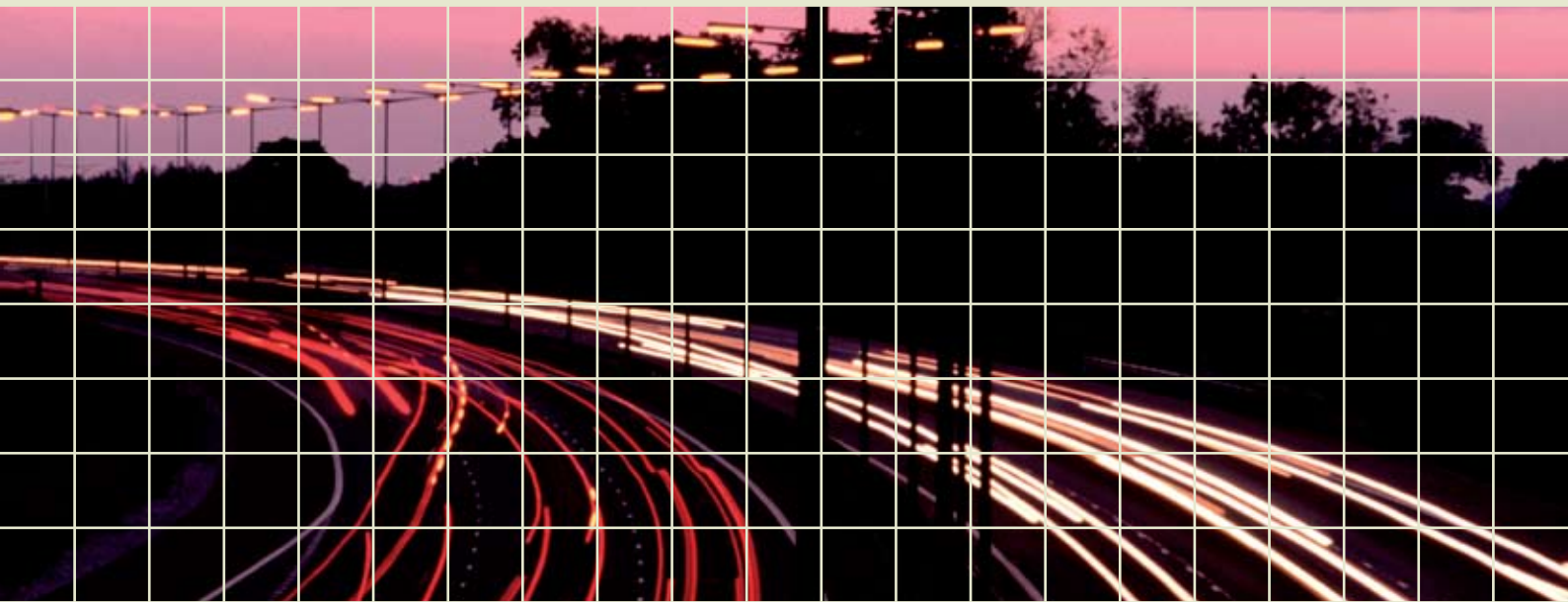


Managing speed and traffic restrictions with GIS

Newcastle City Council



Managing speed and traffic restrictions with GIS

Visionary

With growing numbers of commuters travelling into and out of the city every week, Newcastle City Council wanted to improve traffic flow and road safety on key access roads. At the same time, it also needed to prepare for the Traffic Management Act. The council launched two innovative traffic management initiatives – and deployed ESRI GIS to help it achieve its goals.



“Through our use of GIS, we can really make a positive impact on traffic flow within the city.”

Bill Taylor, ICT technical consultant

The client

Newcastle City Council serves a population of around 270,000 people and over 111,000 households. However, as Newcastle is one of the largest cities in the North East, it is also the base for many businesses. Consequently, there are a large number of people that commute into and out of the city at peak times. Roads are typically very busy, making traffic management a high priority for the council.

The challenge

Newcastle City Council was concerned about the number of drivers in the city who were speeding. Recent reports had reinforced the link between speed and accidents, and the council felt that it had a responsibility to encourage motorists to slow down. However, before it could implement new traffic calming measures, it needed evidence of precisely where and when speeding occurred.

The council launched a new Speed Management initiative, with the aim of collecting information about traffic flow and speed across the city. It set up speed monitoring equipment at key locations and started to collect statistics – but it needed a way to display this information, so that it could be easily interpreted and analysed.

Shortly after the Speed Management initiative was launched in Newcastle, the government passed the Traffic Management Act 2004 (TMA). This new legislation gives local authorities powers to enforce traffic and parking offences, rather than the police.

As a result, Newcastle City Council found that it had to be able to maintain up-to-date information about a wide range of traffic restrictions. These included no entry signs, double yellow lines, disabled parking bays and parking meters. In order to be able to carry out a successful prosecution, the council had to ensure that these signs and road markings actually corresponded correctly with the legal documentation.

Bill Taylor, ICT technical consultant explains: “If a particular road was officially designated ‘by law’ as a no-parking zone, but the double yellow lines had been obscured, a motorist might feel justified in appealing against prosecution. Likewise, if a motorist obstructed a disabled parking bay marked on a street and received a parking ticket, we might not be able to levy the fine if the legal document did not acknowledge the existence of a disabled parking bay at that location.”

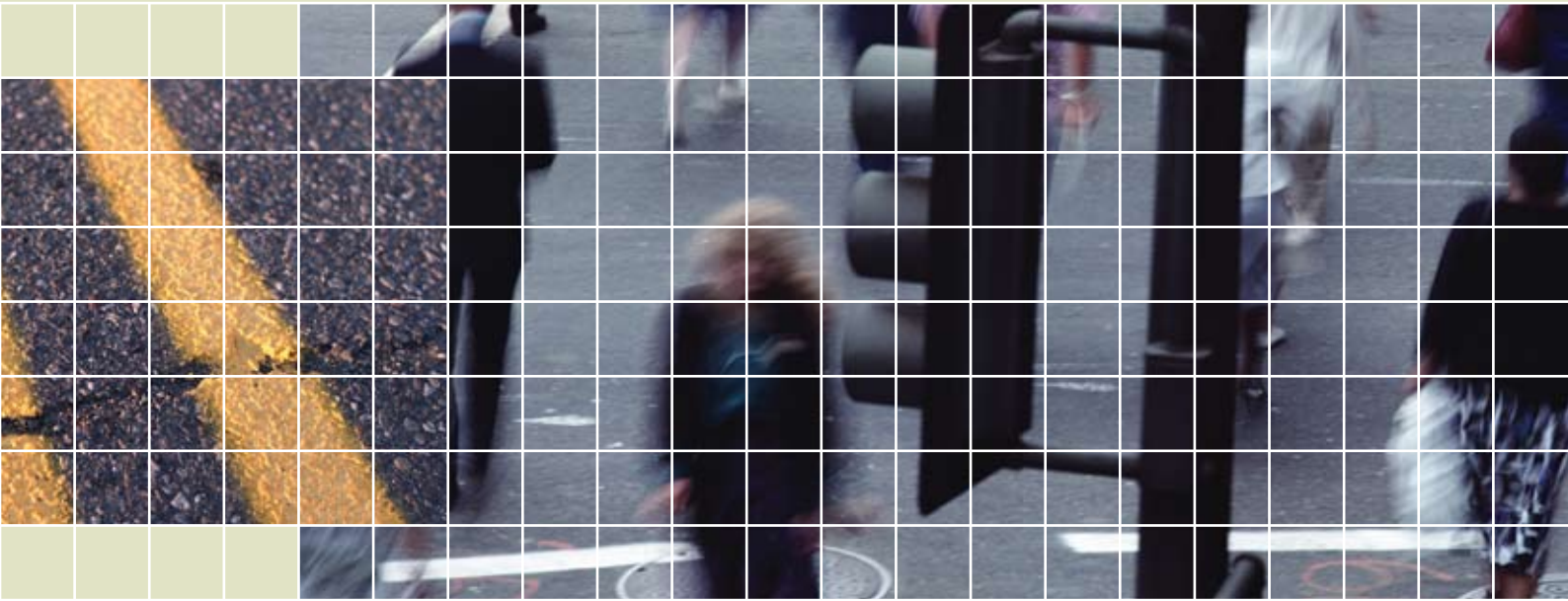
To enable it to enforce the TMA effectively, the council therefore needed to be able to gather and store up-to-date information about traffic restrictions and traffic orders in the city.

Solution and capabilities delivered

Newcastle City Council had been using geographic information systems (GIS) from ESRI (UK) for over 10 years and immediately recognised the value of using GIS to support traffic management. “Our Speed Management initiative was envisaged as a GIS project from day one,” says Taylor. “Similarly, when we started to prepare for the Traffic Management Act, we quickly realised that GIS could play an important role in this initiative too.”

“ESRI GIS solutions enable us to spot high level trends and patterns, but also drill down into the detail to see exactly what the issues are,” says Taylor. “When we launched these two traffic management initiatives, we knew that we would have vast amounts of data to process. The ESRI solutions enable us to present large volumes of data in an easy to understand way.”

thinking delivered



For its Speed Management initiative, the council installed over 100 traffic speed sensors across the city, and each of these sensors now transmits data in real time over the mobile network to a central server. From here, the data is then transferred to a dedicated speed management GIS system, where it is displayed on interactive city maps and aerial photographs.

Each speed sensor is represented on the maps as discrete colour-coded icons. Sensors that detect high levels of speeding are shown as red circles. Sensors that detect only occasional, minor speeding are shown as yellow circles, and green indicates areas where there is no speeding present. "The GIS enables us to see, immediately, the routes in the city where excessive speed is a problem, to make informed decisions," says Taylor.

For the Traffic Management Act initiative, the council employed two people to survey traffic restrictions in the 'real world' and to gather accurate information that could be compared to the 'legal world'. To ensure that the surveyors collected the right information in a consistent format, the council customised a GIS application for the surveyors to use on hand-held computers as they travelled around the city.

The benefits

The speed management GIS system gives Newcastle City Council a clear understanding of traffic speed and flow across the city. Managers can either view high-level city maps and compare the number and location of red circles to green circles, or drill down into other screens to gain access to precise, up-to-date statistics. For example, managers can examine actual average speeds along particular stretches of road or find out the proportion of motorists that exceed speed limits by more than 10% and more than 20%.

"All of this information is absolutely crucial in helping us to identify potential accident black spots," says Taylor. "We can use actual statistics as strong evidence to support proposals for new traffic calming measures."

"We firmly believe that this GIS-enabled project will eventually help us to improve road safety in the city," he adds. "Certainly, it is giving us a much clearer understanding of traffic flow at peak times and it will help us implement measures to reduce congestion for commuters."

Like this Speed Management initiative, the Traffic Management Act initiative has also been a huge success. The data collected via the council's mobile GIS application revealed discrepancies between traffic orders and the traffic signs actually in place on streets. Some traffic orders referred to roads that did not exist any more, for example. In other locations, yellow lines had been obscured during road repairs and not been repainted. As a direct result of the survey, Newcastle City Council is renovating signs and street markings, as well as updating its legal documentation, as necessary. Consequently, it will be in a much stronger position to be able to issue and defend any fines for traffic offences. If there is an appeal against a parking offence, the council will be able to use the GIS to zoom in on the specific section of the road and see which restrictions apply and which signs or road markings exist. It will then be able to issue fines and investigate appeals more promptly.

"Thanks to our Traffic Management Act initiative, we are now confident that we will be able to enforce restrictions, and reduce the time and effort wasted in appeals," says Taylor. "This will ultimately save the council money and improve customer service."



Speed sensors are represented on the maps as discrete colour-coded icons. RED – More than 30% of vehicles are over the speed limit. ORANGE – Between 10 and 30% of vehicles are over the speed limit. YELLOW – Less than 10% of vehicles are over the speed limit. GREEN – All vehicles are equal to or under the speed limit. GREY – No data.

The future

While both of the traffic management initiatives have got off to an impressive start, it is still early days.

With regards to the Traffic Management Act initiative, Newcastle City Council has collected data about road markings and signs from a number of wards within the city, but its surveyors still have many more streets to assess. What is more, all of the 'real world' inconsistencies that the surveyors find result in actions – either for the legal team to update the legislation or for the highways team to deal with road signs and lines.

It will take time for the whole city to be surveyed and all actions to be completed. However, the most important thing is that the council has a successful and proven approach for achieving this goal.

The Speed Management initiative has been up and running for several months, and Newcastle City Council is now evaluating its data collection methods to make sure that the data collected from the sensors is accurate and valid. It then plans to use the GIS system to present evidence for new traffic calming measures that might reduce the numbers of accidents.

At a later stage, the GIS information could also be used to post diversions on large electronic signs, to help improve traffic flow at peak times. "Through our use of GIS, we can really make a positive impact on traffic flow within the city," says Taylor.