



## **Asset Management Success in Dudley**

“An Integrated Asset Management System is fast becoming an essential tool for the Highway Manager”. So says Mike Bosworth, Dudley Metropolitan Borough Council’s Highway Asset Manager.

In 2002, Dudley were faced with determining the effects of increasing investment in planned highway maintenance works, in response to the Government’s initiative to “Arrest the deterioration of the highway network by 2004 and eliminate the maintenance backlog by 2010”. In meeting this objective, Mike realised that asset management solutions would have to be employed.

Dudley MBC is responsible for managing a highways asset totalling nearly 1,000 Km of roads, 1900 Km of footways and 300 Km of footpaths. Mike recognised that if a successful asset management strategy was to be implemented, it was essential to ascertain:

- the value of the asset
- the current condition of all elements
- the predicted future condition
- the maintenance standards or service levels required
- the level of budget necessary to maintain the asset

It quickly became apparent that the current highway assessment system used to prioritise maintenance works, did not have the ability to predict the condition of the roads and footways in future years, but relied upon a simple “snapshot of the condition” at any one time. Albeit the replacement value of the roads and footways could be calculated, neither the condition of the network nor the likely condition in future years was known in today’s terms. Consequently, realistic maintenance standards could not be set or objective maintenance budgets allocated.

As part of preparing an asset management plan, it therefore became necessary to investigate the methodology required to achieve the main objective, that is, “to determine the effects on the condition of the roads using multiple budget scenarios” and “to acquire a system that could fully meet these identified requirements of a modern asset management approach”.

Dudley MBC, for the past 11 years has successfully carried out its obligations under the Roads and Street Works Act using Symology systems. Indeed, for a number of years, Mike Bosworth was involved nationally with RASWA and the National Street Gazetteer. He saw the significant advantage of incorporating the RASWA function into a fully integrated asset management system, which also included the United Kingdom Pavement Management System (UKPMS). Having employed consultants to consider the alternatives, Dudley MBC selected Symology to supply the sophisticated systems and the practical experience involved in establishing the fully integrated asset management solutions.

UKPMS Coarse Visual Inspections (CVI) had been undertaken on 85% of the road network during 2002/3 together with Detailed Visual Inspections (DVI) on 15% of the network. These

surveys were used in the analysis of the road condition. In a joint project with Symology, Mike was able to set up the street gazetteer, superimpose the network referencing system, which had been used for data collection, and import the condition surveys. The network was also plotted on Symology's SymView GIS, providing a visual representation of the network, which was subsequently used to show the condition of the network and the treatments identified.

With guidance from Symology's UKPMS consultant, the condition data was processed through the UKPMS-based 'Maintenance Standards' module, using the national standard Rules and Parameters RP3.0, after careful allocation of treatment costs.

Resurfacing and other maintenance works have been historically funded from two sources dependant on the Road Classification:

- Principal Roads (A Class) from Central Government as part of the Local Transport Plan (LTP) settlement.
- Non Principal Roads (B and C Class) and all non-classified roads from Local Authority Revenue Funds.

As part of the Government's initiative, an additional allowance was granted in the LTP settlement for Local Roads. Mike wanted to investigate the effects on the condition of the highway network, by an injection of funds to form the basis of a Local Public Service Agreement (LPSA) bid for funds. The "Project Network Trends" functionality of the Maintenance Standards module provided a mechanism to obtain these predictions.

This UKPMS-based process uses Condition Projection algorithms to forecast deterioration from year to year. Starting with the current assessed network condition, it identifies the costs of all recommended treatments and allocates the available budgets in priority order until all funds are exhausted. Unfunded defects are carried forward to the following budget year, where the condition is projected and the process of treatment identification, cost and allocation is repeated. From this process, the overall effect of any given budget strategy can be highlighted, by predicting the Performance Indicators for future years. The following table shows the results of four different budget strategies, extrapolated over a seven-year period:

	2003/4	2004/5	2005/6	2006/7	2007/8	2008/9	2009/10
<b>Base plus LTP 2004/5 only</b>	5.81	3.52	0.31	0.42	0.54	11.07	11.60
<b>Base plus LTP all years</b>	5.81	3.52	0.31	0.42	0.34	6.87	6.16
<b>Base plus LTP all years + £1m in 2004/5</b>	5.81	3.52	0.31	0.27	0.27	5.71	4.85
<b>Base plus LTP all years + £2m In 2004/5</b>	5.81	3.52	0.31	0.23	0.27	4.92	2.53

It can be seen that a sharp rise in BVPI would occur in the year 2008/9. Following investigation, it was determined that this was mainly because a significant part of the network, due to its age and condition, was projected to deteriorate beyond the threshold levels for major construction works. The table shows that the injection of the additional £1m or £2m during 2004/5 had little effect in the short-term, but could be instrumental in reducing longer-term deterioration, and substantially reducing overall costs.

The BVPI results show no measurable reduction during the period of the proposed LPSA, regardless of the additional funds injected. However, there was an identifiable return in the long term, as shown by a dramatic reduction in the PI in 2008/9 and 2009/10.

The above conclusion that “one off” injections of funds had little effect upon the BVPIs over a short period of time, prompted the recommendation that calculating an “optimum budget” should be investigated, with funds allocated over a number of years to meet the requirement of Government's stated aims.

Following new DfT regulations for calculating the performance indicator for principal roads, BVPI 96, Dudley carried out Tracs Type Surveys (TTS) in 2003, on the A class roads within the borough and decided to use the data for the investigation and calculation. Consequently, Mike Bosworth asked Symology for an early release of the rules and parameters RP4.0 for processing the TTS data.

RP4.0 contains treatments for Structural, Wearing Course and Surface defects, and realistic treatment costs were allocated directly from the Schedules of Rates held within the asset management system.

The methodology used to ascertain the optimum budget for the principal roads was quite straightforward:

- a UKPMS automatic pass was set up using “Project Network Trends”
- a single budget head was created but without budgets being allocated
- the projection was run over 5 budget years

Analysis of the results showed that the money required to fund the treatments in the first instance was £7.3m. Without any allocated budgets, it also showed that the need would rise to £11.3m over the 5 years as the condition deteriorated and no treatments were carried out.

Mike then allocated 10% of the first instance need, as a budget for each of the 5 years and re-ran the process. This was repeated in 10% increments up to 50%. Projection reports were produced for all 5 years, for each of the 5 levels of budget allocation, showing how the outstanding maintenance requirement was affected by each budget level. The results are shown on the graph. From this, it is easy to identify what is required to meet the Government objective. The line becoming horizontal represents "arresting deterioration", whilst the falling level represents "reducing the maintenance backlog".

The same principles were applied to the lower classification roads, and projections again used to clearly indicate an “optimum budget” level.

“The objectives have been fully met” says Mike. “The initial results prompted an investigation into the determination of an ‘optimum budget’. The immense power of the software, together with specialist Symology expertise provided a solution with modest amounts of effort, and allowed Dudley MBC to make the required recommendations”. The following conclusions were also drawn:

- The measure of effectiveness of the service during the period of the agreement will be targeted at the reduction of unallocated treatments and consequently the reduction in the BVPI levels.
- The highways maintenance budget should be increased by £1m during the period of the LPSA, and a review carried out in March 2005 to ensure that the predicted BVPI is correct and that the unallocated work is not exceeded.
- Although UKPMS condition projection is available to be used as a tool for the engineer, until such time as further work is carried out on the “projection dll”, the results should be viewed with some caution.

The exercise proves that using the power of UKPMS in an integrated asset management system, the government's aim can be clearly demonstrated as achievable, if the predicted funds are made available.

Mike Bosworth said, "Over the past 11 years, I have been building towards an integrated system for highways operations. The new asset management solutions are very powerful, and have been implemented with great care and professionalism. The depth of IT and engineering expertise have been crucial to a speedy implementation, and achieving the result of '**Asset Management Success**' for the people of Dudley.