

‘Securing the expeditious movement of traffic’ – a discussion on the requirements of the Highways Act 2004, and the issues that Local Authorities face in managing their highways network

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Introduction

Several years ago, I happened to be chatting with someone from another local authority, so we compared notes on UTC (as you do). It turns out they did something a bit different to the way I’d do it – I’ve no problem or issues with that, it’s their traffic signals that they’re managing, after all.

In discussion with them, it turns out that that particular setup we’d chatted about had been set that way when the UTC system was first installed, over fifteen years earlier, so the decision about that particular setup had been made at that time.

This got me thinking a bit more about how we do things with networks of traffic signals, in terms of how things are set up, and thinking a bit more broadly about what we should be doing. In the Highways Act it mentions ‘securing the expeditious movement of traffic’, so how do we do that?

In particular, I’m aware of the situation for local authorities, where things have changed over the years. In the past they might have had larger signals teams, but with cutbacks and problems of austerity, their teams might well be that bit smaller now, possibly just one or two people.

The Highways Act 2004

Probably like any other bit of legislation, it’s not a light read – the bit I was interested in was the section just below, outlining the requirements of local authorities in keeping traffic moving, reducing congestion, and generally managing their network as efficiently as they can.

16 The network management duty

(1) It is the duty of a local traffic authority [or a strategic highways company (“the network management authority”)] to manage their road network with a view to achieving, so far as may be reasonably practicable having regard to their other obligations, policies and objectives, the following objectives—

(a) securing the expeditious movement of traffic on the authority's road network; and

(b) facilitating the expeditious movement of traffic on road networks for which another authority is the traffic authority.

(2) The action which the authority may take in performing that duty includes, in particular, any action which they consider will contribute to securing—

(a) the more efficient use of their road network; or

(b) the avoidance, elimination or reduction of road congestion or other disruption to the movement of traffic on their road network or a road network for which another authority is the traffic authority;

and may involve the exercise of any power to regulate or co-ordinate the uses made of any road (or part of a road) in the road network (whether or not the power was conferred on them in their capacity as a traffic authority).

The requirement to efficiently manage the highways network is entirely correct; the idea that we reduce congestion and efficiently manage the road network for the benefit of all road users is entirely appropriate.

It did, then, lead me onto look at this side of things to get a bit more clarity. In my particular case, I’m interested in the traffic signals network – how do we go about avoiding, eliminating or reducing road congestion?

TA 84/06 'Code of Practice for Traffic Control Systems'

One of my starting points was to look at TA84/06 ('Code of Practice for Traffic Control and Information Systems for All-Purpose Roads'). While it does detail that improvements are to be sought, it tends to run along the lines of:

- *'.. for the selected scheme it is necessary to demonstrate that there is a net benefit that exceeds the 'do nothing' option.. '*
- *'...A pro-active approach to the monitoring of the overall effectiveness of traffic control and information systems is recommended, leading to measures to maintain or improve performance...'*

While it does identify that improved performance is desirable on the highways network, there's no particular detail in how to go about improving the performance of the network.

TD 101 'Traffic Signalling Systems'

TD 101 was recently published in June this year, superseding TA84/06.

It does consider operational performance on the highways network, but is along the lines of:

- *'The traffic signalling installation design shall define a control strategy.'*
- *'To determine the optimal control strategy, location of the site, other existing signals, road speed and junction type should be assessed by undertaking appropriate modelling.'*

So, while the intention here is to proactively seek to improve the operation of the highways network, my concern here is for a broader discussion on the principles and practice in how we can achieve this.

DfT Traffic Management Guidance

While the various Local Transport Notes (LTN's), TA's, TD's are all important design guides and Advice Notes in their own right, they don't necessarily dwell on the operational aspects of managing the signals network.

As an example, TD 86/03 ('Layout of large signal controlled junctions') concerns itself with the various factors relating to the geometry of junctions, as well as considering operational aspects (see the example just below).

1.9 Large signal controlled junctions may vary in type from complex single node junctions where the design of the signal phase and stage structure will greatly influence capacity, to multi-node junctions where each node has a simple signal phase and stage structure and where the design of good signal coordination between nodes will be the more important issue.

Although the principal concern of the evaluation of the type of junction to be considered may be to create additional capacity for vehicles, the needs of pedestrians and cyclists should not be suppressed. The resulting solution should aim to improve conditions for all road users.

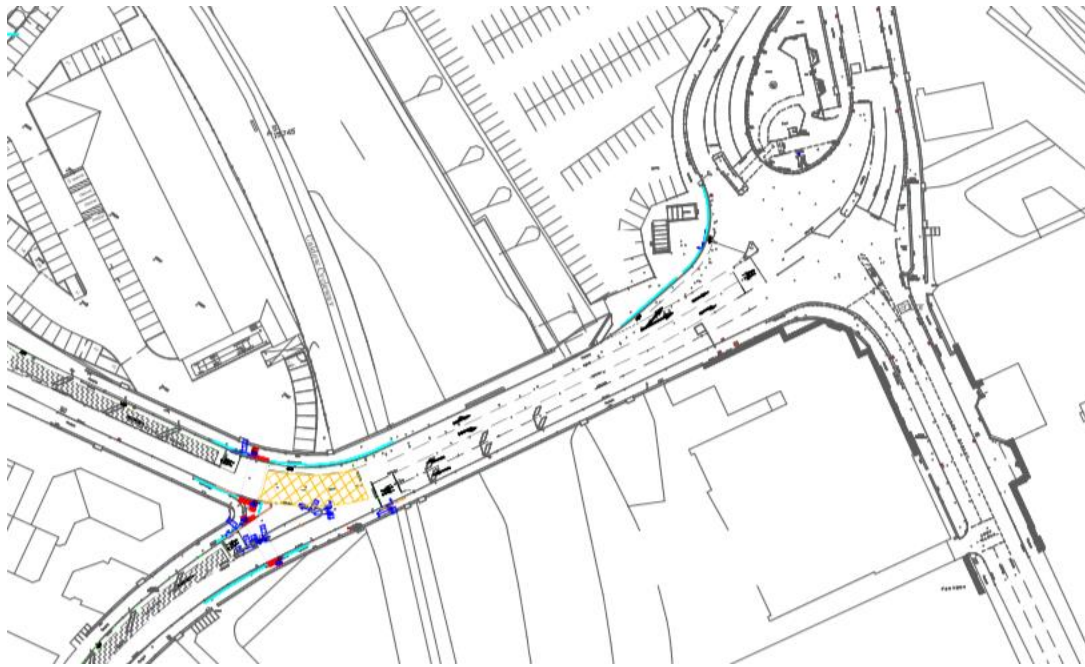
This is fine in itself; in this instance we're talking about single node and multi node arrangements, as well as taking pedestrians and cyclists into consideration, in order to come up with the best operational design for capacity.

I suppose what I'm talking about here is: How do I do that?

What are the practical aspects and operational methods that we should use in order to get the best out of the highways network?

Making improvements to a newly introduced highways scheme

As an example, let's consider two junctions, fairly close to one another, both signal controlled.



We wish to secure 'the expeditious movement of traffic' on the authority's road network; if it's my job, what are some of the decisions I'm going to make?

The analysis has been carried out, and it's my job to use whatever systems I choose to coordinate the traffic.

Methods of control

I've listed just below the various options I'd consider:

Method of control considered	Options that I'd use
VA	✓
CLF	✓
MOVA	
Compact MOVA	
Linked MOVA	
UTC (Fixed Time)	
SCOOT	✓
'Fine Tuning' of options	✓

An issue here is that the various options used in choosing the methods of control could be based on my personal experience, preferences, custom and practice. Others might well choose different options.

Perhaps if my experiences were different, I might investigate other options?

Just below I've touched on a few of the options I've listed:

Compact MOVA – Interestingly, a few years ago I tried to do something with a couple of sites that used linked MOVA, which had been installed a few years previous. However, timescales were short, there was no money to spend on it.

When I saw the controller specification, it seemed overly complex - one of the junctions had eleven pages of special conditioning, with 53 items in the special conditioning.

I didn't want to touch it, in case I broke it.

In the event, the problem was resolved without needing to touch the linked MOVA. However, I've not considered linked MOVA as an option since then.

Trunk Roads – use of MOVA

It may well be that you manage signals on the Trunk Road network, so the decision here is made for you – in TD 35/06 'All Purpose Trunk Roads MOVA System of Traffic Control at Signals' it's quite clear on that.

In section 2.1, the recommendation is that *'All new all-purpose trunk road installations shall incorporate MOVA as the standard mode of signal control'*.

If two junctions are sufficiently close (as in our example), the guidance adds *'Where more than one junction is situated too close to be considered as isolated, there are ways in which two or more junctions can be linked by the use of MOVA control.'*

Unfortunately, the situation isn't as clear cut as that – on the same page we have the additional comments:

2.3 If MOVA is not to be used, then a sound case for departure from the standard must be made and approved

2.6 For large networks where there are many signal controlled junctions that need to be co-ordinated, alternative systems such as SCOOT and TRANSYT derived fixed time plans should be considered.

So, for our two junctions which require close coordination, while we have some guidance on the methods of coordination, we are potentially able to either use Linked MOVA or an alternative, such as SCOOT.

While I have particular preferences in how I'd approach this, I'm not sure if I'm guided in any particular direction?

'Fine tuning' of options

This particular item covers the various other factors that might well come into play in operating the signals – for example:

- the length of cycle time may well be a consideration; whether it's a shorter cycle time (say in the middle of a town) if there's higher pedestrian usage. Or, longer cycle times if it's perhaps a busier location, with higher vehicle flows and less pedestrian use.
- If SCOOT was the preferred method of control, what times would that operate?

- Are there any particular requirements for the coordination of these signals? Should any approaches on one junction be tied or 'fixed' to another to maintain that coordination?

The finished product

There could well be many factors you take into consideration, which will end up with a layout and method of control you're happy with, and will fit with how you manage your signals network. Would my layout be similar, or would it be different to how you would set it out?

A Dilemma for Local Authorities

An issue here is that ITS systems can be incredibly complex in both the setting up and in their ongoing management.

In the meantime, funding to Local Authorities has steadily decreased over recent years, which could potentially lead to a reduction in either staff, training, or both. Local Authorities will have faced a reduction of funding of nearly £18 Billion since 2010.

As a consequence, the staff can be at full stretch, with less time to devote to these complex systems – they're sufficiently occupied dealing with the day-to-day issues of balancing budgets and handling complaints. It's easier to leave something as it is, rather than open up something which could potentially be time-consuming and expensive to remedy.

Discussion

My suggestion here is that pressures are growing on signals staff to keep things moving, at the same time the systems can be incredibly complex. If you don't have sufficient 'critical mass' of people in the team to discuss things with, then it's easier to keep things as they are, rather than trying something new or changing things.

The task of 'facilitating the expeditious movement of traffic on the road network' was done years ago – what they have to do now is keep things as they are.

So, a suggestion here is: 'if it's been like that for years, why bother changing it?'

However, a potential game-changer here is: if reducing congestion and emissions is now a major factor, should we be actively seeking to improve on what we have?

So, the points I'd like to make are:

- Are there any real 'ground rules' for Local Authorities, or specific rules to follow in terms of managing the highways network? (Should we have a 'standard model'?)
- The situation's changed in terms of funding for local authorities – the issues of austerity and reductions in funding can potentially result in less staff on the ground, or less opportunities for training
- As a result, signals staff can be at full stretch, with little incentive (or time) to explore the technology that's there
- What's possibly a real issue: signals staff don't necessarily have other people to chat with, particularly when it comes to some of the more obscure or complex issues – or even an appreciation of the complexity of the various issues.

Possible ways forward

In the ideal world, funding and training of staff wouldn't be an issue. However, is there something that can be done given the current state of play?

- Requirements for a 'standard model' or 'best practice': Is there any 'standard model' or any particular requirement that needs to be carried out? – while there are many recommendations contained in Signals guidance, are there any specific tasks that should be done, or a 'standard' way of approaching things?
- Training: I've looked slightly further afield to base a possible model on, perhaps to look at things from a different angle - a change in the dynamics? What I've looked at is another organisation, where they're trying to raise the bar at a National level:

NYO Inspire (see <https://www.nyo.org.uk/inspireday>)

The National Youth Orchestra of Great Britain provides free training for young musicians to improve their playing and technique, via workshops and rehearsals.

So, could something like that help? A series of practical workshops might serve as a suitable model to improve on what we currently have in terms of management of signals?

My suggestion here is that workshops take place, either one-day or over a period of several days, for staff from various local authorities. The main points here are:

- They're hands-on workshops, looking at various aspects of signals work, such as validation of sites, in terms of MOVA or SCOOT, or what the basics are in terms of managing a network
- Staff get to see how other local authorities work – the basic idea here is to get a handle on how others have sorted their problems, or manage their networks.
- The idea of a residential course is that signals staff get to meet others and get to know them. If they can talk about issues they've got, and make contacts, could this help to raise the bar on levels of training – particularly for Local Authorities with just one or two staff.
- If it was thought sufficiently important, could they be free to local authority staff? How could funding of this be managed?

People are now far more aware of the issues and problems of increased congestion and increased emissions. While technology may be available which can help address these issues, it may be the case that signals teams don't have the finances, or are simply too busy to review how things are working on the ground.

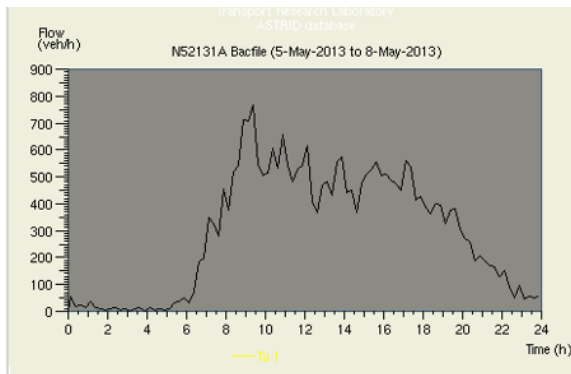
While some people may be able to apply their knowledge and experience in getting the best out of a particular junction arrangement, others learn best coming from a practical demonstration and application of the theory.

Improving on what we've got

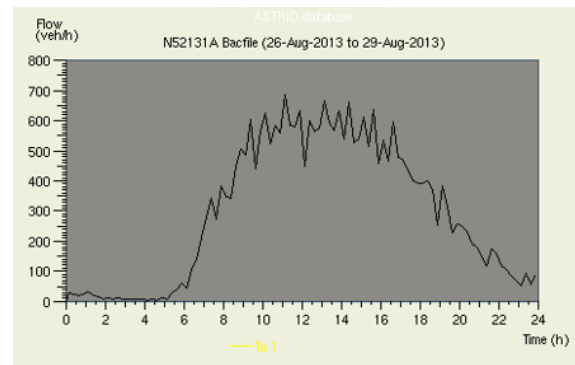
Earlier on, I'd discussed whether it's sufficient to leave sites running as they were originally set up, or whether it's better to be more proactive in seeking out better alternative solutions.

As an example, several years ago some funding came up to improve one particular junction – we'd not received any recent complaints about its operation, but as it was on a main route into a town it made sense to make a fairly obvious improvement to this particular junction.

Inbound traffic flows (before)



Inbound traffic flows (after)



The flows show the inbound flow of the junction, both before and after the change to the junction. My take here is that prior to the improvement, local traffic was avoiding the junction and taking a detour.

Before the scheme, the graph shows that typical flows were around 450 veh/hr – that's inbound. So, assume 900 veh/hr to include both inbound and outbound flows. Over a 10 hr period, that's 9,000 vehs per day going through the junction.

After the scheme, assume 550 veh/hr inbound, i.e. 1100 vehs two-way. Over a 10 hr period, that's 11,000 vehs per day.

So, we have an increase in 2,000 vehs per day using the junction – my interpretation is that more vehicles were now using the junction as it was now a shorter and easier route.

If that traffic was taking a detour of say an extra mile just to avoid that junction, we've now saved journeys of the order of 2,000 miles per day.

So, over a week, we're talking about saving 10,000 miles in commuter travel. Over a year, we're talking about ½ a million miles saved in travel?

So, my answer is yes – we should be proactively looking to make improvements where we can.

It might be that over the coming years, local highways staff are faced with more cutbacks and even more demands on their time.

The suggestions I've made here are for greater clarity in what's wanted in terms of network management, and for possible improvements in training. These are simply suggestions on how we can perhaps improve on what we're delivering on the ground.

By looking at things slightly differently, and perhaps coming at things from a different angle, we may be able to improve on how we secure the expeditious movement of traffic.

