HIGHWAYS ASSET MANAGEMENT PLAN

ANNUAL STATEMENT REPORT 2022

Environment Directorate,
Highways and Transport
Division

carmarthenshire.gov.wales

Cyngor Sir Gâr
Carmarthenshire
County Council

Contents

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 highway assets have been managed over the past twelve months (financial year 2021-2022) and includes a discussion of the key issues and changes which have impacted performance and condition. The Report also provides an update on in-year activity and look ahead to the next financial year.

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.

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 summer temperatures, which were extreme this year, 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 accelerate its natural deterioration.

Continuous investment is required to ensure it is fit for purpose and it is calculated that the County Council needs to invest £6M each year to maintain the road network in a 'stand-still' condition.

In common with other highway authorities Carmarthenshire has a backlog of over £45M of highway maintenance, which is growing for a number of years. This has necessitated a risk-based approach to asset management to focus on the higher priorities for resource allocation.

In 2021/22 through Welsh Government and County Council funding £3.05M was invested and in 2022/23 this increased to £3.9M. This is significantly below the stand-still figure but was sufficient to enable the authority to keep the higher-class roads in a reasonably stable condition. In 2022/23, 39km of road is being resurfaced and 48km

of road surface dressed, which equates to approximately 2.5% of the network. Deterioration will be more noticeable in the less trafficked lower-class roads.

There is no indication of any Welsh Government funding being available for 2023/24 and current County Council funding is expected to be £1.4M. This scenario will increase the percentage of roads requiring resurfacing from 9% in the current year to 18% in 10 years and 31% in 20 years. Reductions in preventative maintenance result in more expensive treatments with a higher carbon impact in future years.

Our highway drainage systems are also being revealed as a particular concern. Drainage surveys have been undertaken on strategic routes to improve network resilience. However, the surveys are indicating that 20% of drainage pipes are compromised.

The authority's footway and cycle network exceed 1000km in length, investment in maintenance has been very modest and is mainly focused on local priorities.

Bridges and Structures
Our highways are supported by almost 1,900 structures which includes 794 bridges, 570 retaining walls 529 large culverts and 53 footbridges.

Highway Structures condition indicators show that the asset is in a relatively stable condition and is assessed as good to very good.

There are currently 47 sub-standard structures which are subject to a monitoring regime to ensure that they are safe for public use. With recent capital investment, the number of our sub-standard structures has decreased from 54 to 50 in 2021/22 and a further 3 structures are being strengthened in 2022/23. This represents 7% of the bridge stock and is the second highest number of sub-standard structures in Wales. Based on the current rate of investment all sub-standard structures will be upgraded in 13 years.

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 lowered energy costs, improved light quality and reduced carbon emissions by 1,200 tonnes of CO_2 each year.

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 3,400 illuminated traffic signs and bollards, 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.

Highway authorities around the country have maintenance backlogs and Carmarthenshire has an increased to £45m. 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 and adverse weather events and a natural deterioration undermine the fabric of our roads.

The HAMP recognised this difficultly with the adoption of a risk-based approach to focus limited resources where they are most urgently needed. The HAMP also includes the development of a Maintenance Manual which continues the risk-based approach with recent sections covering the adoption of a Network Hierarchy and a new approach to Safety Inspections.

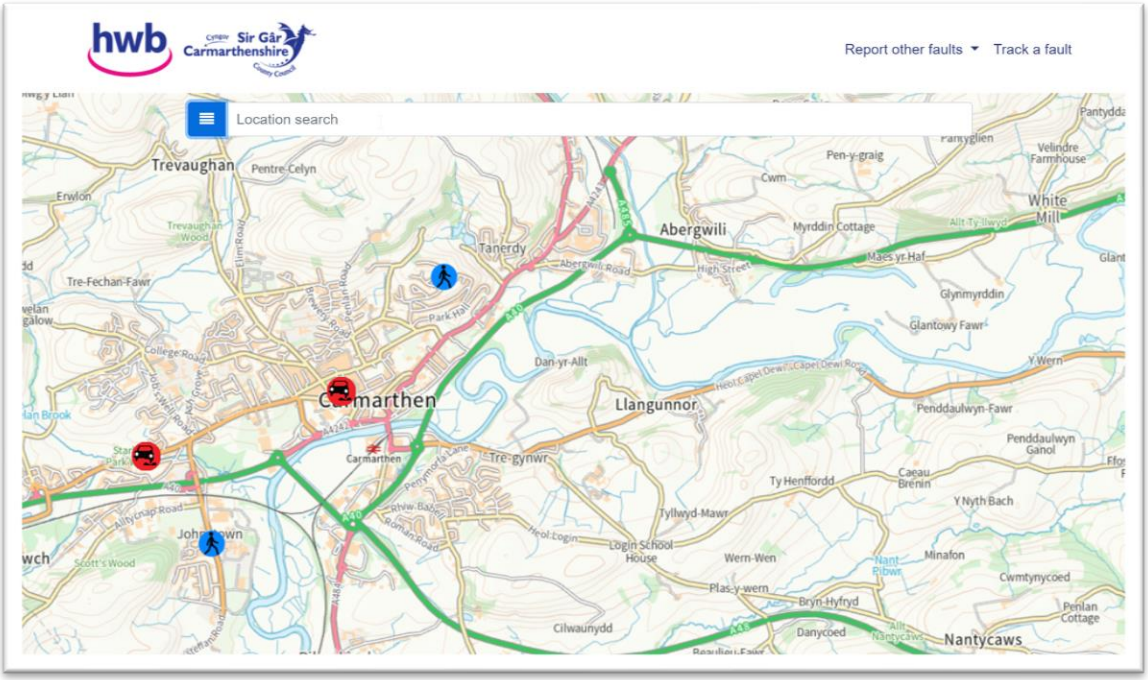
1.3 Challenges

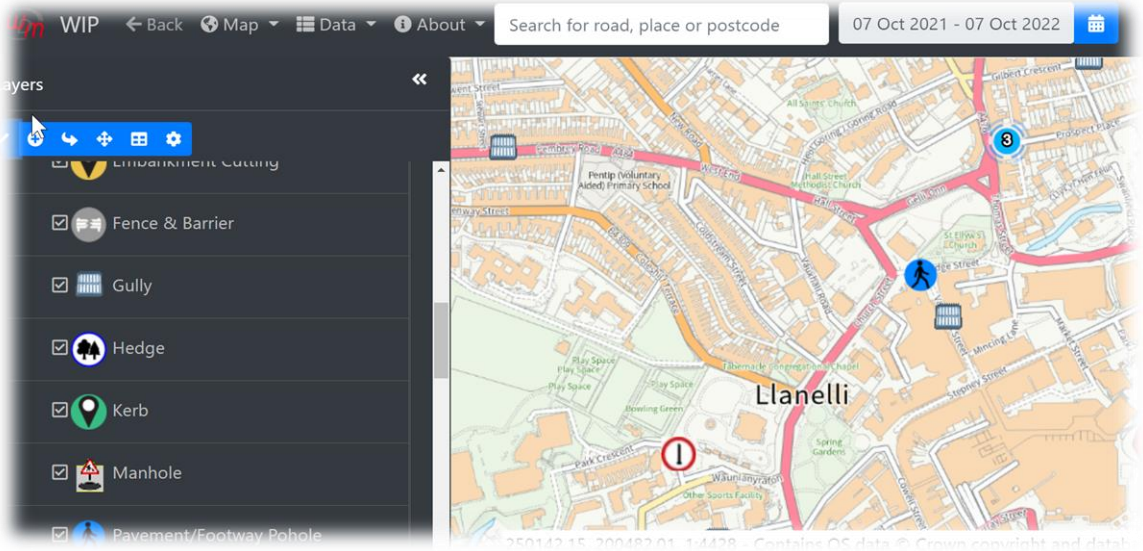
Through 2021/22 the authority has faced and continues to face many challenges and these have had an impact on the highway network and how it is managed. The key challenges are highlighted below.

Key Challenge – Carbon Reduction
• The introduction of LED lighting units has made a significant contribution towards reducing carbon emissions saving an estimated 1,200 tonnes of CO2 emissions each year. • A review is also underway of our vehicle fleet to introduce ultra-low emission vehicles where feasible. • A new highway repair methodology is being implemented to improve the durability of pothole repairs and improve efficiency with a 'fix-first-time' approach. • The potential use of low carbon materials is continually reviewed to assess their feasibility as they become commercially available. • The Vaisala video survey system has reduced the need for many site visits and is utilised throughout the Division. • Increasing use of virtual meetings to improve efficiency and reduce travelling.
Key Challenge – Climate Change
• The Service operates an emergency management plan to respond to the increasing frequency of adverse weather events. • Out of Hours management systems are in place with Duty Officers, Operatives and contingency plant such as gulley cleaners, pumps and a snow blower on standby. • A programme of Highway drainage and geotechnical surveys of key routes and high-risk locations is on-going to improve network resilience. • Additional roadside weather stations are being introduced to improve the accuracy and detail of weather forecasting.
Budget pressures
• The current expenditure for lighting energy is £600k pa. Energy costs are currently forecast to increase by 250% in 2023. • Increased fuel, materials and contract costs will result in less value for money being achieved. • Expected macro-economic pressure on public sector budgets are likely to result in further service cuts • Recruitment in critical areas is challenging as private sector out-competes the public sector.
Asset Deterioration
• Road condition deterioration – Investment levels continually fall short of steady state budget levels and roads deteriorate. • The road maintenance backlog is estimated at £45m and is increasing. • Road deterioration is accelerated by climate change and severe weather events • Limited budgets deliver less benefit as costs such as resurfacing increase.

1.4 Achievements

Despite a very challenging backdrop, a number of notable achievements have been made during the last 12 months.

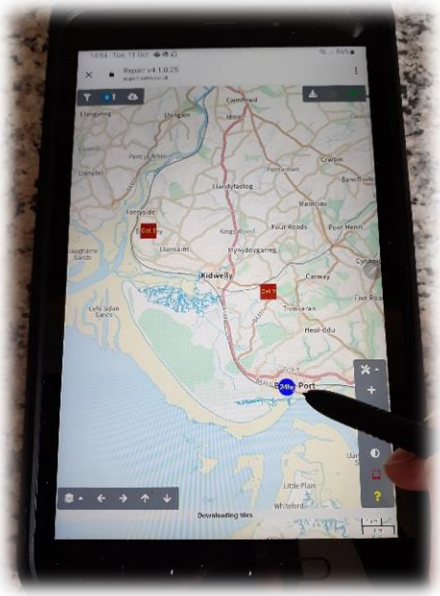
New Technology – Customer enquiries system
In November 2021 we introduced an improved system for customers wishing to report problems on the highway. Our existing highway maintenance software system was used, and a user-friendly map developed and embedded on the authority's website, allowing customers to report non-urgent problems directly via computer or mobile phone. The reports are linked to the authority's customer contact system and record requests directly in the highway management system. This has reduced paperwork, improved accuracy of information, the overall management of service requests and provides automated customer feedback.

Customer interface via Report a problem page on CCC website
From 16th November to October 2022, less than 12 months, we have received and handled 4737 requests, 2973 of which have been completed, with the remainder being less urgent requests. In addition to improved customer experience, the data allows us to better understand demands. As an example, 24% of requests were related to road surface defects, and 20% concerning trees along the highway which are often the responsibility of the adjacent landowner. Almost 36% of service requests were received out of normal working hours and managed by the out of hours standby teams.



Back-office Map showing location of requests

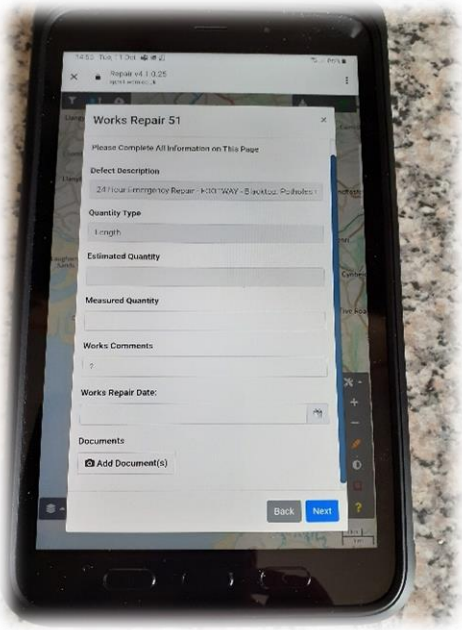
Mobile working

Our 20 general highway maintenance gangs and 2 structures maintenance gangs are now equipped with tablet computers. Using our back-office software systems, work instructions are issued directly to these devices using wireless connectivity.



Operatives receive details of works and also travel directions, improving efficiency and reduce paperwork.

Our teams on the ground are able to collect photographic evidence of repairs and accurately update our systems when works are complete. The process will automatically complete associated customer enquiries and provides customers with updates on repairs carried out.



Work is underway to roll out this technology to our out of hours service, providing more timely information to aid decision making, especially during storm events and periods of high demand.

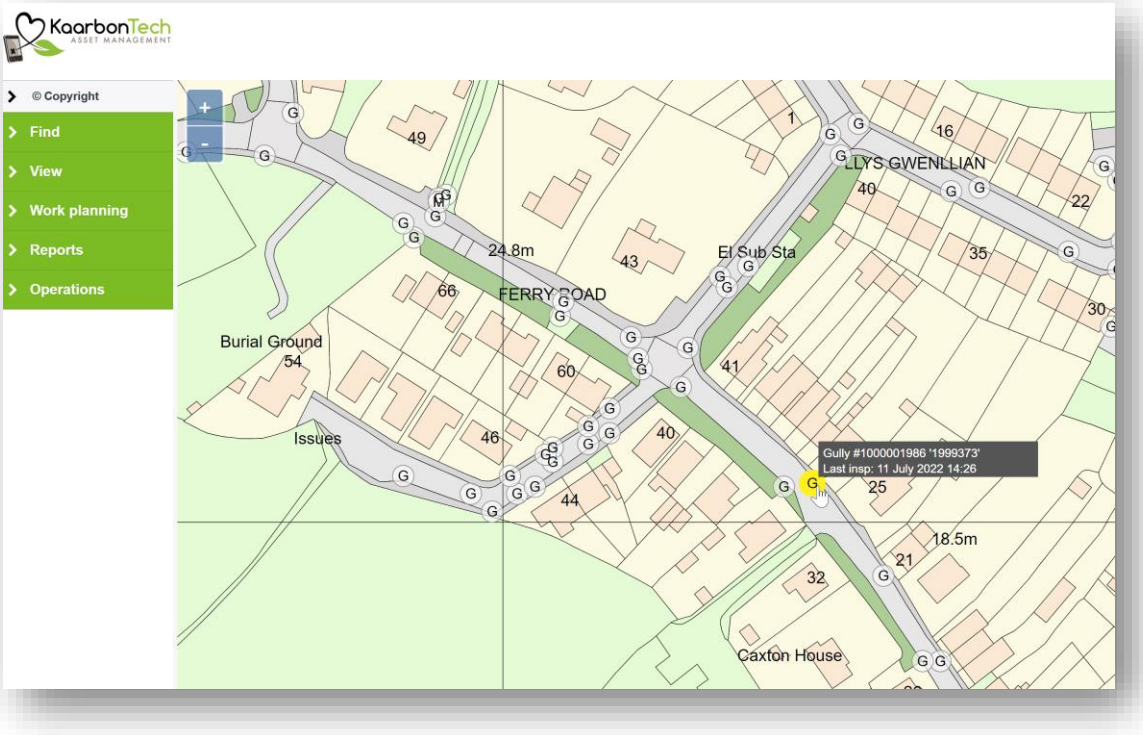
Replacement Lighting Columns

A programme has been introduced to replace aging lighting columns which are in danger of collapse.

The initial focus is on over 7,000 steel columns, and a large proportion of these have exceeded their design life. The programme will need to be sustained over a number of years to address the current backlog.

Drainage Management

A new management system has been introduced to improve the planning and operation of the gully cleaning regime as we develop a risk-based approach for the Maintenance Manual. In June 2022 we introduced new mobile recording devices with our gully cleansing crews. This has gone well and up to the start of October 10,296 gullies have been checked and recorded in the system.



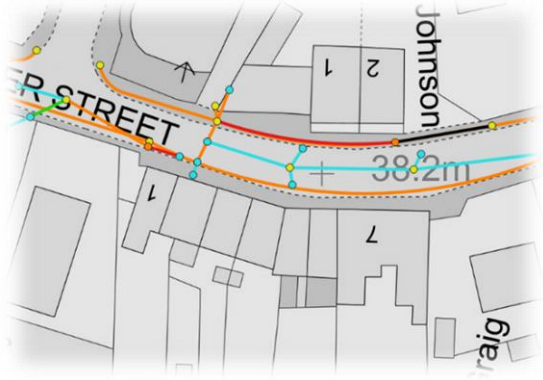
Our inspectors and technical staff are able to quickly see drain locations and details of maintenance carried out.

In addition to an improved gully cleansing regime, condition surveys have been carried out on selected key main roads. The surveys are recording below ground

pipework and identifying issues which can causing surface water flooding not immediately obvious from routine gully cleansing.

To date we have completed surveys on 106km of A road including the A484, A485, A486 and A48, recording and mapping over 66km of pipework. Surveys are on-going on the A476 and A4138.

The details are discussed in section 2.4 of this report, however initial results show that over 20% are blocked and over 8% of pipework is not fit for purpose. These figures only represent a small portion of the 3500km highway network, however they indicate an urgent need to increase investment in our drainage systems.



Hot Material Pothole Repair Initiative	
A trial has been carried out using new methods for repairing potholes using hot materials rather than temporary cold repair materials. The aim is to improve the durability of the repairs and to improve repair efficiency by only making one visit with a 'fix first time' approach. The adapted machine (pictured) has a 'hotbox' to continually heat materials for hot repairs to potholes.	

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 and most visible highway asset in terms of operational importance and investment value of over £3 billion. 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 accelerate the natural deterioration of road surfaces.

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. Maintaining the highway network is also a statutory duty the County Council has under the Highways Act 1980.

The authority continues to promote active travel and cycling, successfully hosting Stage 5 of the Women's Tour of Britain in June 2022 and sections of the Wales Road race at Newcastle Emlyn the same month.

It is the estimated that £6m needs to be invested in corrective and preventative maintenance every year to achieve a 'standstill' network condition. The adage a '*stitch in time saves nine*' is very appropriate to highway maintenance where a timely preventative investment saves more expensive reactive treatment later. The current lack of planned maintenance is leading to an increase in 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) are 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 9.6 % 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.

2.2 Highways Status and Condition Report

In 2022/23 we are fortunate to be able to invest £3.9m in carriageway maintenance. Although this is below the standstill figure of £6m it is nevertheless enabling the authority to:

- Surface dress 51km of road
- Resurface 39km of road

In 2023 our Capital budget reduces to £0.6m and there is no indication of any grant funding. Our future road refurbishment programmes will be significantly reduced as a result. This is in addition to further reductions in revenue funding from PBB's. We to have an overall lower than average level of investment in highways and transport in Carmarthenshire, ranking us **18th out of 22** authorities in Wales.

Key Facts
Carmarthenshire has the **second largest** highway network in Wales (3566 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 road condition figures, there is a backlog of carriageway maintenance works in Carmarthenshire equating to **£45.8M.**
Based on current funding levels, the length of road estimated to be in a poor condition is **predicted to increase from 9% to 31% over the next 20 years.**

(* updated data pending from StatsWales.gov.wales)

The impact of current investment levels and investment options are set out later within this report.

The graph below shows highway investment in comparison with other local authorities in Wales.

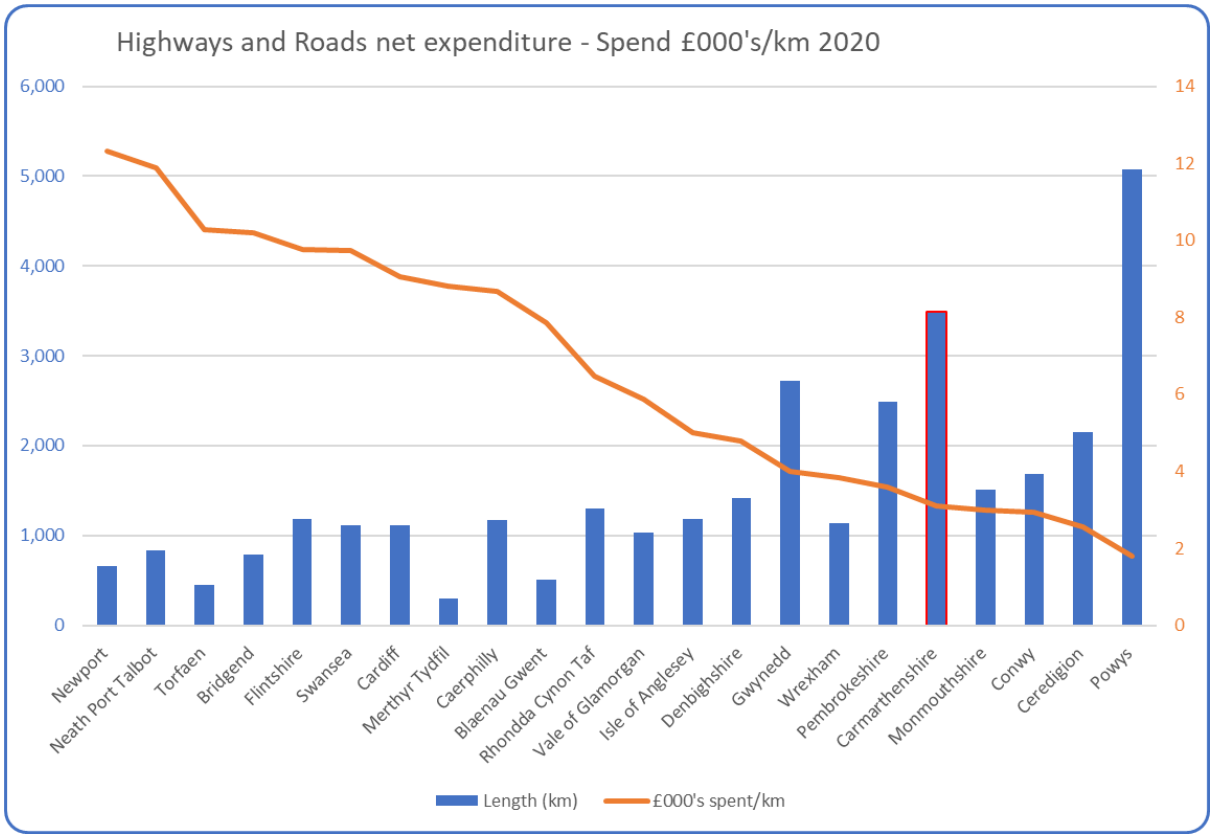


Table 1. Estimated carriageway maintenance need based on measured road condition

Road Class	A	B	C	U	Total	
Network Length (km)	249.6	331.5	1284.4	1691.2	**3556.7**	
Av. Width (m)	7.3	6	5	3		
Surfacing rate (£)	11.5	11.5	11.5	11.5		
Surface dressing Rate (£)	5	4	3.5	3.5		
% Red (>100) Resurfacing	3.6	2.8	11.7	11.7		Condition
% Amber 1 (80-100) Resurfacing	5.2	4.5	9.1	9.1		
% Amber 2 (40-80) Surface treatment	21.3	19.1	28.3	28.3		
Total	**30.1**	**26.4**	**49.1**	**49.1**		
Area Red	65594.88	55692	751374	593611.2		One off costs
£ (resurfacing cost)	£754,341	£640,458	£8,640,801	£6,826,529	**£16,862,129**	
Area Amber 1	94748.16	89505	584402	461697.6		
£ (Resurfacing cost)	£1,089,604	£1,029,308	£6,720,623	£5,309,522	**£14,149,057**	
Area Amber 2	388103.04	379899	1817426	1435828.8		
£ (Surface treatment cost)	£1,940,515	£1,519,596	£6,360,991	£5,025,401	**£14,846,503**	
Sum Total	£3,784,460	£3,189,362	£21,722,415	£17,161,452	**£45,857,689**	

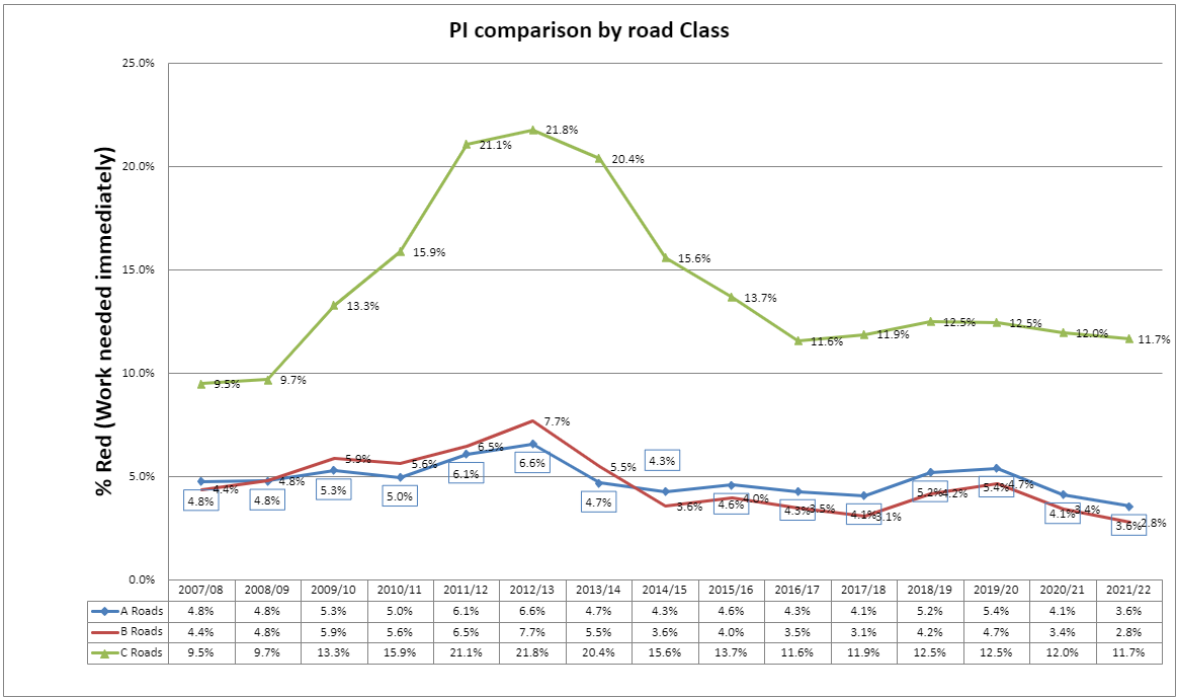
The above table indicates that to rectify all areas of highway requiring remedial surfacing works would cost more than £45 million.

Carriageway Condition

This section sets out the condition trend and provides commentary on the asset performance and investment levels. The primary asset discussed in this section is the carriageway or road surface, which is by far the most critical and most valuable asset in maintaining a safe and efficient highway network. The costs summarised below also include categories for routine highway maintenance.

Asset Group: Carriageways (Roads)

Measured road condition (PI – Performance Indicator)



	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22
A Roads	4.8%	4.8%	5.3%	5.0%	6.1%	6.6%	4.7%	4.3%	4.6%	4.3%	4.1%	5.2%	5.4%	4.1%	3.6%
B Roads	4.4%	4.8%	5.9%	5.6%	6.5%	7.7%	5.5%	3.6%	4.0%	3.5%	3.1%	4.2%	4.7%	3.4%	2.8%
C Roads	9.5%	9.7%	13.3%	15.9%	21.1%	21.8%	20.4%	15.6%	13.7%	11.6%	11.9%	12.5%	12.5%	12.0%	11.7%

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 condition of A and B Class roads has steadily recovered 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.

Road Surfacing Investment		
	Resurfaced	**Surface Dressed**
2021/2022	**30.6Km**	**51Km**
2022/2023	**39Km**	**48Km**

The above table shows almost 70Km of new surface delivered over the two-year period. This equates to approximately 2% of the highway network and a resurfacing rate of broadly 1 in 100 years.

Road Conditions: Percentage of A,B and C Roads in poor condition (2021/22)		
A Roads	**3.6%**	**Up from 5.2% in 2018/19 where Carmarthenshire ranked 20th out of 22 authorities in Wales**
B Roads	**2.8%**	**Up from 4.2% in 2018/19 where Carmarthenshire ranked 10th out of 22 authorities in Wales.**
C Roads	**11.7%**	**Up from 12.5% in 2018/19 where Carmarthenshire ranked 17th out of 22 authorities in Wales.**

Note: The all-Wales figures for 2018/19 provides the most recent dataset available.

There is no national survey regime in place to inform on road condition for the larger rural unclassified network which has received less investment.

Commentary

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.

Expenditure Summary by category 2021-22

Cost Category	£	Output
Planned Maintenance - Corrective	£2,487,426	• 51 resurfacing schemes totalling 30.6km
Planned Maintenance - Preventative	£1,991.219	• 41 surface dressing schemes totalling 51km of new surface treatment.
Routine Cyclic Maintenance	£2,428,336	• Cyclic gangs & routine works, drainage, sign cleaning, grass cutting
Routine – Reactive Repairs (emergency)	£285,443	• 2920 Emergency repairs and service requests

	Routine – Reactive Repairs (non-emergency)	£603,180	• Drainage and surface repairs, sign repairs – 5038 routine repairs and minor works
	Routine – Inspection & Survey	£345,423	• Asset management & condition surveys
	Operating Costs	£1,217,884	• Includes Winter Service
	• The above cost categories are based on groupings developed for national reporting requirements and are used to inform budget planning.		

2.3 Highways Investment Options

Road assets gradually deteriorate 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 2022-42 includes the recent additional Capital funding invested in 2022, which provided a total of £3.9m investment in highway surfaces.

Three 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.

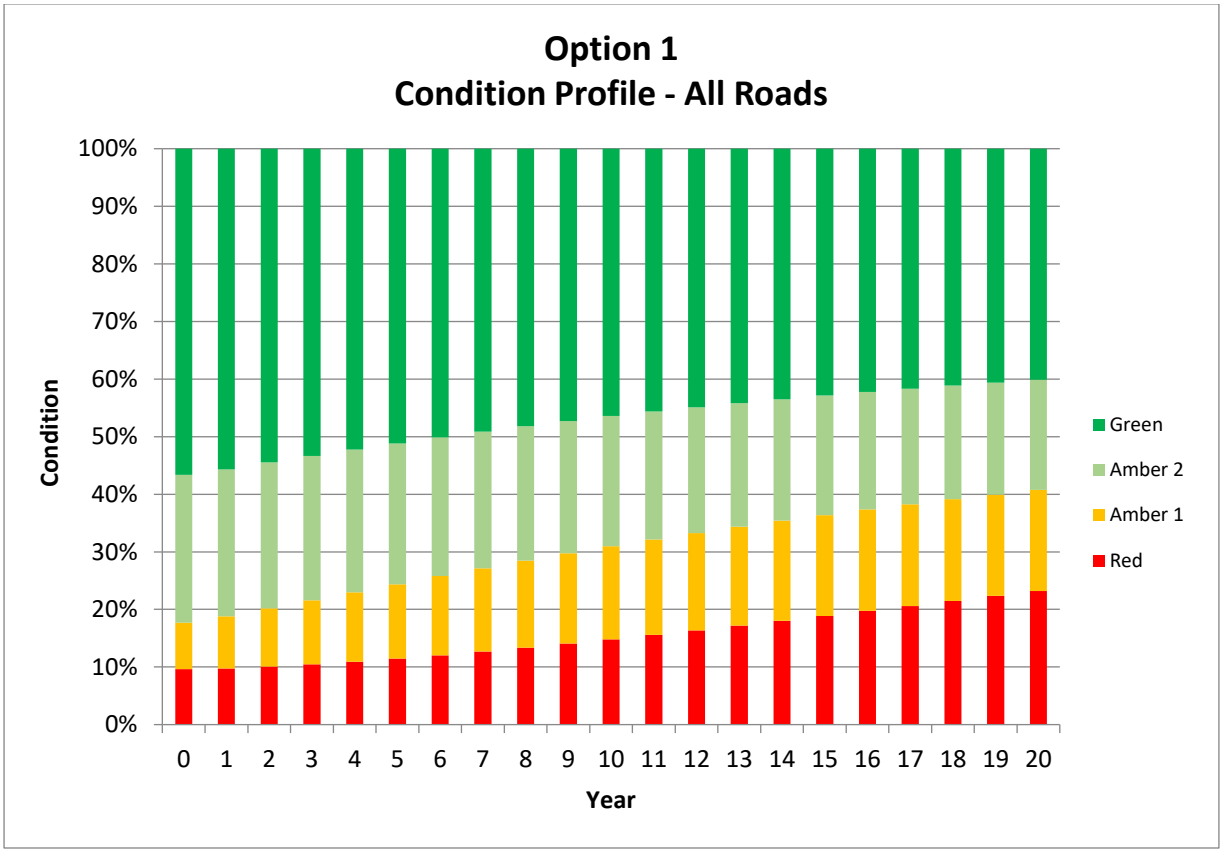
Road condition indicators

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:

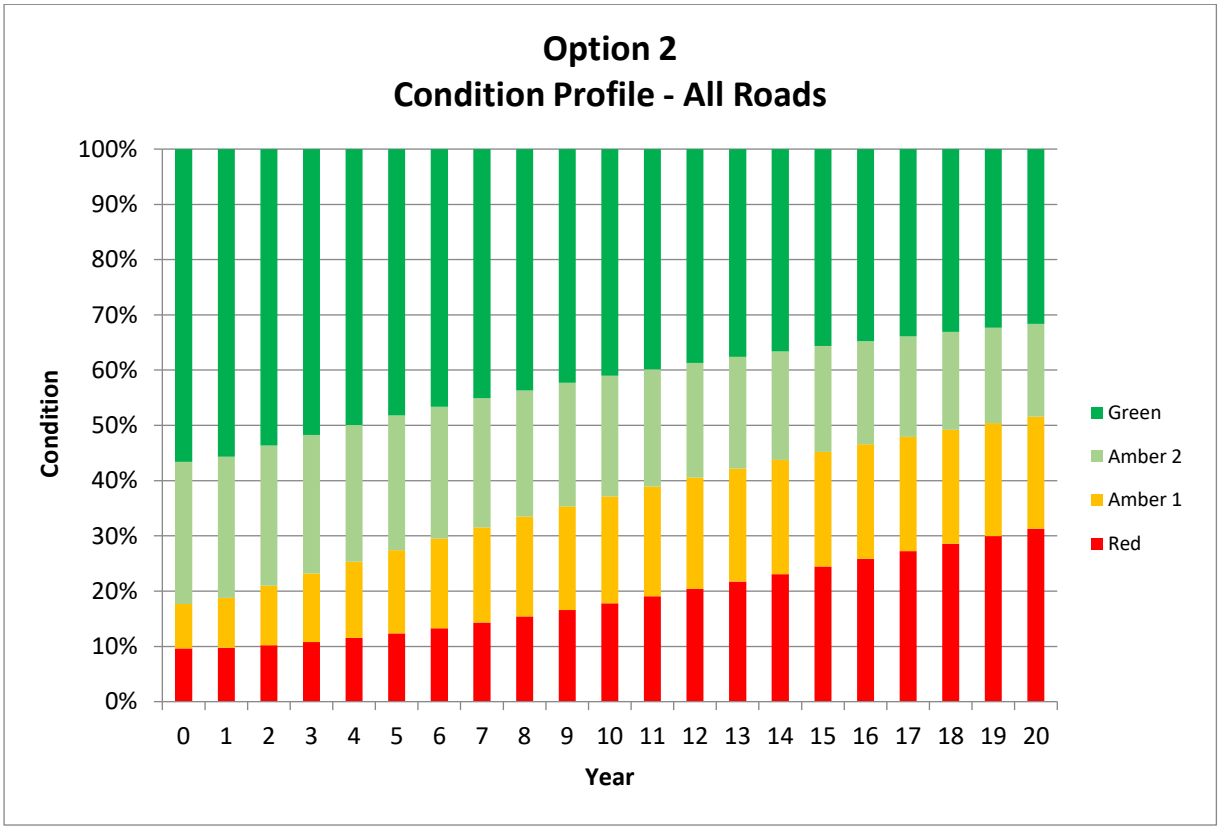
Option 1 Optimistic - Existing budget and assuming WG grant		
2022-23 Capital funding of £3.9M 2023-24 onwards County Capital £0.6m + £0.8m + WG Grant £1.5m– Total £2.9m		
Funding/Year	**23/24**	**23/24 onwards**
Welsh Government	1.5	1.5
CCC	1.4	1.4
Total invested £m	**2.9**	**2.9**



The percentage of road in poor condition (Red) increases from 9% (313km) to 15% at 10 years and 23.2% (825km) at 20 yrs.

The percentage of road in good condition (Green) falls from 56% to 46% at 10 years and to 40% at 20 years.

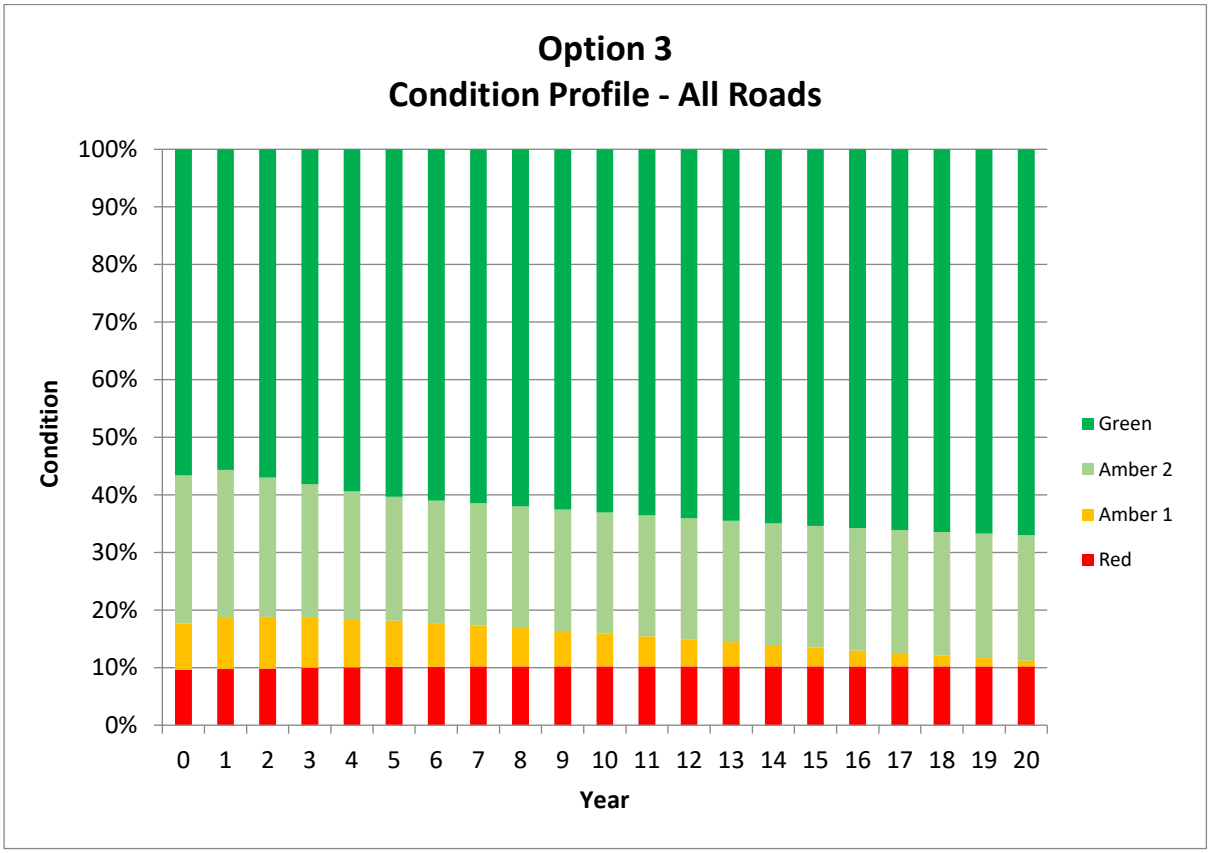
Option 2 – Predicted option (Actual budgets) - Modelled investment of £1.4M/annum 2022-23 Capital funding of £3.9M £1.4M from £600k County Capital & Revenue £800k		
Funding/Year	**23/24**	**23/24 onwards**
Welsh Government	0	0
CCC	1.4	1.4
Total invested	**1.4**	**1.4**



The percentage of Red increases from 9% (313km) to 18% (640km) at 10 years and to 31% (1102km) at 20 yrs.

The percentage of Green falls from 56% to 41% at 10 years and to 32% 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.** Capital £5.2m and Revenue £0.8m.		
Funding/Year	**23/24**	**23/24 onwards**
Welsh Government	0	0
CCC	6.0	6.0
Total invested (£m)	**6.0**	**6.0**



The percentage of Red remains at 9.6% at this level of investment increases marginally from 9.6% to 10% at 10 years and in 20 yrs.
The percentage of Green increases from 56% to 63% at 10 years and to 67% 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. This scenario allows for investment in preventative treatments which will reduce the extent of more expensive treatments at a later data. In addition to road condition improvement there will be a corresponding reduction in reactive and emergency repairs which are abortive costs and should reduce the potential for damages claims against the authority.

2.4 Highway Drainage

Our existing highway drainage infrastructure is ageing, and limited maintenance carried out due to reducing revenue budgets over recent decades. To better understand the condition of our drains, surveys have been carried out on sections of our A road network by specialist survey teams. Quickcam survey techniques have been used 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.

Table 3.4 Structural and service grade definitions

Grade	Structural condition	Service condition
1	No defects	Clear
2	Superficial defects	Superficial deposits with no loss of performance
3	Minor defects	Performance slightly reduced
4	Major defects	Performance severely reduced
5	Not fit for purpose	Blocked or unsafe condition
9	Assessment attempted but not possible	Assessment attempted but not possible
0	Assessment not attempted	Assessment not attempted

The surveys so far have shown that **20%** of our drainage pipes are either **Severely reduced** or **Blocked and unsafe**. Of that **8%** 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. A Capital bid of £500k pa was submitted in 2021 to fund further survey and remedial schemes along the key strategic routes. We were successful in receiving £250k per annum for a five year period and as a result further surveys are being carried out in 2022. A prioritised programme has been developed using a combination of Capital and revenue funding. Funding will be used to address drainage issues following the risk-based approach. 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.

To date we have surveyed 106 km of our key routes including:

- A484
- A485
- A486
- A48

The surveys have recorded and mapped:

- 106km of pipework
- 5176 point items including manholes and gullies.

All of these have been graded and photos and video evidence recorded. Survey work is on-going this year on the A476, A4138 and the B4333 totalling 75km. By the end of this year, we will have surveyed 181 km of the 576km prioritised for survey.

The new capital funding is a significant improvement of investment in recent years and is allowing us to address priority drainage issues and gather further information to support future business case for additional funding which is critical 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 from this initial sample of data 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. A detailed estimate of maintenance need will be developed for the report in 2023.

2.5 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 footway and cycleways hierarchy and maintenance regime will be developed as part of our maintenance manual.

In 2021/22 we invested £96k Capital into footway maintenance and refurbished footways at:

- Llais Afon, Ffairfach
- Lime Grove, Carmarthen
- Margaret Road, Llandybie
- Danlan Park, Pembrey
- Parc y Minos, Burry Port

In 2022/23 we have been able to allocate a budget of £300k to footway refurbishment using capital funding but there is no dedicated capital budget for footway surfacing in 2023/24.

It is important that we to continue and increase our investment in footways and cycleways if we wish to realise our corporate objectives.

The division has previously been unsuccessful with a Capital bid of £500k pa to develop a modest footway and cycleway refurbishment programme.

<table>
<tr><th colspan="3">Asset Group: Footways and Cycleways</th></tr>
<tr><td rowspan="2"></td><td colspan="2">Footway Length by Material (km)</td></tr>
<tr><td>
<table>
<tr><th>Bituminous</th><th>PCC Slabs</th><th>Precast blocks</th><th>Concrete</th><th>Total</th></tr>
<tr><td>869</td><td>48</td><td>6.5</td><td>12.8</td><td>936</td></tr>
</table>
</td></tr>
<tr><td></td><td colspan="2">Commentary</td></tr>
<tr><td>Footways</td><td>

Reactive repairs to footways in 2021-22 cost £71,102 and were funded through revenue budgets. Over 700 individual defects were recorded and managed.
Active Travel funding and Safer Routes in Communities projects are providing additional routes for pedestrians and cyclists.
Carmarthenshire’s footway/cycleway network is extensive at over 1000km.

</td><td>

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.
Our footway resurfacing programmes are based on local priorities with budgets allocated in line with the extent of footway.

</td></tr>
<tr><td>Cycleways</td><td>

On road cycle-lanes – 2.6km
Dedicated cycle-tracks/shared use paths – 23.3km
On road cycle routes (e.g. National Cycle Network) – 126km

</td><td>

Repair and service level targets will be established in line with National recommendations in conjunction with our revised highway standards.
Inspection regimes on off-road routes will be introduced in April 2023. This will further support the

</td></tr>
</table>

Asset Group: Footways and Cycleways		
	These lengths are estimated based on current confirmed responsibilities for the highways service. Increasing cycling numbers and networks will require continued investment.	County Council's cycling ambitions.
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	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. A risk-based approach will be developed as part of our Maintenance Manual (Part 4 of the HAMP).	

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 1951 structures consisting of:

- 794 highway bridges
- 53 footbridges
- 570 retaining walls (cumulative length 19Km)
- 529 large culverts
- 5 subways

These structures 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, and 55 of the structures are listed meaning that they require additional care and attention when carrying out maintenance.

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 gathered informs effective maintenance management and planning of our highway structures.

There are currently 50 bridges which have been assessed as sub-standard with 3 structures being strengthened in 2022/23 bringing the total to 47. Of these, 8 bridges are weight restricted. 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. The recommended period for monitoring is 2 years and a review of assessments and interim measures will commence later this year to ensure the appropriateness of the current monitoring regime. In accordance with Technical Standards, monitoring of sub-standard structures should be for a defined period. 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.

It is estimated that the cost of strengthening these sub-standard structures is of the order of £5 million. It is also estimated that the maintenance backlog on highway

structures is £9.8 million giving a combined total maintenance/strengthening backlog of circa £14 million.

In addition to on-going maintenance of existing structures stock, the number of failed highway supports is on the increase due to severe weather events, historic underfunding of 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. National guidance recommends a formal review is carried out following appropriate technical standards and Carmarthenshire has commenced its review. Following the initial review of all 799 bridges, 207 were identified as requiring a Level 1 Scour Assessments which have been completed this year. Structures identified as requiring Level 2 Scour Assessments are currently being reviewed and assessments will be carried out this year and into 2023/24, 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 2021 due to COVID restrictions however this is expected to conclude in 2022/23.

Bridge Improvement Works

Revenue funding in 2022 has remained steady and allows reactive and routine maintenance works to be undertaken. There is however an estimated £9.8m backlog of repair and preventative works which should be considered for funding. The structures unit is prioritising funding for planned maintenance to improve access to structures and ensure basic maintenance visits to all structures on a 2 yearly cycle. This may reduce contingency funds available for unplanned failures.

Funding of £741k in 2021/22 enabled 5 structures to be upgraded.
The Capital budget for 2022-23 is £1.025m and this funding is being utilised on sub-standard structures where we will be completing 4 structural schemes within 2022/23. A programme of design and construction is also underway, aiming to reduce the number of sub-standard structures year on year. Capital funding for 2023-24 is projected at £400,000 and will allow us to deliver an additional 4 structural schemes.

Bridge Upgrade Programme - 2021-24		
2021-22	2022-23	2023-24
Doethie Bridge Replacement Scheme, Rhandirmwyn	Railway Inn Llanpumsaint - Bridge Replacement	Bridgend Inn Culvert, Pontamman – Bridge Replacement
Ffaldre Bridge, Rhandirmwyn, Deck Replacement – Strengthening Scheme	Garregllys Bridge, Whitemill – Bridge Replacement	Mynyddygarreg Bridge – Bridge replacement
Clynmelyn Culvert replacement	Glanrhyd Bailey Bridge, Cilycwm – Bridge Replacement	Pont Y Pentre, Llannon – Bridge Replacement
Loughor bridge rehabilitation (part funded with Swansea City Council)	Danrheol B ridge, Meidrim – Bridge Strengthening	Tan Y Berllan, Ffairfach – Bridge Replacement
Upper Lliedi Bridge, Felinfoel, bridge strengthening		

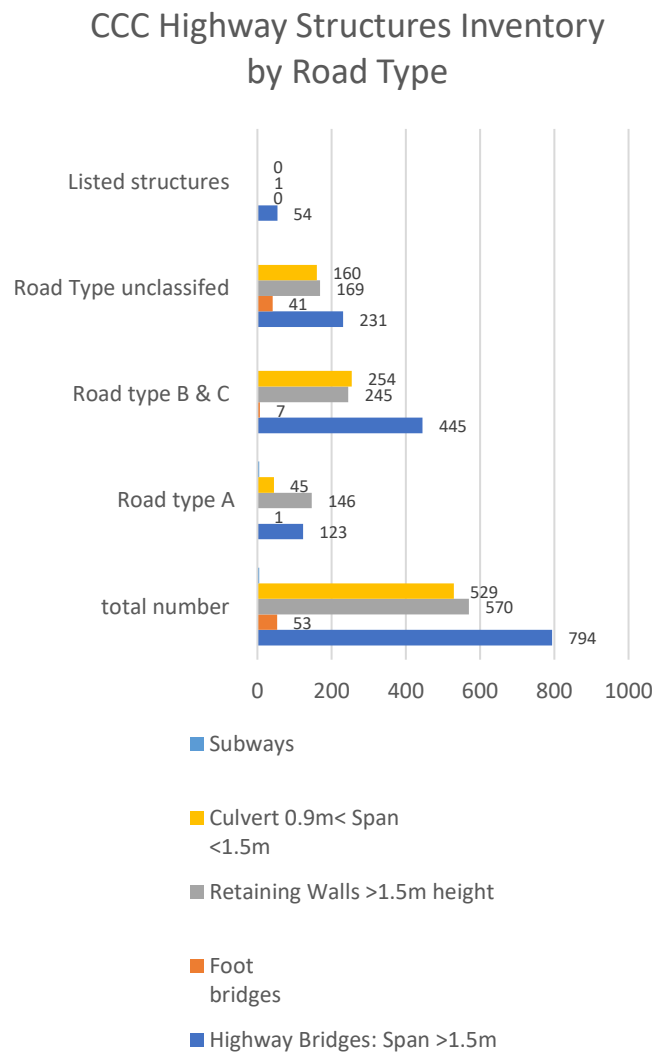
Doethie bridge replacement 2021

Prioritisation of Overall Funding Needs
Using the structures priority matrix for funding we consider 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		
The Asset		• 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

Asset Group: Highway Structures

Inspections

Inspection Statistics	No.
Number of bridges requiring principal inspections – 6 years	42
Number of principal inspections scheduled	3
Number of principal inspections on time	3
Number of structures requiring general inspections 21/22	936
Number of planned general inspections	936
Number of general inspections on time	537

- 42 structures are subject to Principal Inspection (PI). The remainder are subject to General Inspections (GI).
- PI's were resumed in 21/22 following suspension in 20/21 due to COVID restrictions.
- A reduced number of general inspections were carried out in 2021-22 due to a vacant inspector post and COVID restrictions

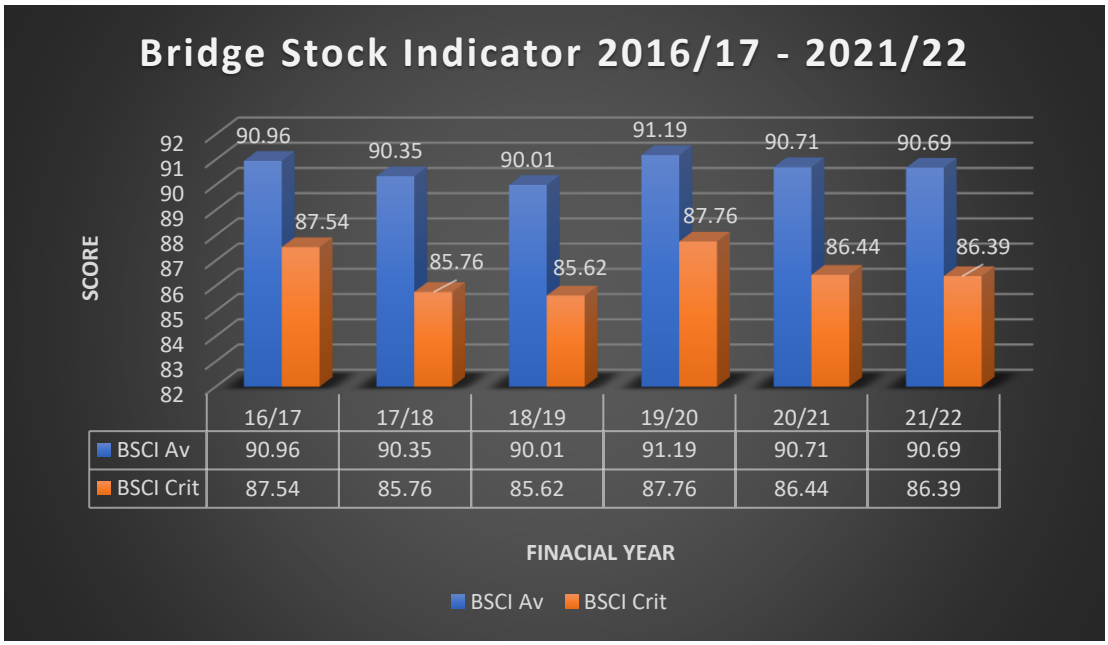
Structural Condition

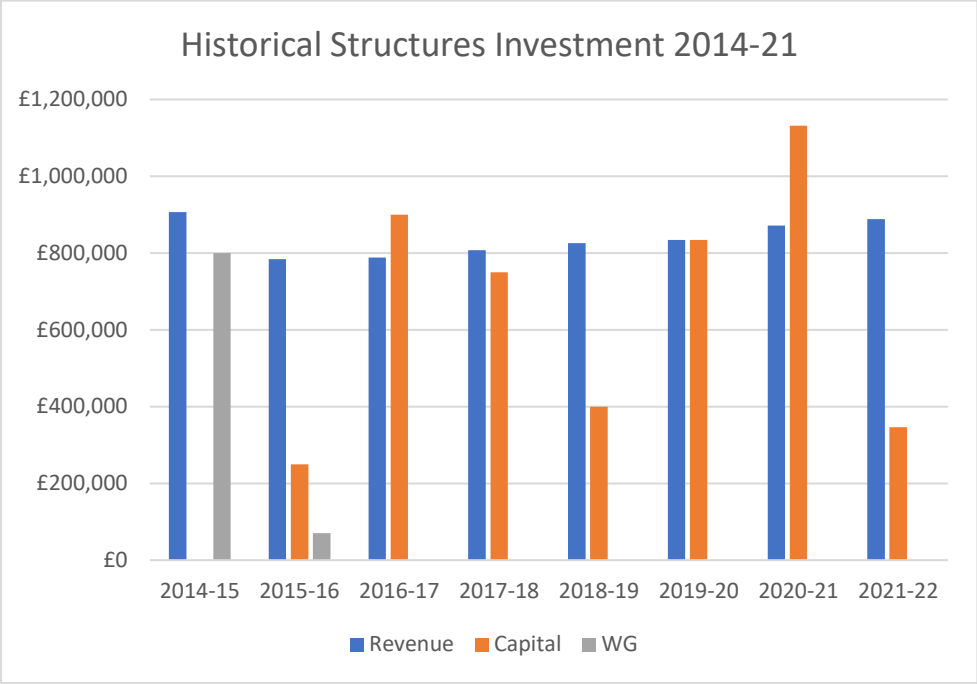
Assessment Statistics	No.
Number of council owned / maintained bridges that failed assessment	126
Number of privately owned bridges within council's road network that failed assessment	5
Number of council owned / maintained bridges subject to monitoring / special inspection regimes	47

- 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

Weight and height Restrictions

Weight Restrictions	No.
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		
	Of the 8 weight restricted bridges, 2 are programmed for upgrading in 2022/23 and 1 in 2023/24. There are 17 height restrictions in the county, mainly Network rail structures, with 1 being the responsibility of Carmarthenshire at Llanpumsaint.	
Bridge Condition Indicators	 **Definition:** **BCIAv** is the average BCI for a bridge evaluated considering the condition of all structural elements in a bridge. **BCICrit** is the critical BCI for a bridge evaluated considering the condition of those elements deemed to be of very high importance to the bridge. **BSCIAv and BSCCrit** are the average and critical condition index for a bridge stock evaluated using the BCIAv and BCICrit values for all bridges in the stock. The 2020-21 BSCIave of 90.69 and BSCIcrit of 86.39 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.	

Asset Group: Highway Structures		
Historical Investment		
	• 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.	

Strengthening / Replacement

By the end of 2022/23 there will be 47 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 16 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 47 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 47 sub-standard structures is £5 million. With current levels of funding this will take approximately 13 years to complete the programme as a minimum, and assuming no other major structural work is funded by this budget during this period.

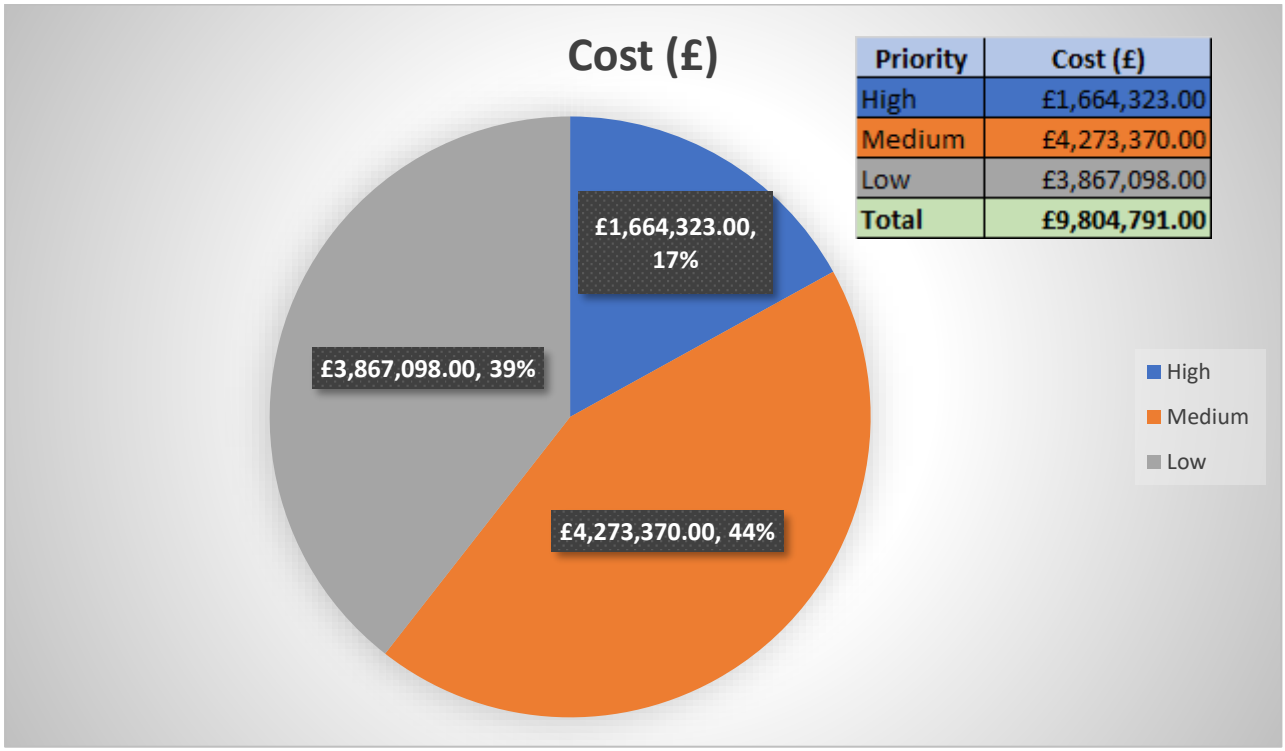
Monitoring sub-standard structures for a further 13 years places the authority at risk, as the condition of structures may deteriorate. Addressing the backlog over a shorter period is recommended. An increase of Capital budget to £850k per annum for bridge strengthening would accelerate the programme for substantial completion over 6 years. Higher risk structures would be addressed in the early part of the programme.

A budget of £1m per annum would complete the programme in 5 years and this option is recommended due to the on-going risk of deterioration and the monitoring programme being significantly beyond that recommended in technical standards.

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 as shown in the table below.

Bridge Stock Indicator	15/16	16/17	17/18	18/19	19/20	20/21	21/22
BSCIav	90.32	90.96	90.35	90.01	91.19	90.71	90.91
BSCIcrit	86.25	87.54	85.76	85.62	86.76	86.44	86.72

Overall condition performance indicators are unlikely to improve in the short term however by sustaining the current level of revenue funding, overall condition performance indicators should remain between 80 and 90. These scores are considered to represent 'Good' to 'Very Good' condition in accordance with the County Surveyors Society (Wales) classification of structures condition Performance Indicators.

Continued investment in our bridges and structures is essential to maintain continuity of our highway network. To tackle the current maintenance backlog and to upgrade our sub-standard structures requires investment of £14m.

Historically, revenue funding has been focussed on reactive repairs which often require urgent repair. 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 to address emergency repairs previously funded from planned maintenance budgets.

Section 4 – Public 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 has reduced carbon emissions, lowered energy costs and improve light quality. The project is estimated to save 2.4 million Kwh which equates to 1,200 tonnes of CO_2 emissions each year.

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 high-risk columns are removed immediately.

  A column replacement programme is currently underway.

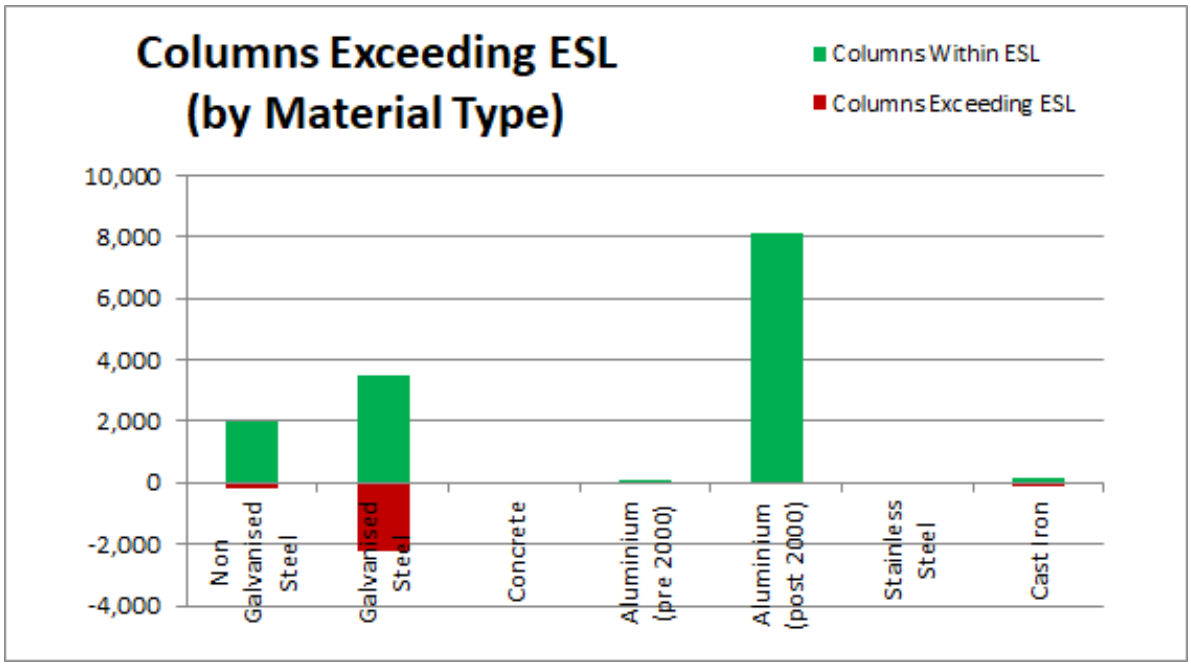
- There are around 304Km of underground electric cables supplying lighting units. Often the cable in not ducted and is more prone to perishing in the ground. This is leading to an increasing number of cable faults and power outages and presents a safety concern.
- A funding bid for cable renewal was unsuccessful in 2022/23 and a new submission is being made for 2023/24.

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

4.2 Lighting Columns

There are currently 20,600 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) of the column. This is represented for the range of lighting columns in use throughout the County in the graph below.

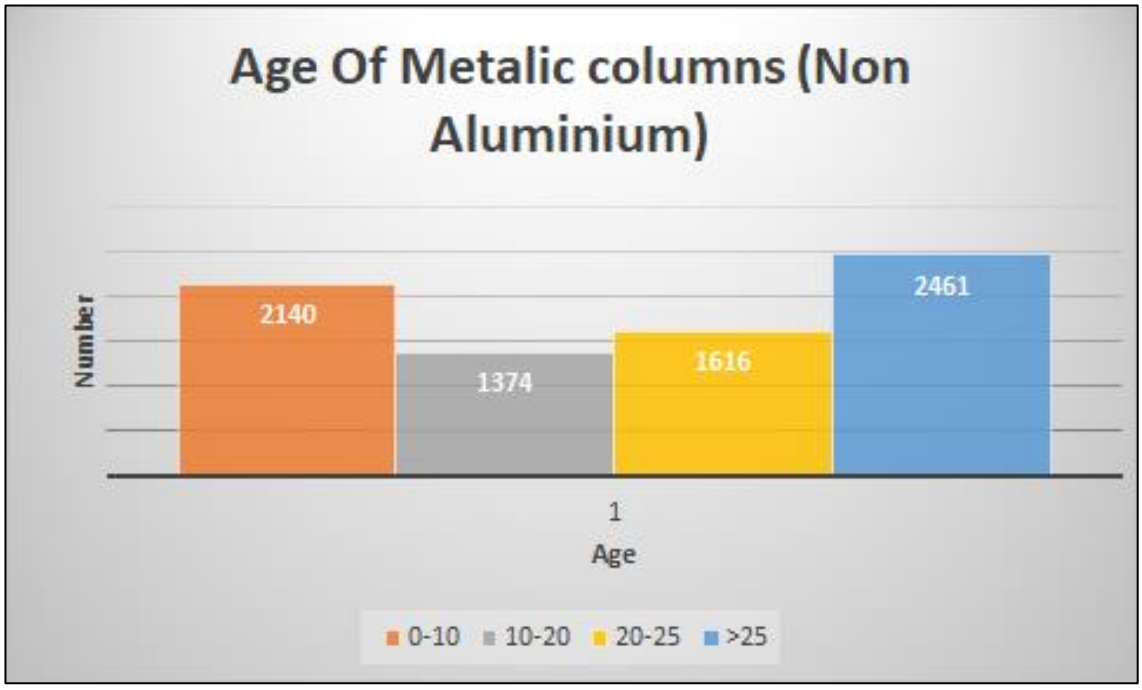


A key concern are the existing steel columns which are considered to have an ESL of up to 25 years before replacement. Columns exceeding their ESL are subject to a management regime with periodic inspections.

Based on current data 32% (2461 out of 7591) of our metallic lighting columns/brackets exceed their expected service life.

A column replacement programme is underway which is replacing approximately 400 columns each year and these are being prioritised to target the older life-expired steel columns which present the greatest risk of collapse.

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 in 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 Traffic Signs

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.

A project proposal is being evaluated to target the removal of any unnecessary traffic sign illumination or conversion to LED units. This will link in with the 20mph role out. It should be noted that there will be a capital cost to pursuing this proposal.

4.4 Traffic Signals and Pedestrian Crossings

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.