bridges, 560 retaining walls 459 large culverts and 49 footbridges. Welsh Government's Resilient Roads Grant funding has helped address storm damaged areas particularly along the A484 where new retaining walls have been required in a number of locations.

With recent capital investment, the number of sub-standard structures has decreased from 54 to 50 and these are being carefully monitored to ensure they remain safe for public use.

The overall bridge stock condition has remained relatively stable.

Highway Lighting and Traffic Signals

Our street lighting system includes over 20,000 lighting units. We also manage 5000 units for our Town and Community Councils. LED lighting units have been introduced for County and Community lights to replace less efficient street lighting units on an invest to save basis. This has reduced carbon emissions, lowered energy costs and improved light quality. The project was completed in the summer of 2020 and is estimated to have saved 1,200 tonnes of CO₂ emissions.

There are two significant challenges for the Public Lighting Team:

- Ageing lighting columns, including more than 7,000 steel columns need to be replaced to avoid the risk of collapse. A programme is underway for this.
- 304Km of deteriorating underground electrical cabling needs replacing to prevent cable faults, power outages and to ensure public safety. A funding application has been made for this.

The County Council also has 54 signalised pedestrian crossings and 20 signalised junctions.

Section 1 – Introduction

1.1 Introduction

The highway network plays a vital role in facilitating the safe and efficient movement of goods and people. It underpins not just our economy but also the fabric and wellbeing of our communities. Carmarthenshire has the second largest highway network in Wales with over 3,500km of highway, 1,000km of footways & cycleways, 1,900 structures and 20,000 lighting units. All of these important assets require continual investment and management to ensure that they continue to support and connect our communities.

In common with highway authorities around the country the highway network in Carmarthenshire has a maintenance backlog which is increasing. This is recognised through the HAMP where a risk-based approach is adopted in line with the recommended Code of Practice.

1.2 HAMP Management Approach

Maintaining the highway network in a serviceable condition remains a continuing challenge against a weight of public expectation. External influences such as traffic loading, winter service and severe weather events and natural deterioration undermine the fabric of our roads and its management through events such as covid are a strain on resources.

The HAMP recognised this difficulty with the adoption of a risk-based approach to focus limited where they are most urgently needed. This year we have built on Parts 1, 2 and 3 of the HAMP in developing the first sections of the HAMP Maintenance Manual. The Maintenance Manual is being brought forward as a separate report and extends the risk-based approach in the following areas:

- Highway Maintenance Management
- Highway Network Hierarchy
- Highway Inspection and Repair Regime
- Road Condition Assessment and Investment Prioritisation

1.3 Challenges



Through 2020/21 the authority has faced many challenges and these have had an impact on the highway network and how it is managed. The key challenges are highlighted below.

Key Challenge – Carbon Reduction
<ol style="list-style-type: none">1. Initiatives such as the introduction of LED lighting units have made a significant contribution towards reducing carbon emissions.2. A review is also underway of our vehicle fleet to introduce ultra-low emission vehicles where feasible.3. A new highway repair methodology is also being trialled to improve the durability of pothole repairs and improve efficiency.4. The potential use of low carbon materials is continually reviewed to assess their feasibility as they become commercially available.5. The adoption of the Vaisala video survey system has reduced the need for many site visits and improved our efficiency by supporting maintenance and design teams in reducing the number of vehicle journeys.
Key Challenge – Climate Change
<ol style="list-style-type: none">1. Adverse weather events are occurring more frequently, and the Service operates an emergency management plan to respond to such events.2. Out of Hours management systems are in place in partnership with other key responders.3. Duty Officers, Operatives and plant such as pumps and a snow blower are on standby to assist in critical locations.4. Highway drainage and geotechnical surveys of key routes are being undertaken to improve target areas of concern and improve network resilience.5. Additional weather stations are being introduced to improve the accuracy and detail of forecasting.
Key Challenge – Covid Pandemic
<ol style="list-style-type: none">1. Continuing the provision of services through the pandemic has been a challenge requiring a flexible and adaptive approach.2. Covid Risk Assessments and Safe Working Practices were introduced to cover all site and office-based operations.3. Office based employees adapted to working remotely to continue to provide services and support front-line operations.4. Additional vehicles were introduced and working 'bubbles' implemented to safeguard operatives undertaking certain activities.5. Staff absence due to covid was managed and support given to other front-line services so that they could continue to be delivered.

1.4 Achievements

Despite a very challenging backdrop, not least the continuing provision of a service through the covid pandemic, a number of notable achievements have been made.

Hot Material Pothole Repair Trial	
<p>A trial is underway to repair potholes using hot materials to improve the durability of the repairs and to improve repair efficiency by only making one visit with a 'fix first time' approach.</p> <p>The Roadmender machine (pictured) has a 'hotbox' to continually heat materials and can also carry excavated materials</p>	
Replacement Lighting Columns	
<p>A programme has been introduced to replace aging lighting columns which are in danger of collapse.</p> <p>The initial focus is on over 7,000 steel columns, and a large proportion of these have exceeded their design life.</p>	

Drainage Surveys	
<p>Proactive drainage surveys are being undertaken on a selection of key main roads including the A484 from Newcastle Emlyn to Llanelli and the A485 north of Carmarthen. The surveys are identifying issues which are causing surface water flooding and enabling appropriate remedial or cleaning works to be brought forward as funding permits to ensure that road flooding does not occur. It should be noted that 32% of the drainage systems so far surveyed are blocked or collapsed.</p>	
Geotechnical Surveys	
<p>A programme of geotechnical surveys and assessments are being undertaken along key main routes which are prone to river flooding in particular such as the A484 and A485. The purpose of the work is to assess the stability of potentially vulnerable sections and to identify early remedial works which may prevent bigger problems developing and potentially compromising the highway.</p>	

The following three sections provide detail of the three key highway asset areas:

- Highways (carriageways, footways, and cycleways)
- Bridges and Structures
- Highway Lighting and Traffic Signals

Section 2 – Highways

2.1 Introduction



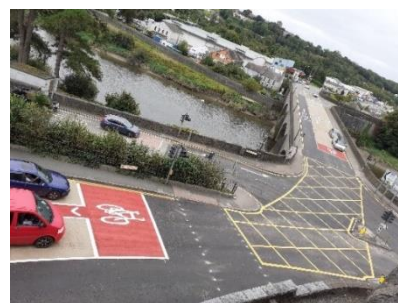
The road, or carriageway asset, is by far the largest asset in terms of operational importance and investment value. Over recent years traffic volumes have continued to increase along with customer expectation. Increased levels of usage combined with the effects of more frequent adverse weather events can accelerate the deterioration of road surfaces. Heavy goods vehicle journeys, which cause the most significant stress on the fabric of the highway are less likely to have reduced during this period as essential supply chains were maintained.

Carmarthenshire's highway network provides the vital infrastructure which supports and facilitates connectivity within our County and with the rest of Wales. Our road system ensures businesses continue to operate, people get to work, food reaches shelves, children get to school, and patients get to hospitals. Ensuring this network remains fit for purpose and provides for the safe and efficient movement of goods and people is an essential component in maintaining a healthy, vibrant, and prosperous Carmarthenshire.

It is estimated that the cost to keep pace with on-going deterioration of our road surfaces across the 3500km network requires long term funding of £6m per year to carry out corrective and preventative maintenance. The current lack of planned maintenance is leading to increased abortive cost of reactive maintenance for potholes and surface failures, placing increased pressure on diminishing revenue budgets and increased replacement costs for future generations. Current budget levels (600k Capital), even with additional WG funding (£1500k PA in recent years but not confirmed for future years) is not keeping pace with deterioration and we face increased future costs and risk of claims against the authority. Current funding does not support the authorities' commitments and promotion of cycling on the highway network. Currently 9.4% of the County's classified road network are in a RED condition (plan maintenance soon) and in need of refurbishment to provide a safe and sustainable transport network. The project consists of a county wide prioritised programme of road refurbishment and preventative treatments aiming to extend the life of existing road surfaces and reducing future costs from reactive repairs and complete reconstruction when roads fail.

2.2 Highways Status Report

The Transportation and Highways Division has been able to maintain key services this year despite the lockdown restrictions. A large programme of road refurbishment has been delivered and by the end of November we will have resurfaced 17km of priority sections of road. In addition we surface dressed 43km of road providing essential surface restoration and preventative maintenance treatment. A significant portion (50%) of this has been funded by Welsh Government Road refurbishment grant. There is no indication of grant funding for 2022 and our future road refurbishment programmes will be significantly reduced as a result and in addition to potential for further reductions in revenue funding from PBB's. We continue to have an overall lower than average level of investment in our Highways and transport, ranking **18th out of 22** authorities and remain in the lower quartile across Wales.



Key Facts

Carmarthenshire has the **second largest** highway network in Wales (3485 Km of highway) and is more than double the Welsh average of 1514km *

We have the **third highest traffic volume** in Wales - in 2020 the Wales average was 1.12 billion vehicle km/per year and Carmarthenshire was third at 1.68 billion (Cardiff 2.65 and RCT at 1.77 were highest) *

In 2020/21 our **spend on highways and transport was ranked 18th out of 22** authorities on money spent per km on highways and roads. £3090/km compared to a Welsh average of £6610/km. *

Based on current funding levels, the length of road estimated to be in a poor condition is predicted to increase from 9% to 28% over the next 20 years.

(* data from StatsWales.gov.wales)

There have been a number of particular points of note over the last year (2020-21) regarding our highway network. Work has continued in delivering projects funded by the road refurbishment grant from Welsh Government and the £3.1M grant in March 2019 for remedial works following Storm Callum. A further £936k has been secured from Welsh Government to address storm damage highway infrastructure and work is progressing on a number of schemes.

Carmarthenshire successfully hosted Stage 3 of the Tour of Britain in September 2021 and sections of the Wales Road race at Newcastle Emlyn the same month.

Our 3500km highway network is subject to many external influences which cause the asset to deteriorate such as weather impacts and traffic loading. Based on current road condition figures, there is a backlog of carriageway maintenance works in

Carmarthenshire equating to £38M. Our current investment consists of £600k of County Council funding which has been bolstered through grants of £1.5m per year from Welsh Government. The impact of current investment levels and investment options are set out within this report.

The latest available condition survey data for 2018-19 show that Carmarthenshire **remains in the lower quartile** for road condition.

Road Conditions: Percentage of A,B and C Roads in poor condition (18-19 data)		
A Roads	5.2%	Ranked 20th (out of 22 authorities in Wales)
B Roads	4.2%	Ranked 10th (out of 22 authorities in Wales)
C Roads	12.5%	Ranked 17th (out of 22 authorities in Wales)

These performance figures are directly related to investment levels in Carmarthenshire. The graph below shows an investment comparison with other local authorities in Wales.

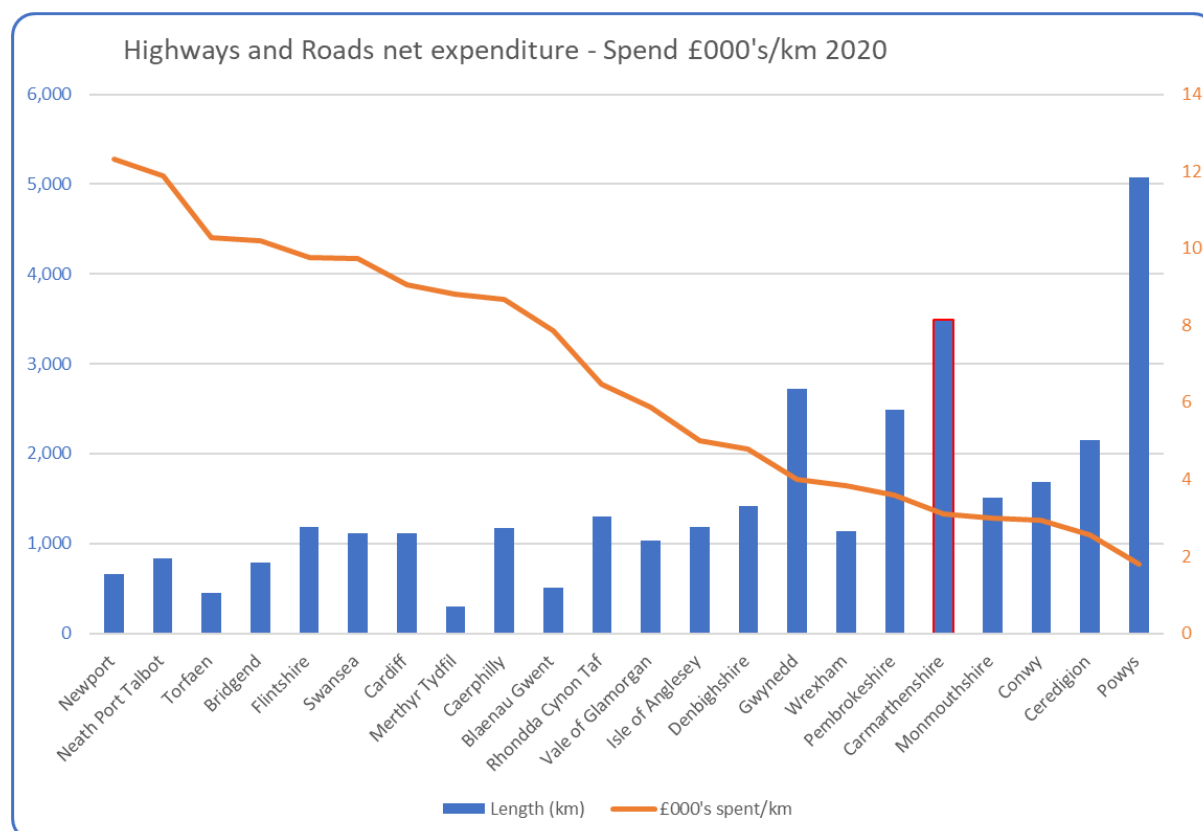


Table 1. Estimated carriageway maintenance need based on measured road condition

Road Class	A	B	C	U	Total	
Network Length (km)	249.6	331.5	1283.8	1617.1	3482	
Av. Width (m)	7.3	6	5	3		
Surfacing rate (£)	12	10	10	10		
Surface dressing Rate (£)	5	4	2.5	2.5		
% Red (>100) Resurfacing	4	3.4	12	10		Condition
% Amber 1 (80-100) Resurfacing	5.2	4.5	9.2	9.2		
% Amber 2 (40-80) Surface treatment	23.2	21.2	28.4	28.4		
Total	32.4	29.1	49.6	47.6		
Area Red	72883.2	67626	770280	485130		One off costs
£ (resurfacing cost)	£874,598	£676,260	£7,702,800	£4,851,300	£14,104,958	
Area Amber 1	94748.16	89505	590548	446319.6		
£ (Resurfacing cost)	£1,136,978	£895,050	£5,905,480	£4,463,196	£12,400,704	
Area Amber 2	422722.56	421668	1822996	1377769.2		
£ (Surface treatment cost)	£2,113,613	£1,686,672	£4,557,490	£3,444,423	£11,802,198	
Sum Total	£4,125,189	£3,257,982	£18,165,770	£12,758,919	£38,307,860	

The above table indicates that to rectify all areas of highway requiring remedial surfacing works would cost £38,307,860.

2.2 Ash Die-back

Ash trees across Europe are under attack by a pathogen that significantly affects the structural strength of ash trees. The authority has established a management plan to respond to this and the Transportation and Highways Division has taken on a key role in managing trees on and alongside the highway. In 2019 highway inspection teams undertook surveys of all A and B roads across the county (581km) and identified 2512 Highway trees and 10326 private trees requiring immediate attention due to the level of the disease. Works packages have been developed using specialist contractors to remove hazardous trees on the public highway. Trees on private land are subject to notice and appropriate action by the landowner.

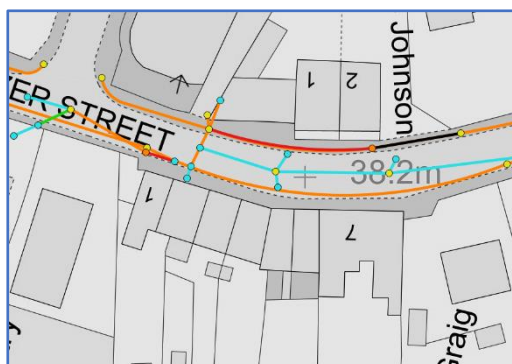
In 2020 we carried out surveys on 1155km of our C Class network, identifying 218 highway trees and 14,386 private trees.

This summer we have carried out repeat surveys on our A&B roads to monitor progress on the busier parts of the network. The surveys recorded 353 highway trees and 3892 private trees, down from 2512 and 10326 respectively in 2019. This represents a significant improvement in the numbers of high-risk trees on this class of roads. A continuance of surveys and funding remedial work on highway trees is anticipated. Whilst the majority of the trees are on private land, as the highway authority we have a duty to identify potential risks affecting the safe use of the highway, and we work with landowners to reduce these risks.

2.3 Drainage surveys

Our existing highway drainage infrastructure is ageing, and limited maintenance is carried out due to reducing revenue budgets over recent decades. Surveys have been carried out on sections of our A road network by a specialist survey team using Quickcam survey techniques in order to record detailed location information of our drainage assets above and below ground and also provide a condition rating. The surveys record the service level (ability to carry water) and structural condition.

The surveys so far have shown that **32%** of our drainage pipes are either **Severely reduced** or **Blocked and unsafe**. Of that **9%** are graded as having **Major Defects** or **Not fit for Purpose**. The results of the survey show action must be taken and an on-going programme of further investigation and drainage repairs is essential. Further surveys are planned in 2021 and a prioritised programme should be developed to reduce the risks to the road user. A Capital bid of £500k pa has been submitted to fund further survey and remedial schemes along the key strategic routes. It is well documented that poor management of water and drainage systems can lead to failures of highway construction and edge support leading to more costly repairs in the future. A pro-active approach improves the management of risk from highway flooding but will require additional funding.



Examples of blocked pipes

Investment will be required to maintain serviceability and efficient functioning of our drainage assets.

Further surveys will provide more accurate estimates of the condition across the entire network, however it is clear that funding needs to be identified to carry out programmed cleansing and repair of drainage systems in addition to traditional gully emptying.

2.4 New Technology – Condition and inventory surveys



In March 2020 we commissioned a new technology system which enabled us to undertake surveys of the highway network using an adapted smartphone. This was part of a project to improve our inventory and asset data. This information has provided us with an up-to-date video which is map based. The artificial intelligence in the system carries out a condition analysis of the highway network to produce a coarse visual assessment (CVI). In addition, the system recognises and categories highway signs which can assist us with managing our assets. To date over 22,000 signs have been recorded and categorised. As a result we have been able to review and assess issues and projects on the highway network by having access to current information. This has been very helpful with the travel restrictions and going forward provides opportunities for efficient ways of working.

These video surveys are now carried out by our Highway Inspectors during their driven inspections and assist in information capture as we continue with single manned routine inspections during COVID restrictions. Each A road is inspected once a month, B and C roads every three months, Urban Unclassified roads every 6 months and Rural Unclassified roads annually, thereby building up a library of up-to-date videos of the road network.

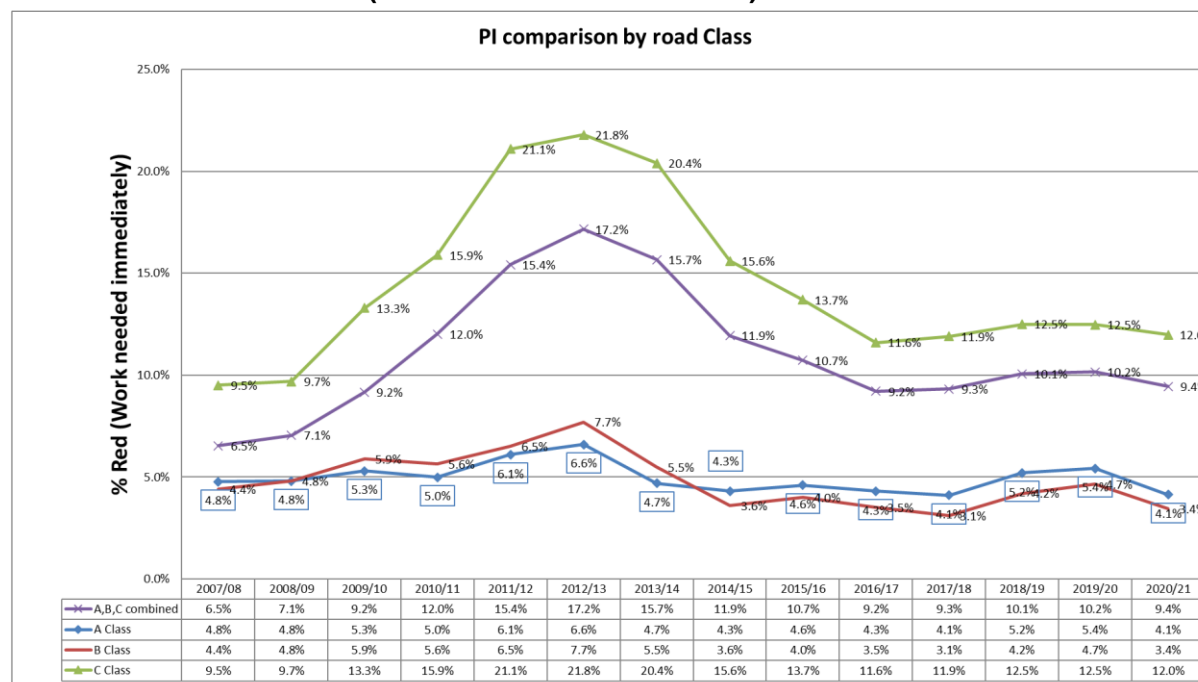
The availability of these videos will provide valuable information to our engineers and colleagues across the department and has potential to reduce vehicle journeys and improve efficiency.

2.5 Highways Condition

This section sets out the condition trend and provides commentary on the asset performance and investment levels.

Asset Group: Carriageways (Roads)

Measured road condition (PI – Performance Indicator)



The sharply changing condition indicators between 2009-2015 illustrate the impact of a period of significant flooding and successive harsh winters followed by increased investment in road maintenance in 2012-15 (Local Government Borrowing Initiative). More recently Welsh Government grant funding through the local highway refurbishment grant of average £1.5m per year has helped to improve condition on our priority roads. The classified network (A,B & C) will recover at this rate of investment as we target resources using the network hierarchy. The unclassified network which makes up 45% of our network will continue to deteriorate.

The Welsh Government local highway refurbishment grants have funded a number of surfacing schemes around the County which were prioritised to target areas of greatest risk. **In 2020 we resurfaced 25km of an estimated 535km which is in a poor condition (Red).** The condition of the County Road network is set out in the table below and shows over the period of analysis one of minor deterioration overall on the classified network. The condition of A and B Class roads has remained relatively stable over the period although C roads remain in worse condition than in 2007 despite recent investment. Our investment is increasingly targeted at the higher priority classified roads at the expense of our unclassified network, where investment is increasingly limited due to the risk-based approach. Compared across Wales our road condition is in the lower quartile.

Commentary	<p>Our carriageways are maintained through a combination of corrective and preventative treatments, and we use the network hierarchy to prioritise investment within budget resources. Early investment in preventative treatments provides a more cost-effective approach and decreases the need for more expensive reactive maintenance. We require additional investment to fund a pro-active approach so that road treatments can be carried out before road surfaces deteriorate beyond an economic threshold.</p>		
Expenditure Summary by category 2020-21	Cost Category	£	Output
	Planned Maintenance - Corrective	£1,356,463	<ul style="list-style-type: none"> 42 resurfacing schemes totalling 25km
	Planned Maintenance - Preventative	£830,367	<ul style="list-style-type: none"> 49 surface dressing schemes totalling 55km of new surface treatment.
	Routine Cyclic Maintenance	£2,428,533	<ul style="list-style-type: none"> Cyclic gangs & routine works, drainage, sign cleaning, grass cutting
	Routine – Reactive Repairs (emergency)	£385,231	<ul style="list-style-type: none"> Pothole repairs etc.
	Routine – Reactive Repairs (non-emergency)	£369,059	<ul style="list-style-type: none"> Drainage and surface repairs, sign repairs
	Routine – Inspection & Survey	£201,758	<ul style="list-style-type: none"> Asset management & condition surveys
	Operating Costs	£1,378,798	<ul style="list-style-type: none"> Includes Winter Maintenance
	<ul style="list-style-type: none"> The above cost categories are based on groupings developed for national reporting requirements and are used to inform budget planning. The overall length of road treated in 2020-21 was 80 km, which is 2.3% of the highway network. This equates to a treatment period of over 42 years on average per section of road. 		

2.6 Highways Investment Options

Road assets deteriorate slowly over time and consequently a long-term view needs to be taken. This report includes 20-year forecasts to enable decisions to be taken with an understanding of their long-term impact. The investments analysis for 2021-41 includes the recent Welsh Government grant which is in its final year (2021) and proposed PBB reductions.

A number of budget scenarios showing the effect of investment on the carriageway condition performance indicator have been carried out.

Condition forecasting methodology

This has been carried out using a forecast model developed by the County Surveyors Society Wales CSSW Road Asset management project. The tool is intended for use by Welsh authorities to assist in Asset Management and budget planning. The results are considered realistic and demonstrate the impact of a continued reduction in real terms investment in the highway network, against a backdrop of increasing traffic volumes and user expectation. Reductions in preventative maintenance are leading to higher levels of reactive repair placing further pressure on the reducing revenue resources. Unplanned works are by nature less economical and increase safety risk for road users and increased risks to the authority and are less environmentally friendly due to wasted resources.

The calculations are based on depreciation of the existing highway network and using known treatment costs and current condition values from SCANNER data. The condition indicator used in the examples is a combined indicator across all road classes and provides an indication of the likely effect of current budget levels on actual carriageway condition across the County.

Road condition indicators

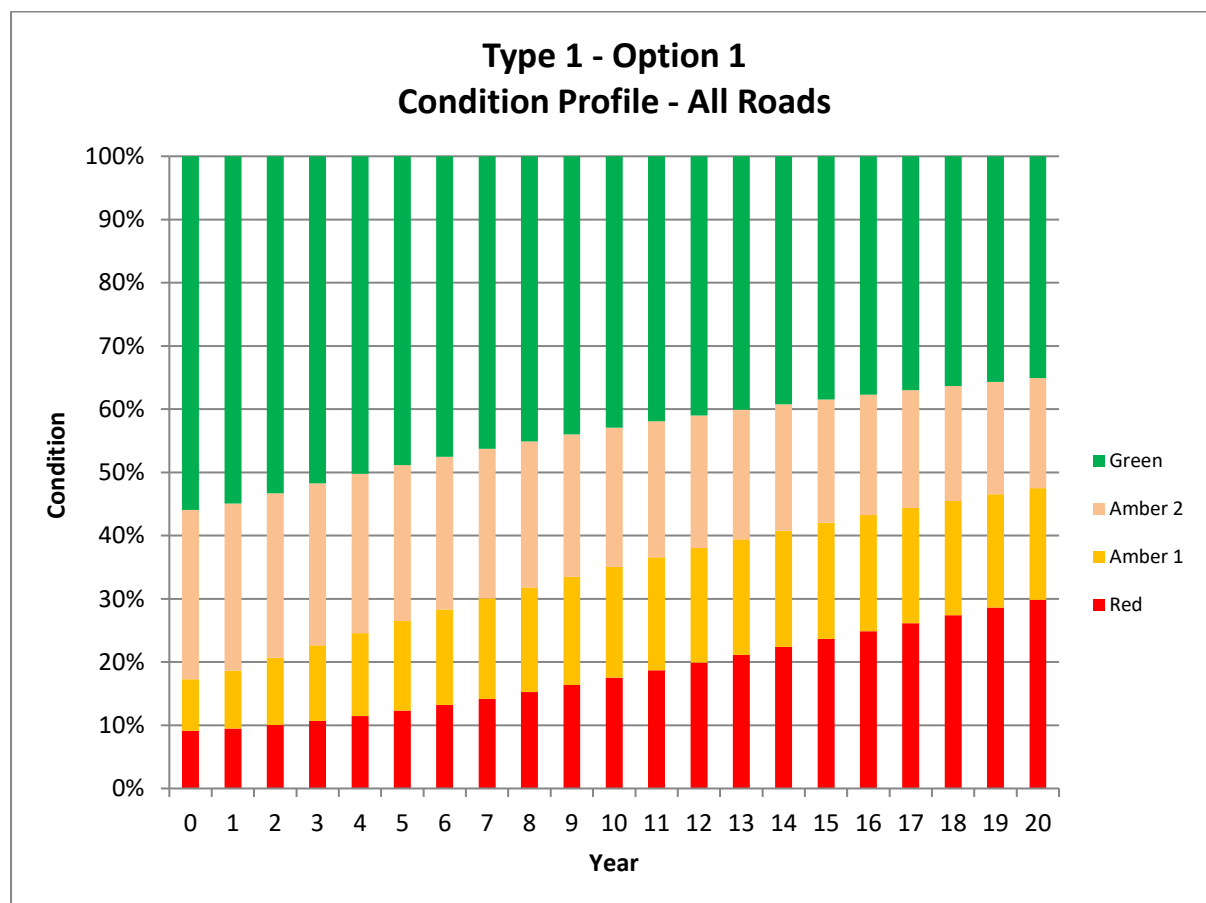
A description of the condition indicators and indicative maintenance treatments are as follows:

- **Green** – Good condition - No planned works are anticipated in the next 3 years
- **Amber 2** – Preventative maintenance, typically surface dressing on the 3–5-year programme
- **Amber 1** – (Imminent Red) Works should be planned by Year 3 – part Preventative/Corrective maintenance i.e. Resurfacing/Surface dressing/patching
- **Red** – Maintenance work needed now – Corrective maintenance i.e. Road Resurfacing

The following options show the predicted levels of road condition related to each funding scenario. There are 3 investment options that have been considered for comparison:

Option 1 - Existing budget – funding including WG Grant of £1.5M in 21/21, From 22/23 onwards County Capital £500k/annum and Revenue £1050k/annum (includes 100k PBB revenue reduction)

Funding/Year	21/22	22/23	23/24 onwards
Welsh Government	1.5	0	0
CCC	1.55	1.55	1.55
Total invested	3.05	1.55	1.55



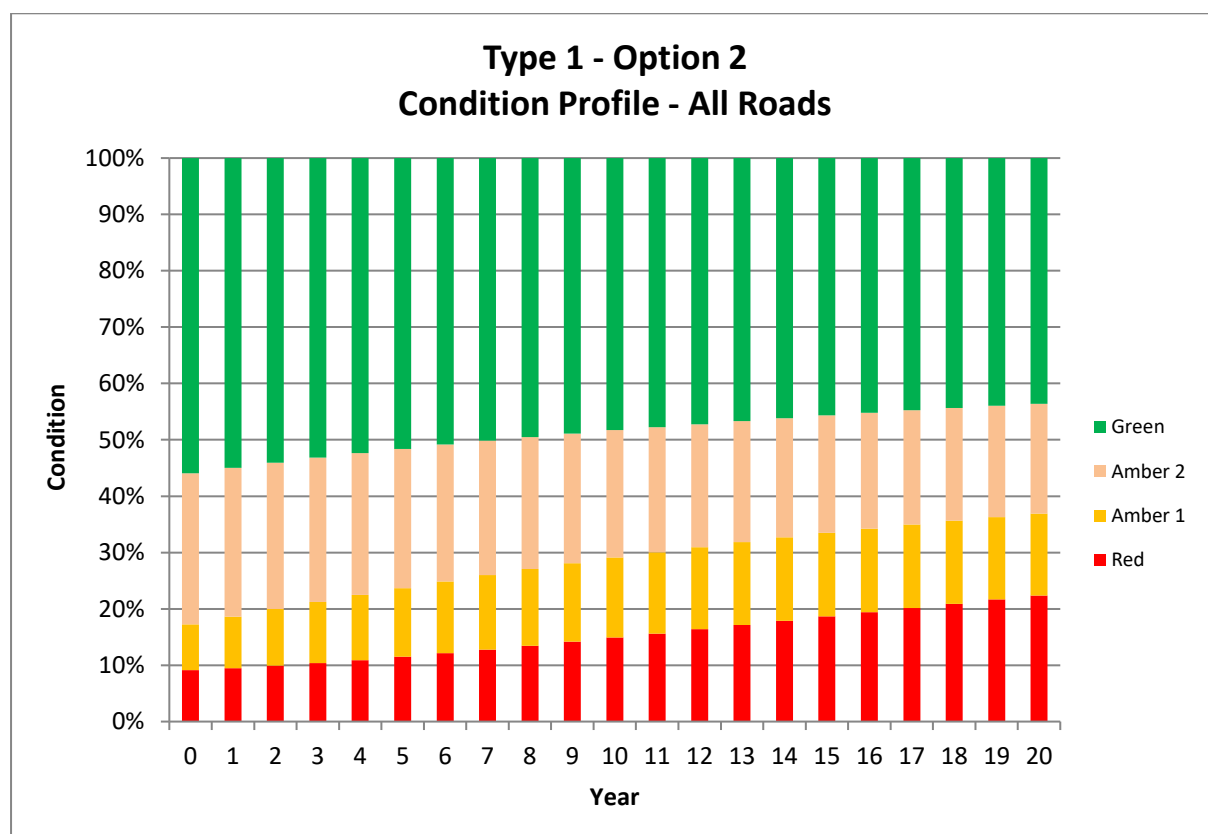
The percentage of road in poor condition (Red) increases from 9% (313km) to 18% (626km) at 10 years and 30% (1043km) at 20 yrs.

The percentage of road in good condition (Green) falls from 56% to 43% at 10 years and to 35% at 20 years.

Option 2 – Modest option - Modelled investment of £3.05M/annum

This maintains funding at current levels including the additional £1.5M grant, £500k County Capital & Revenue £1050k (assumes WG grant continuing).

Funding/Year	21/22	22/23	23/24 onwards
Welsh Government	1.5	1.5	1.5
CCC	1.55	1.55	1.55
Total invested	3.05	3.05	3.05



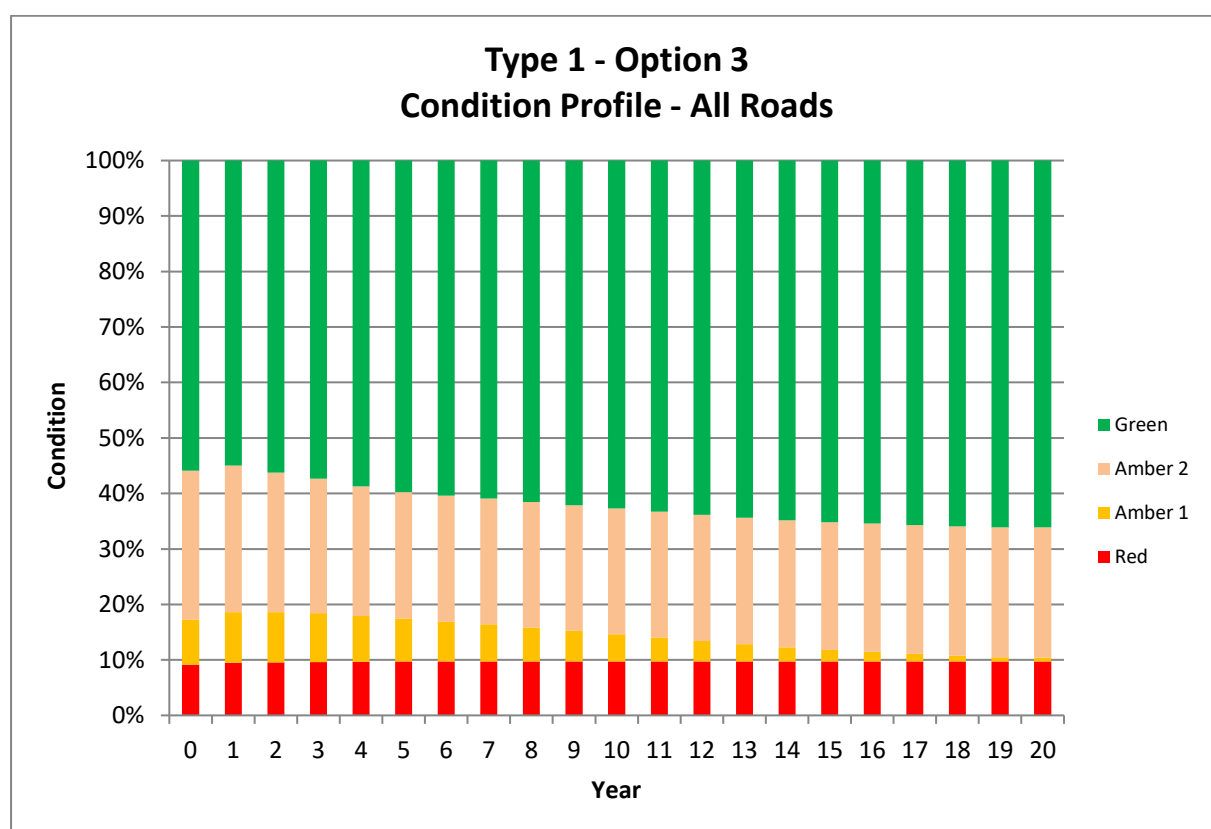
The percentage of Red increases from 9% (313km) to 15% (522km) at 10 years and to 22% (765km) at 20 yrs.

The percentage of Green falls from 56% to 48% at 10 years and to 44% at 20 years.

Option 3 – Steady-state Option -. Modelled investment of £6M/annum.

This option maintains the asset in a steady state condition with a gradual improvement. This requires an increase to the existing budgets in year 2 to **£6M**. This is most likely to be funded by Capital £5m and Revenue £1m.

Funding/Year	21/22	22/23	23/24 onwards
Welsh Government	1.5	0	0
CCC	1.55	6.0	6.0
Total invested (£m)	3.05	6.0	6.0



The percentage of Red remains at 9.1% at this level of investment increases marginally from 9% to 10% at 10 years and in 20 yrs.

The percentage of Green increases from 56% to 63% at 10 years and to 66% at 20 years, with a reduction of roads in the amber category.

This provides for an almost steady state and a modest improvement is predicted in the percentage of highway in good condition with the length of roads in poor condition remaining stable.

2.7 Highways Summary

A key principle of Carmarthenshire's 5 ways of working is :

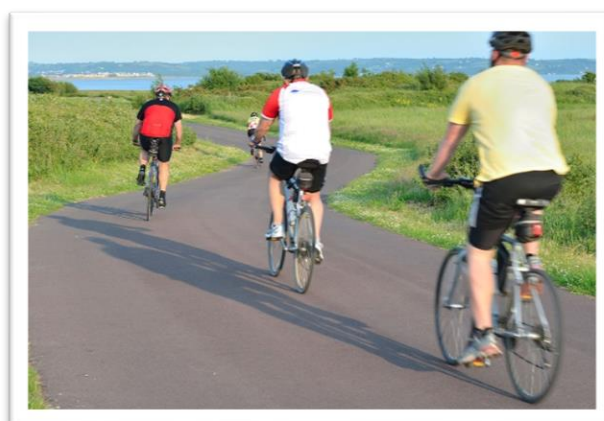
‘ The importance of balancing short-term needs with the need to safeguard the ability to also meet long-term needs.’

For our highways, this means investing in lower cost preventative treatments which provide a cost-effective way of prolonging the life of the carriageway and reducing the need for more expensive resurfacing treatments at a later stage. However, such an approach requires up-front funding which currently is not in place. Without sufficient funding we will continue to utilise funds on a reactive basis as road surfaces fail. Reactive carriageway repairs such as potholes increase the pressure on revenue budgets and resources. Highway surfaces naturally deteriorate over time and increasing our investment in preventative surface treatments is recommended if we are going to maintain our significant highway assets for future generations.

The County Council currently invests £1.55M in surfacing and surface dressing work and this has been bolstered by Welsh Government Grants of typically £1.5m each year. The carriageway condition data set out in this report highlights a long-standing backlog of highway maintenance and demonstrates the necessity to invest in our highway network to prevent future deterioration. It is expected that the division will need to identify further PBB savings from our revenue budgets. This will have a further impact on road conditions unless additional Capital or grant funding is available to offset reductions in revenue funding. Carmarthenshire is currently in the lower quartile for investment in its highways assets and a more sustainable approach needs to be developed if we are to meet our corporate objectives.

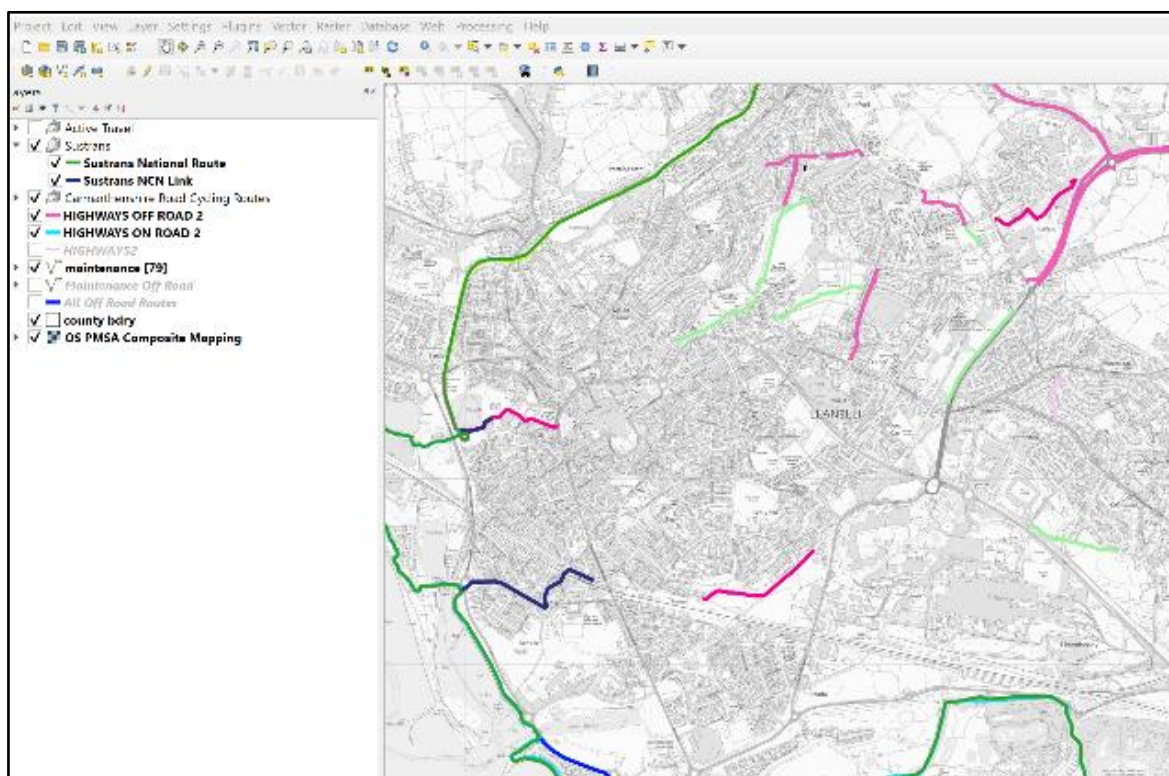
2.8 Footways and Cycleways Introduction

Our footway and cycleway networks play an important role in facilitating sustainable modes of travel and directly support the Active Travel agenda. The County Council has set out its ambition of being the cycling hub of Wales and the HAMP has an important role in supporting our adopted cycling strategy.



Footways are currently inspected on a regular basis alongside carriageway inspections and a methodology is being developed for cycleway inspections. A wide review of known cycle routes is underway, and proposals are being developed to develop a hierarchy led management plan and to improve consistency in the

inspection and maintenance across the cycle network. A footway and cycleways hierarchy and maintenance regime will be developed as part of our maintenance manual in 2022-23.



Cycle route network example

In 2020/21 we invested £85k Capital into footway maintenance and refurbished footways at:

- Garregllwyd Pembrey
- Brynlluam, Gorslas
- Millfield Estate, Whitland

It is important that we to continue and increase our investment in footways and cycleways if we wish to realise our corporate objectives. Current Capital budget allocations do not support this. A pro-active capital investment in preventative treatments can reduce the demand for less economical reactive maintenance which pressurises our revenue budgets.

In 2021/22 we have allocated a budget of £100k to footways and cycleways refurbishment. This funding will typically address 2km of our 1,000km footway network. The division has submitted a Capital bid of £500k pa to develop a modest footway and cycleway refurbishment programme.

Asset Group: Footways and Cycleways							
	Statistics					Commentary	
Footways	Footway Length by Material (km)					<ul style="list-style-type: none">Carmarthenshire's footway/cycleway network is extensive at over 1000km.CSS Wales is developing a National Code of Practice for a footway hierarchy.We will develop a programme of headline condition data in line with the CSS Wales HAMP procedure.Footway inspections are currently carried out at regular frequencies alongside road inspections.	
		Bituminous	PCC Slabs	Precast blocks	Concrete		Total
	Total	869	48	6.5	12.8		936
	The predominant material for our footways is bituminous macadam.						
	Our footway resurfacing programmes are based on local priorities with budgets allocated in line with the extent of footway.						
Cycleways	<ul style="list-style-type: none">On road cycle-lanes – 2.6kmDedicated cycle-tracks/shared use paths – 23.3kmOn road cycle routes (e.g. National Cycle Network) – 126km					<ul style="list-style-type: none">The cycleway network is currently being formulated and formal inspection regimes on off-road routes will be introduced in April 2022. This will further support the County Council's cycling ambitionsRepair and service level targets will be established in line with National recommendations in conjunction with our revised highway standards.	
	These lengths are estimated based on current confirmed responsibilities for the highways service. Increasing cycling numbers and networks will require continued investment.						

Asset Group: Footways and Cycleways		
	Statistics	Commentary
Key Issues	Corporate funding has been provided to support off-road cycleways which will help to maintain these routes. Funding for on-road cycle routes remains a challenge.	
Current Strategies	<p>The council's current strategy is to keep the footway asset in a condition which is safe and does not hinder the customer's journey. We do this by means of regular safety inspections and a prioritised reactive repair system.</p> <p>A more pro-active programme of preventative maintenance and refurbishment will be developed in 2022, subject to approval, as part of our Maintenance Manual (Part 4 of the HAMP).</p>	

2.9 Footways and Cycleways Summary

On-going deterioration of our extensive footway and cycleway network (over 1000km) is increasing our risk of claims from pedestrians and cyclists. A planned programme of refurbishment would ideally prevent an increase in reactive maintenance for surface failures. The lack of programmed maintenance places increased pressure on diminishing revenue budgets and will increase eventual replacement costs for future generations. Some provision has been made in previous years by investing £100k of the £600k allocation for Highway infrastructure Capital on footway surfacing.

The division has submitted a Capital bid of £500k pa to develop a modest footway and cycleway refurbishment programme to prevent deterioration and to support the authorities' commitments to active travel and its promotion of cycling.

Section 3 – Bridges and Structures

3.1 Bridges and Structures Introduction

Carmarthenshire has an extensive highway network, the second largest in Wales, and providing vital support to that network there are some 1872 structures. Whilst our 799 highway bridges and 49 footbridges may be easily appreciated there are also 560 retaining walls with a cumulative length of around 19Km, 459 culverts and 5 subways which all provide a largely unseen but nevertheless key role in supporting the highway network. These structures have been built over a wide timespan and vary considerably in the materials and construction methods. 55 of the structures are listed.

These structures are relied upon to remain in service year after year and accommodate changes in traffic and vehicle loadings and weather impacts. All structures are inspected and assessed on a scheduled basis in accordance with national standards to ensure that the inspection regime provides timely, accurate and appropriately detailed information on asset condition and performance. Safety defects are identified and addressed in a prioritised manner, and the data informs effective maintenance management and planning of our highway structures.

There are currently 50 bridges which have been assessed as sub-standard (reduced from 54 in 2021 following further assessment and strengthening of 4 structures) in terms of carrying capacity, of which 8 are weight restricted for some classes of heavy vehicles. Where required, regular monitoring inspections are being carried out and all bridges are managed in accordance with strict technical standards to keep these structures in service and maintain their safe operation. It is estimated that the cost of strengthening these sub-standard structures is of the order of £6.02 million. It is also estimated that the maintenance backlog on highway structures is circa £5.5 million.

In accordance with Technical Standards, monitoring of sub-standard structures should be for a defined period of time. Should sufficient funding not be forthcoming, then the number of structural weight restrictions on the highway network will increase as the condition of structures deteriorate.

In addition to on-going maintenance of existing structures stock, the number of failed edge of highway supports is on the increase due to severe weather events, reduced highway drainage maintenance and the additional impact from increased traffic volumes and larger agricultural vehicles on the highway network.

Scour Assessments

A large proportion of the bridge stock, especially those located on fast flowing rivers, are susceptible to scour. The risk of scour is significant with an increasing number of flood incidents and the impacts of climate change. Covid-19 restrictions halted the scour assessment programme for 2020/21 however we are now developing a programme of assessment with our framework consultants. It is envisaged Level 1 Scour Assessments for all 799 bridges and 49 footbridges will be completed within financial year 2021/22. A programme of structures identified as requiring Level 2 Scour Assessments will be developed and progressed in 2022/23, subject to available funding.

Inspection Training

As part of our review of practices to comply with recommendations of the 2018 Code of Practice, CSS Wales are developing accreditation for Structures inspections. Our inspection team are in the process of under-going a competency assessment to ensure our inspections are carried out to the required standards. Final accreditation was delayed in 2020 due to COVID restrictions however this is expected to conclude in 2021.

Bridge Improvement Works

Revenue funding in 2020 has remained steady and allows reactive and routine maintenance works to be undertaken. There is however a significant backlog of repair and preventative works which should be considered for funding. Planned PBB reductions of £24k in 2021 will not support improvements to maintenance regimes, which are largely reactive. The structures unit is prioritising funding planned maintenance to improve access to structures and ensure basic maintenance visits to structures on a 2 yearly cycle. This may reduce contingency funds available for unplanned failures.

Capital funding of £741k in 2020 enabled the following structures to be upgraded:

- Doethie Bridge Replacement Scheme, Rhandirmwyn
- Ffaldre Bridge, Rhandirmwyn, Deck Replacement – Strengthening Scheme
- Clynmelyn Culvert replacement
- Loughor bridge rehabilitation (part funded with Swansea City Council)
- Upper Lliedi Bridge, Felinfoel, bridge strengthening



Doethie bridge replacement 2021

We will be carrying out the following Capital structural schemes in 2021-22.

- Berem Bridge Replacement Scheme, Pontyberem
- Nantyffin Bridge, Rhandirmwyn, Deck replacement – Strengthening Scheme
- Pont y Pentre, bridge replacement

A programme of design and construction is underway aiming to reduce the number of sub-standard structures. Notable schemes commencing in 2022 include:

- Railway Inn Llanpumsaint - Bridge strengthening
- Mynyddygarreg Bridge – Bridge replacement
- Sawdde Culvert, Llangadog – Upgrade works

Prioritisation of Overall Funding Needs

Using the structures priority matrix which considers the following:

- Road Hierarchy
- Structural condition
- Access/community impact
- Network issues
- Traffic management impact

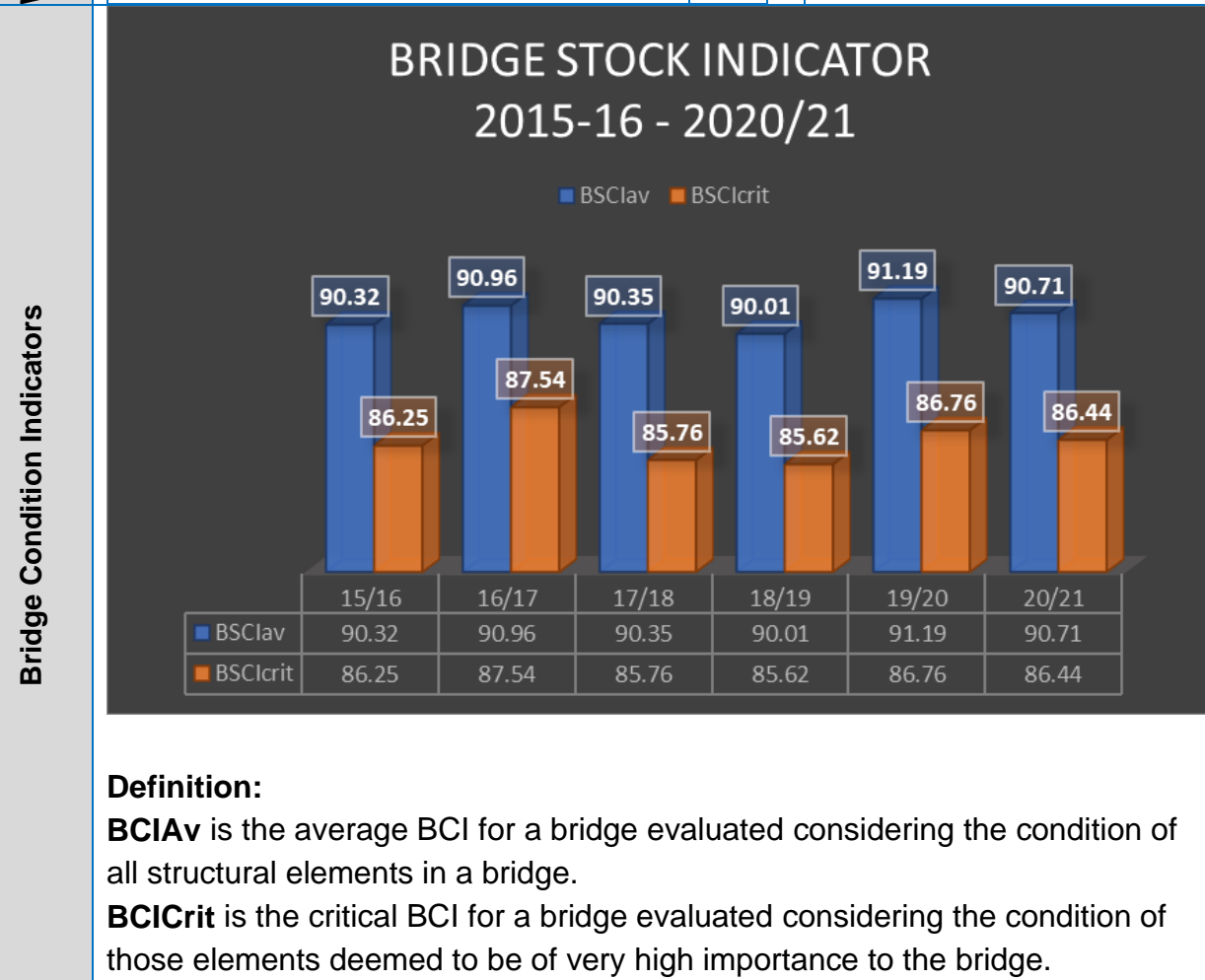
The following section provides detail on the status of our structure's assets, their condition and investment options for their continued maintenance.

3.2 Bridges and Structures Status

Asset Group: Highway Structures																																						
	Statistics	Commentary																																				
The Asset	<div>CCC Highway Structures Inventory by Road Type</div> <table><thead><tr><th>Road Type</th><th>Subways</th><th>Culvert 0.9m< Span <1.5m</th><th>Retaining Walls >1.5m height</th><th>Foot bridges</th><th>Highway Bridges: Span >1.5m</th></tr></thead><tbody><tr><td>Listed structures</td><td>0</td><td>1</td><td>0</td><td>0</td><td>54</td></tr><tr><td>Road Type unclassified</td><td>160</td><td>169</td><td>41</td><td>231</td><td></td></tr><tr><td>Road type B & C</td><td>254</td><td>245</td><td>7</td><td>445</td><td></td></tr><tr><td>Road type A</td><td>45</td><td>146</td><td>1</td><td>123</td><td></td></tr><tr><td>total number</td><td>459</td><td>560</td><td>49</td><td>799</td><td></td></tr></tbody></table> <div><div>■ Subways</div><div>■ Culvert 0.9m< Span <1.5m</div><div>■ Retaining Walls >1.5m height</div><div>■ Foot bridges</div><div>■ Highway Bridges: Span >1.5m</div></div>	Road Type	Subways	Culvert 0.9m< Span <1.5m	Retaining Walls >1.5m height	Foot bridges	Highway Bridges: Span >1.5m	Listed structures	0	1	0	0	54	Road Type unclassified	160	169	41	231		Road type B & C	254	245	7	445		Road type A	45	146	1	123		total number	459	560	49	799		<ul style="list-style-type: none">Bridge inventory is stored in the WDM Asset Management System (WDM)Data is updated as part of the routine General Inspection regime of structures.Growth in the structures' asset has been minimal in the last five years. The increase in numbers is related to new highway retaining structures to address highway support issues coupled with the construction of new structures
	Road Type	Subways	Culvert 0.9m< Span <1.5m	Retaining Walls >1.5m height	Foot bridges	Highway Bridges: Span >1.5m																																
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Inspections	<table><thead><tr><th>Inspection Statistics</th><th>No.</th></tr></thead><tbody><tr><td>Number of bridges requiring principal inspections – 6 years</td><td>42</td></tr><tr><td>Number of principal inspections scheduled to be undertaken in 20/21</td><td>7</td></tr><tr><td>Number of principal inspections on time</td><td>0</td></tr><tr><td>Number of structures requiring general inspections – 2 years</td><td>1872</td></tr><tr><td>Number of planned general inspections</td><td>936</td></tr><tr><td>Number of general inspections on time</td><td>675</td></tr></tbody></table>	Inspection Statistics	No.	Number of bridges requiring principal inspections – 6 years	42	Number of principal inspections scheduled to be undertaken in 20/21	7	Number of principal inspections on time	0	Number of structures requiring general inspections – 2 years	1872	Number of planned general inspections	936	Number of general inspections on time	675	<ul style="list-style-type: none">42 structures are subject to Principal Inspection (PI). The remainder are subject to General Inspections (GI).PI's suspended in 2020/21 due to COVID restrictions																						
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Asset Group: Highway Structures

	Statistics		Commentary
Structural Condition	Assessment Statistics	No.	<ul style="list-style-type: none">5 privately owned bridges are owned by Network Rail (3no.) and Sustrans (2no.). Two of these have since been strengthened to 40 tonne live loading standard
	Number of council owned / maintained bridges that failed assessment	126	
	Number of privately owned bridges within council's road network that failed assessment	5	
	Number of council owned / maintained bridges subject to monitoring / special inspection regimes	50	
Weight Restrictions	Weight Restrictions	No	<ul style="list-style-type: none">Of the 8 weight restricted bridges, three are programmed for upgrading in 2021/22.
	Number of council owned / maintained weight restricted bridges (excluding acceptance weight restriction)	8	
	Number of council owned / maintained height / width restricted bridges	1	



Asset Group: Highway Structures

	Statistics	Commentary																																								
	<p>BSCIAv and BSCCrit are the average and critical condition index for a bridge stock evaluated using the BCIv and BCICrit values for all bridges in the stock.</p> <ul style="list-style-type: none">• The 2020-21 BSClave of 90.71 and BSCCrit of 86.44 indicate that the highway structures are in a good to very good condition (score of 80-100 in accordance with CSS Wales performance indicators).• As a consequence of sustaining the current level of revenue funding, the overall condition performance indicator values have remained fairly constant.																																									
Historical Investment	<div><h3>Historical Structures Investment 2014-21</h3><table border="1"><caption>Estimated Investment Data (£)</caption><thead><tr><th>Year</th><th>Revenue</th><th>Capital</th><th>WG</th><th>Linear (Capital)</th></tr></thead><tbody><tr><td>2014-15</td><td>~900,000</td><td>~800,000</td><td>~800,000</td><td>~300,000</td></tr><tr><td>2015-16</td><td>~780,000</td><td>~250,000</td><td>~50,000</td><td>~400,000</td></tr><tr><td>2016-17</td><td>~780,000</td><td>~900,000</td><td>0</td><td>~550,000</td></tr><tr><td>2017-18</td><td>~800,000</td><td>~750,000</td><td>0</td><td>~650,000</td></tr><tr><td>2018-19</td><td>~820,000</td><td>~400,000</td><td>0</td><td>~750,000</td></tr><tr><td>2019-20</td><td>~820,000</td><td>~820,000</td><td>0</td><td>~850,000</td></tr><tr><td>2020-21</td><td>~880,000</td><td>~1,150,000</td><td>0</td><td>~950,000</td></tr></tbody></table></div>	Year	Revenue	Capital	WG	Linear (Capital)	2014-15	~900,000	~800,000	~800,000	~300,000	2015-16	~780,000	~250,000	~50,000	~400,000	2016-17	~780,000	~900,000	0	~550,000	2017-18	~800,000	~750,000	0	~650,000	2018-19	~820,000	~400,000	0	~750,000	2019-20	~820,000	~820,000	0	~850,000	2020-21	~880,000	~1,150,000	0	~950,000	<ul style="list-style-type: none">• Planned works comprise of maintenance programmes which target renewing the asset.• Reactive works are smaller scale defects which require repair to reduce safety issues. Budgets are based on historical costs. Such works are funded from the revenue budget.
	Year	Revenue	Capital	WG	Linear (Capital)																																					
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Strengthening / Replacement

There are currently 50 structures located on the highway network that whilst in safe operation, are considered sub-standard in terms of their load carrying capacity. There are also a number of structures, due to their overall poor condition, which have been included for replacement. Detailed design is currently being carried out on 15 structures, with a high priority being assigned to structures with a high scoring derived from the priority matrix.

Carmarthenshire has the second highest number of sub-standard structures across all 22 Welsh authorities.

Local Authority	Number of Bridges	Number of substandard bridges	Proportion of substandard bridges
Conwy	293	58	20%
Carmarthenshire	799	54	7%
Powys	1399	47	3%
Denbighshire	282	23	8%
Monmouthshire	400	22	6%
Gwynedd	631	18	3%
Swansea	157	12	8%
Cardiff	113	11	10%
Rhondda	307	10	3%
Bridgend	175	9	5%
Torfaen	189	9	5%
Caerphilly	117	8	7%
Ceredigion	825	7	1%
Merthyr Tydfil	37	5	14%
Wrexham	214	4	2%
Newport	65	3	5%
The Vale of Glamorgan	81	3	4%
Flintshire	148	3	2%
Neath Port Talbot	398	3	1%
Blaenau Gwent	170	1	1%
Isle of Anglesey	150	0	0%
Pembrokeshire	650	0	0%

Note: Figures based on 2020 data. Carmarthenshire now has 50 sub-standard structures.

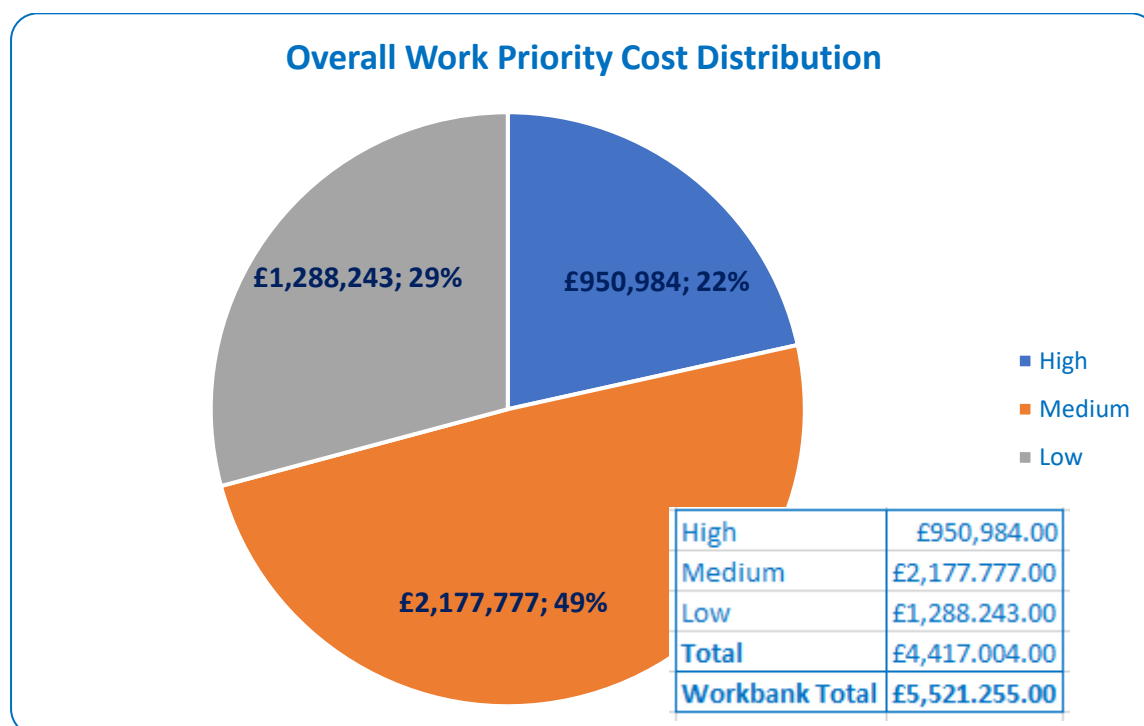
The repair or replacement of sub-standard structures is funded through council capital investment of £400k per year. The overall estimated cost of addressing the 50 sub-standard structures is £6.02 million. With current levels of funding this will take approximately 15 years to complete the programme as a minimum, and assuming no other major structural work is funded by this budget during this period.

Monitoring sub-standard structures for a further 15 years places the authority at risk, as the condition of structures may deteriorate. Addressing the backlog over a shorter period is recommended. An increase of Capital budget to £850k per annum for bridge

strengthening would accelerate the programme for substantial completion over 7 years. Higher risk structures would be addressed in the early part of the programme.

Maintenance Needs

The following figures are derived from the Department's Bridge Management System and relates to the estimated cost of addressing defects identified by the Bridge Inspectors as part of biennial General Inspections. The work is categorised as high, medium, and low priority in a scoring matrix which uses factors including extent, severity, and defect type. The overall cost is termed the work bank total.



3.3 Bridges and Structures Summary

The bridge stock has remained fairly stable in terms of the Condition Performance Indicators since 2015/16. It is considered that the overall condition performance indicators will not improve in the short term however by sustaining the current level of revenue funding, overall condition performance indicators should remain between 80 and 90, which represents 'Good' to 'Very Good' condition in accordance with the County Surveyors Society (Wales) classification of structures condition Performance Indicators (see table below).

Bridge Stock Indicator	15/16	16/17	17/18	18/19	19/20	20/21

BSClav	90.32	90.96	90.35	90.01	91.19	90.71
BSClcrit	86.25	87.54	85.76	85.62	86.76	86.44

Continued investment in our bridges and structures is essential to maintain continuity of our highway network. Current funding levels are maintaining our asset stock in a steady state condition, although if in-roads are to be made into the current maintenance backlog and to upgrade our sub-standard structures, then further investment will be required.

Historically, revenue funding has been focussed on reactive repairs which often require urgent repair. There is a large backlog of repair work identified during inspections that we plan to develop into planned programmes of work and additionally increase the level of scheduled maintenance visits to structures to address basic maintenance and improve access for inspection. A more pro-active approach to carrying out repairs at an early stage of identification is anticipated to reduce more costly repairs in the future. This planned approach may place pressure on revenue budgets for larger repairs or structural failures in the shorter term and additional Capital funding will be required going forward.

Section 4 – Lighting

4.1 Public Lighting Introduction

Our street lighting system includes over 20,000 lighting units. We also manage 5000 units for our Town and Community Councils. The Public Lighting Team have worked in partnership with Town and Community Councils to introduce LED lighting units in Community Lights. This project was developed on an invest to save basis to reduce carbon emissions, lower energy costs and improve light quality. The project was completed in March 2020 and is estimated to have saved 1,200 tonnes of CO₂ emissions.

The Public Lighting Team have also introduced new technology to enable mobile working so that lighting surveys, checks and works can be recorded electronically in place of the previous paper-based system.



There are two significant challenges for the Public Lighting Team:

- Ageing lighting columns need to be replaced to avoid the risk of collapse. Regular inspections help to reduce the risk of failure and where structural issues are identified columns are removed immediately. A column replacement programme is underway focused on replacing the older life-expired steel columns as a priority.
- There are around 304Km of underground electric cables supplying lighting units which are deteriorating, and this is leading to an increasing number of cable faults and power outages. A funding application is in place for this.

In addition, the Public Lighting Team also manage our stock of illuminated traffic signs and our permanent traffic signals.

4.2 Street Lighting Asset.

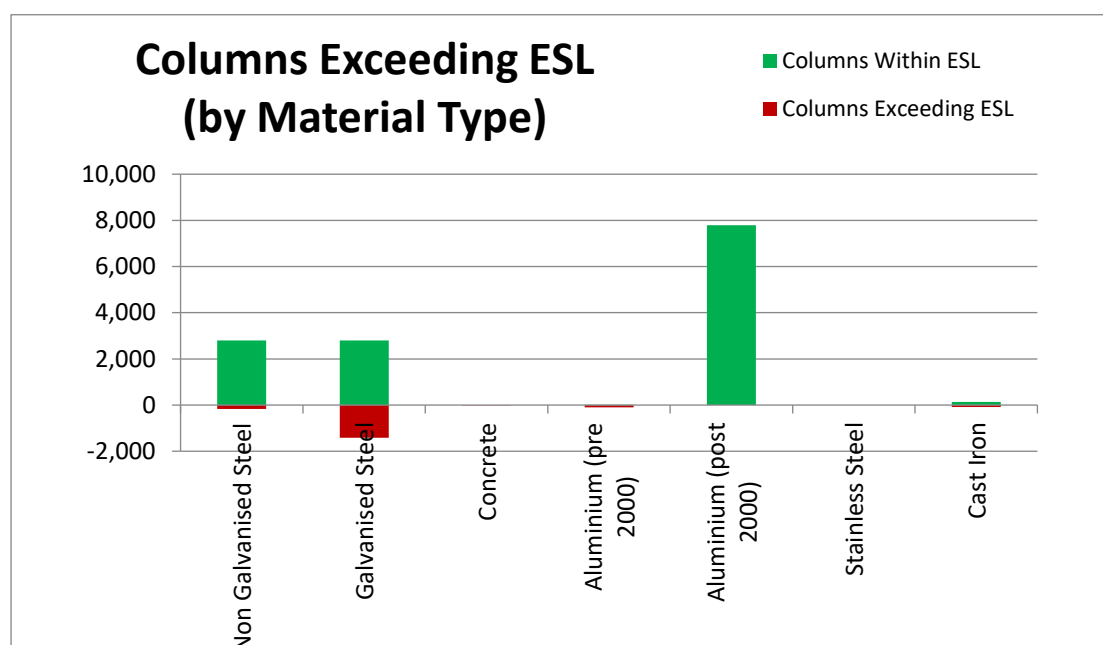
The street lighting asset can be considered in three main areas:

- Lighting columns
- Lighting Lanterns
- Electric supply cabling

Lighting Columns

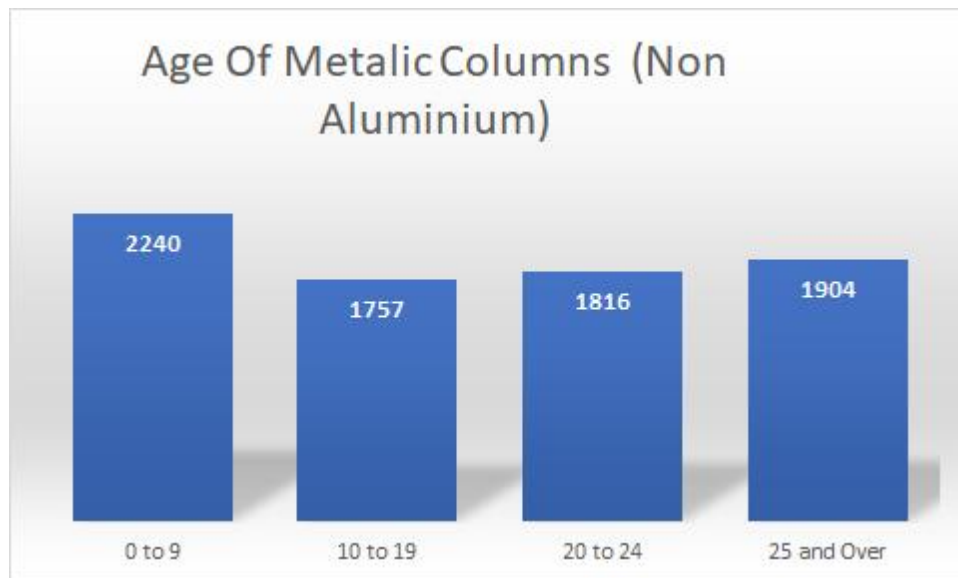
There are currently 20,229 street lighting units which includes bracketed units on third party wooden poles. This figure generally grows by around 150 units every year as new lighting either through highway improvements or new development is adopted.

The age of a street lighting column and its construction material can be used to provide a broad assessment of structural condition and Expected Service Life (ESL). This is represented for the range of lighting columns in use throughout the County in the graph below.



A key concern are the existing steel columns which are considered to have an ESL of up to 25 years before replacement. Based on current data 24.6% (1904 out of 7717) of our metallic lighting columns/brackets exceed their expected service life. Whilst these are subject to a management regime with regular inspections and the removal of columns deemed to be unsafe, a programmed for replacement is required.

The graph below shows the age profile of these metal columns and identifies the number currently beyond their Expected Service Life.



Underground Electrical Supply Cable

The majority of our existing 304km electrical supply network is of a significant age and in many cases accurate records are not available with regards to the exact age and cable type. Often the cable is not ducted and is more prone to perishing in the ground.



A prioritised survey and testing programme are required to establish the future life expectancy of the cable network and develop a programme of renewal.

4.3 Illuminated Signs and Traffic Signals Asset

Carmarthenshire has over 3,400 illuminated signs and bollards on the highway network. All new installations are specified to be LED sign lights and solar bollards.

There are 74 Traffic signal installations on the Highway network. These are made up of 54 pedestrian crossings and 20 Traffic Signal junctions. These assets are regularly inspected and are maintained by externally procured contractors who also provide an Out of Hours service to deal with emergencies.



4.4 Lighting Summary

The introduction of funding for the replacement of lighting columns will significantly reduce the risk of column collapse. There are a significant number of columns which require replacement and the programme to address this will take a number of years before a reduced baseline replacement programme can be adopted.

A similar approach is required with respect to the 304km of underground electrical cabling which present operational and safety concerns.

A bid for funding has been submitted.

