



Annual Status & Options Report

Structures

2015/2016

Powys County Council

Working Document

1. Introduction

This report presents a summary of the council's structures assets as at March 2016. The report complements the Highway Asset Management Plan (HAMP). It provides information to enable choices about future levels of investment in the structures asset.

1.1. Status

The status of the structures asset is reported in terms of condition, the outputs delivered, the standards achieved and an indication of customer satisfaction where information is available.

1.2. Options

The report considers the following options:

- A continuance of current funding levels;
- The predicted cost of maintaining current standards;
- Predicted effect of specified budget changes.

1.3. Long Term Forecasts

Structures assets deteriorate slowly, typically having a design life of 120 years. The impact of a level of investment cannot be fully understood solely by looking at the predicted impact over the short term. The methods of predicting the deterioration are not well developed enough yet. The report therefore includes some initial assessment of long term funding needs by means of providing comparison with the options for future investment.

1.4. Impacts Risk

It may not be possible to provide budgets capable of delivering an ideal service standard and some compromises may need to be made. To aid these decisions each option presented is accompanied by an assessment of its impact and the associated risks.

2. Status

2.1. The Asset

The authority's Structures asset comprises:

Asset	Number
Bridges & Culverts	1,697
Footbridges	75
Retaining Walls	254
Cattle Grids	289

2.1.1. Data Quality

Confidence is high with regard to the quality of records for bridges, culverts, footbridges and cattle grids.

Confidence is moderate with regard to retaining walls.

2.2. Structure Condition

2.2.1. Assessments

A programme to assess the condition of bridges for carrying vehicles operating at 40/44 tonnes commenced in the late 1980's.

The programme is 79% complete with a failure rate to date of 36%. Currently 62 structures that failed assessment are awaiting attention. Assuming the same failure rate a further 78 bridges would require some form of work. The total projected cost for bringing all 140 bridges up to 40/44 tonne capacity is £34 million.

Details of the assessment programme are given in the table below:

	Powys	
<i>Total including Network Rail, British Rail Property Board, MOD & Canal and River Trust requiring assessment[See Note 1 below]</i>	1,042	
Total Number of Assessments Completed	824	
Total Number of Assessments Remaining	218	A
% Assessments Completed	79%	
Number of Passes	528	
Number of Failures	296	B
% Failure of Assessments Completed	36%	C
Number of Bridges Strengthened	234	D
Total Cost of Strengthening (known costs)	£12,082,816	
Number of Bridges Currently Weight Limited	48	
Total Estimated Cost of Strengthening Weight Limited Bridges	£11,656,000	
Average Estimated Cost per Bridge	£242,833	E
Number of Bridges with Substandard Parapets	221	
Number of Bridges subject to Scour	100	
Number of failures already assessed but awaiting attention	62	F = B - D
Potential number of failures from assessments to be completed	78	G = A x C
Number of Bridges potentially failing assessment and requiring work	140	H = F + G
Total Estimated Cost of Strengthening Failed Bridges	£34,072,110 ^[2]	J = E x H

Note 1 – this relates to structures requiring assessment. Total number of bridges PCC responsible for = 1,605. Total number of bridges on road network including Network Rail, British Rail Property Board, MOD & Canal and River Trust = 1,701.

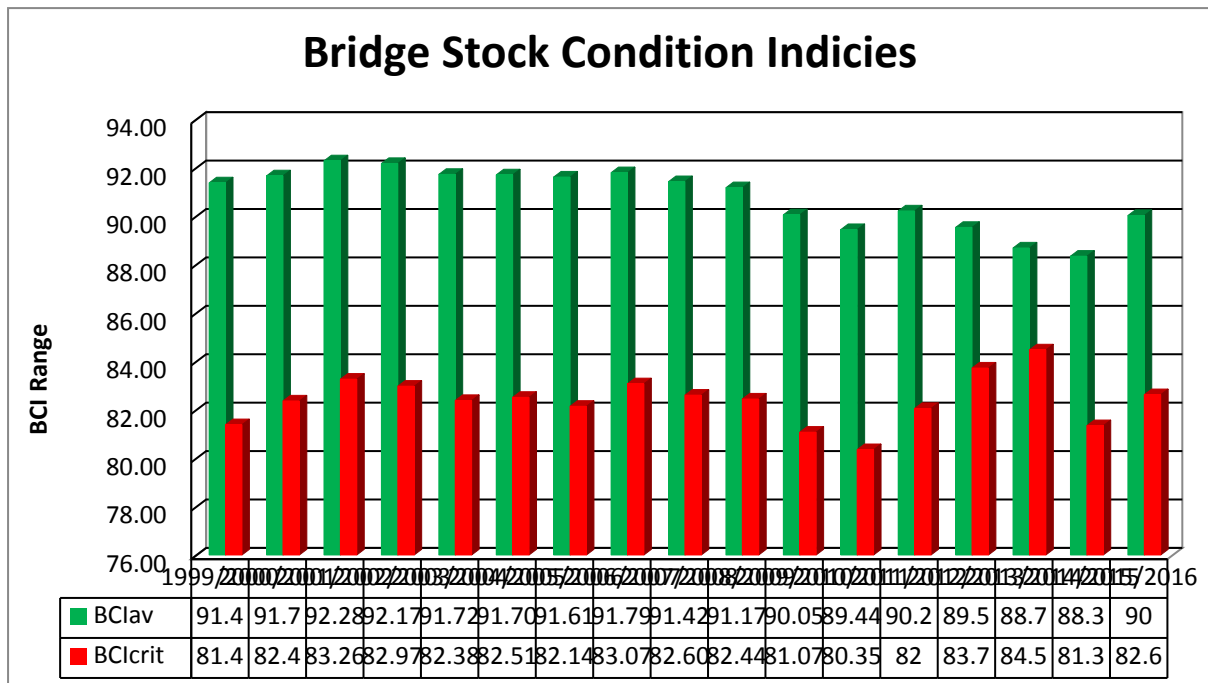
Note [2] – A number of these bridges may not require strengthening because they are deemed suitable to operate at a lower weight.

2.2.2. Bridge Stock Indicator (BCI)

The Bridge Condition Index for a structure is derived from the inspection of a structure which grades each component on the structure. Each of these components is weighted in terms of importance. The results are calculated to produce an index rating between 0 and 100 that gives an overall condition for a structure, 100 being the best. A further calculation is also undertaken that summates all the individual structures indexes into two overall Bridge Stock Condition Indexes (BSCI), namely, a BCI average (BCI_{AV}) and BCI critical (BCI_{CRIT}). The average figure summates all the individual components whereas the critical score looks at the specific components vital for the integrity of the structure. These scores give an indication of the overall health of the bridge stock and are used as KPI's which are compared with other authorities.

BCI Condition Performance Indicator Range	
Category	Range
Very Poor	0 – 40
Poor	40 – 65
Fair	65 – 80
Good	80 – 90
Very Good	90 – 100

The bridge condition indicator scores for the structures stock computed using inspection results up to and including 2015/16 are:

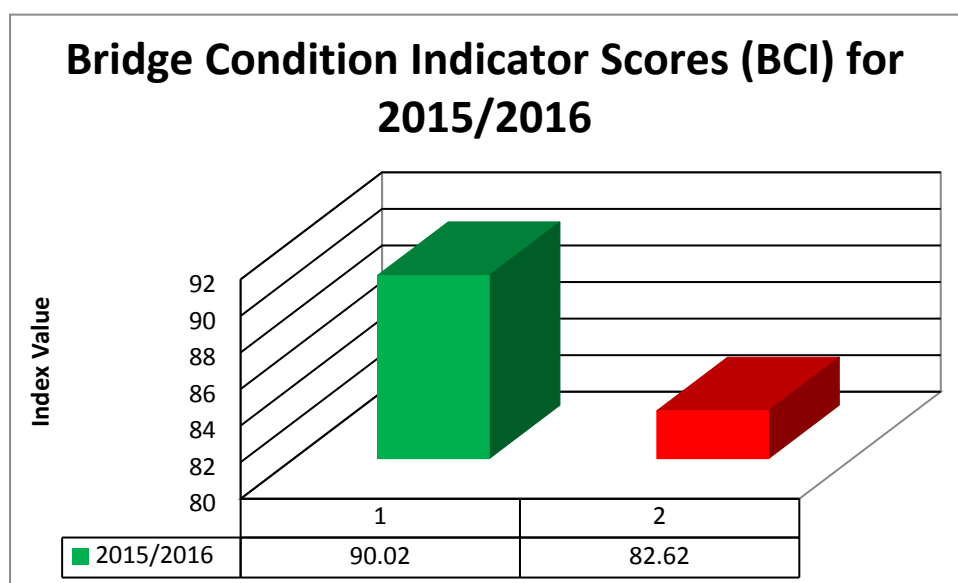


BSClave: The bridge stock condition indicator (ave) is the numerical value of a bridge stock evaluated as an average of the bridge condition indicator values weighted by the deck area of each bridge.

BSClcrit: The bridge stock indicator (crit) is the numerical value of the critical condition index for the bridge stock evaluated using the BClcrit values for each bridge.

The results over the last 17 years clearly show deterioration in the bridge stock, not only in the average score but also a marked deterioration in the critical elements. This is a worrying trend as it demonstrates that maintenance budgets have not been sufficient to counter the inflation and construction services increases thus decreasing the amount of works that can be undertaken.

At the end of the 2015/2016 financial year the Bridge Stock Condition Indices were calculated as follows;



This shows the average condition of the bridge stock was 'Good'. However, when the critical components are taken in isolation the overall condition of the bridge stock is reduced to 'Fair'.

2.2.3. Scour

Scour represents one of the greatest risks to the integrity of a structure which can lead to catastrophic failure if not identified and addressed. A new technical memorandum has been published to guide structure owners in the assessment of the risk associated with scour effects.

The Authority over the next three years will undertake a level one assessment of its relevant structures to identify those at most risk from scour. This work will be undertaken in conjunction with the general inspection regime.

2.2.4. Substandard Parapets

The Authority is in the early stages of establishing a programme to undertake a risk assessment of the structure stock to establish those structures which have parapets that do not comply with current design requirements. For those structures that do

not comply the risk will be managed according to the nature of the road, its location and obstacle crossed and may not result in the need for replacement.

2.3. Performance

Overall it is considered that the structure stock is fit for purpose and safe to use.

2.4. Customer Satisfaction

There is currently no data to establish the level of customer satisfaction in relation to structures.

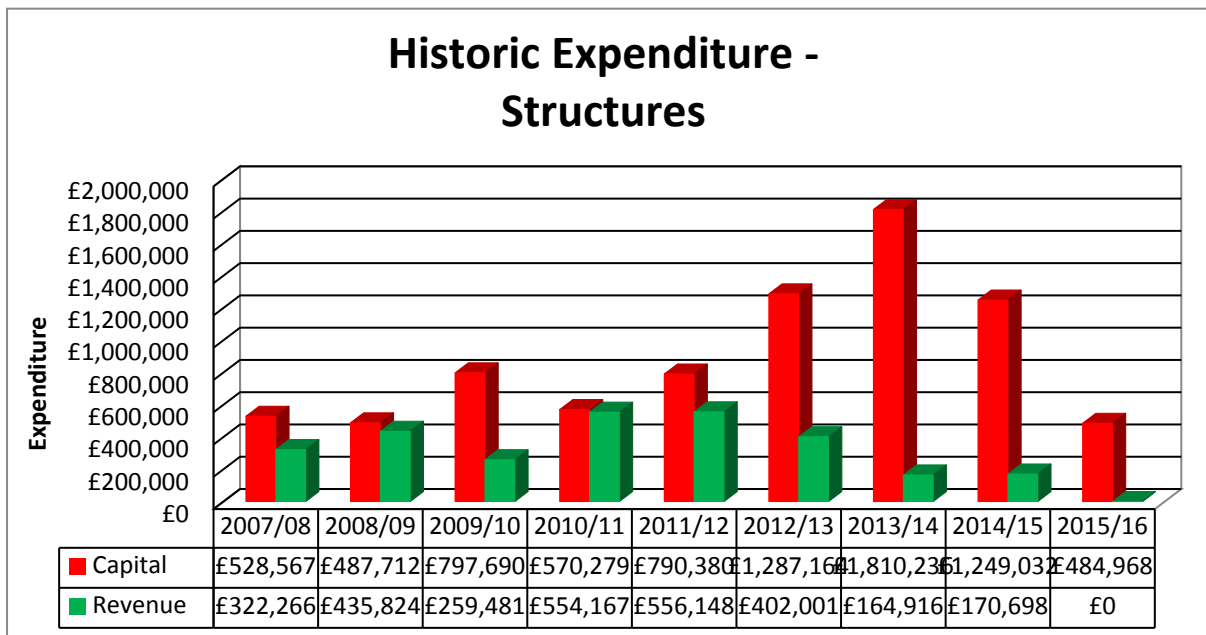
2.5. Financial Information

2.5.1. Asset Value

Structures Asset Valuation		
Asset Valuation	Description	2015/2016 Cost
Gross Replacement Cost (GRC)	Estimate of the current cost of replacing an asset using a standardised procedure.	£277,565,000
Depreciated Replacement Cost (DRC)	Estimate of the current value of the asset reflecting the condition of the asset within its lifespan.	£266,214,000
Annualised Depreciation (AD)	Cost of the asset to a single year of the assets expected lifespan.	£11,341,000

2.5.2. Historical Investment in Structures

Historical investment in Structures has been as shown in the table below:



2.5.3. Output

In 2015/2016 the budgets allocated to structures works were able to provide the following output;

Structures Output		
Category	Budget	Output
Capital – Structures Strengthening (Core)	£150,000	
Capital – Planned Maintenance (Core)	£178,000	23 structures
Revenue – Routine & Planned Works	£379,166	13 structures, 8 new schemes completed, 5 completions from previous year.

3. Options

The areas identified for investment are presented below:

3.1. Strengthening

The strengthening of structures that do not meet their full load carrying capacity and are currently being managed either via the imposition of a weight restriction and/or a regime of special monitoring/inspections.

3.2. Refurbishment

Works required to refurbish structures that have deteriorated to a state whereby action is warranted to prevent further more serious deterioration.

3.3. Parapet Works

Works required to structures with substandard parapets on structures where their replacement would be appropriate.

3.4. Scour Protection

Works required to structures to protect them from the effects of river erosion that will undermine the integrity of the structure.

3.5. Preferred Option

The various areas for investment relate mainly to programming the required works over time. The choice between which area should receive attention first therefore needs to relate to the priority which the council wants to achieve the predicted outcome from each area of investment.

It should be noted that all the structures will continue to deteriorate over time and it is likely that some structures will be identified that required treatment, possibly in advance of those already identified requiring works. An annual review of the programme and subsequent reporting will show if the overall need changes.

For the next few years budgets will be targeted at

3.6. Budget

It is expected that the current level of funding will continue as shown below until at least 2015/16;

Budget for Structures	
Category	Budget
Routine Cyclic Maintenance	£150,000
Planned Maintenance	£125,000
Inspections and Assessments	£100,000
Capital Works - Core	£375,000
Total	£750,000

3.7. Option Summary

If the current levels of funding continue then this is predicted to result in;

- The requirement for the revenue budget to grow over time to accommodate increasing reactive repairs
- A reduction (deterioration) of measured condition
- Increasing quantities of minor defects
- Likelihood of decreased customer satisfaction as a result of increasing repairs

4. Long Term Forecasts

4.1. Prioritisation of Overall Funding Needs

Capital budgets will be targeted at addressing the strengthening of the substandard structures to either remove or prevent weight restrictions. In addition, structures in need of major refurbishment works, which are usually heritage structures, will also be included in the forward capital programme.

The revenue budgets will continue to be used to undertake cyclic routine maintenance together with planned maintenance works on specific elements of those structures identified as needing high priority works through the inspection regime.

4.2. Overall Funding Need

Currently, the estimated cost of strengthening the identified substandard structures is in excess of £7 million. However, the Authority still has over 300 bridges to structurally assess which if the current failure rate of 34% continues will add in excess of 100 further structures to the programme.

The backlog of maintenance works identified through the inspection process is in excess of £7 million, which is in addition to the strengthening costs.

5. Impacts Risk

If funding levels are not increased in the future then the structure stock will continue to deteriorate. Even if the current level of budget is maintained structures will still deteriorate as can be seen from the BCI figures detailed above.

This is likely to lead to increases in costs to rectify defects as they become worse and could eventually lead to structures becoming unsafe or unserviceable and their use having to be constrained or removed.