AGENDA ITEM 6

TRANSPORT FOR LONDON

SURFACE TRANSPORT PANEL

SUBJECT: SMOOTHING TRAFFIC FLOW – TRAFFIC SIGNALS

DATE: 19 MAY 2010

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1 PURPOSE AND DECISION REQUIRED

1.1 The purpose of this paper is to update the Panel on the progress being made by TfL on the development of its traffic signals operations to 'maximise the efficient and reliable operation of the road network' – one of the six key principles set out in the 'Managing the Road Network' chapter of the Mayor's Transport Strategy (MTS). It supports the general Smoothing Traffic Flow update submitted to the Panel on 10 November 2009.

1.2 The Surface Transport Panel is asked to note the actions being taken by TfL to develop and optimise its traffic control systems to help maximise the efficient and reliable operation of the road network.

2 BACKGROUND

2.1 The London road network is at or over capacity for motorised vehicles at significant periods of the day, meaning that resilience is low and traffic disruption common. The average daily traffic flow in London is 27,400 vehicles, 40 per cent higher than average flows in other urban areas of England (eg Tyne and Wear, Greater Manchester, Merseyside, etc). London has around 20 per cent of the UK's congestion costing London's economy at least £2bn a year.

2.2 The causes of motor vehicle congestion are complex and actual traffic growth over the last few years has been small, partly due to investment in alternative modes (eg walking, cycling and public transport improvements). Some of these modal shift measures, along with the impact of major utility infrastructure and urban realm improvements, have impacted on network capacity for motorised vehicles.

2.3 Section 5.6 of the Mayor's Transport Strategy (MTS) sets out the Mayor's aim to manage the road network effectively to make the most of available road space and to introduce measures to smooth traffic flow, manage congestion and improve journey time reliability.

3 BENEFITS OF TRAFFIC LIGHTS

3.1 As Traffic Authority, TfL is responsible for maintaining and operating some 6,000 sets of traffic signals in London. Over half of these operate under central computer control (UTC), and one third under the more sophisticated dynamic 'SCOOT' control (see Section 7 below).

3.2 Traffic lights have a vital role to play in managing day-to-day operations on the

road network, regulating traffic flow, helping to keep pedestrians moving and improving safety. However, a changing approach has evolved and stimulated debate as to whether traffic signals have been over-prescribed in the past and whether, in some locations, they are really needed.

3.3 As a result, the GLA commissioned a study by Colin Buchanan which explored the economic impact of traffic signals, modelling the impact of removing traffic signals at five junctions in London. The report concluded that in many locations traffic signals provided real and tangible benefits of as much as £800,000 a year (in terms of time and disruption savings). However, the report also found that in some locations, traffic signals were less beneficial.

3.4 This is supported by real life evidence on the network. For example, on Saturday 6 March 2010, a power failure caused the loss of all signals at the Hanger Lane gyratory. The gyratory could not cope with the resulting 'unregulated' flow of traffic, which created six hours of serious disruption. The cost of this delay to the economy alone has been estimated at £100,000.

3.5 However, in some locations, particularly at smaller junctions or on minor roads, there can be economic and traffic smoothing benefits in removing traffic signals. For example, working with the City of Westminster, TfL recently removed the traffic signals at the junction of Ebury Street/Elizabeth Street in Belgravia. The signals were originally installed in 1973 and operated as a crossroads with an all-red stage for pedestrians. The new arrangement, incorporating a simple give way junction and high quality, raised pedestrian crossings, opened on 26 April 2010. While it has only been operating for a short period, delays for all road users appear to have reduced considerably. This will be kept under review to capture the benefits.

3.6 TfL has therefore undertaken a review of the approximately 6,000 traffic signals in London and has identified 145 sites, where traffic signals may no longer provide overall benefits in terms of safety and keeping traffic and pedestrians moving. This is discussed in more detail in Section 11 below.

4 TRAFFIC SIGNALS AND SMOOTHING TRAFFIC FLOW

4.1 The Mayor is committed to smoothing traffic flow through a package of measures designed to manage road congestion and improve traffic journey time reliability and predictability. A number of the key measures involve continually improving the efficiency of the traffic signals system and its component parts to make better use of the available capacity. The measures being taken to optimise the operation of traffic signals include timing reviews, signal removal, installation of SCOOT, SVD, SASS and Pedestrian Countdown technology. Further details are set out below.

5 UNPLANNED INCIDENT AND EVENTS

5.1 Centrally controlled traffic signals provide the London Streets Traffic Control Centre (LSTCC) with the ability to control and manage the impact of unplanned incidents and planned events on the network. Currently, half the signals on the network can be controlled centrally this way, through the Urban Traffic Control system (UTC). The LSTCC actively manages on average 10,000 incidents per year and is involved in facilitating the smooth running of 750 events per annum. The ability actively to manage the congestion caused by accidents, spillages,

breakdowns, etc, is key to keeping the road network moving for all users. The only effective mechanism for doing this is the traffic control system, of which traffic lights are a vital ingredient.

6 TRAFFIC SIGNAL TIMING REVIEWS

6.1 In April 2009, TfL committed to review the operation of signal timings at 1,000 sets of signals each year. In 2009/2010, 1,003 sets of signals were reviewed, achieving a 5.9 per cent reduction in stop/start delays at traffic signals (measured through an increase in the number of occasions when all queued traffic will have cleared through the junction during the first green phase). This was achieved with no net disbenefit to pedestrians. Appendix 1 provides further detail on the benefits of these signal timing reviews.

7 SPLIT CYCLE OFFSET OPTIMISATION TECHNIQUE (SCOOT) IMPLEMENTATION

7.1 SCOOT is an automated, intelligent traffic signal control system which can dynamically change signal timings to best suit prevailing traffic conditions and reduce stops and delays. Sensors buried in the road detect when traffic is building up and computers then adjust signal timings on a second by second basis throughout the day in response. SCOOT is effective in smoothing variations in traffic flow and responding to disruptions caused by accidents and other unplanned incidents.

7.2 In 2009/2010, SCOOT infrastructure was installed at 335 new sites across the Capital. Over the next four years, SCOOT will be installed at a further 665 traffic signals, resulting in 50 per cent (3,000) of London's signals being operated by this technology.

7.3 SCOOT makes over 10 million signal timing decisions per day. Under normal flow conditions this results in a 12 per cent reduction in delay, an 8 per cent reduction in stops, and a 9 per cent reduction in noxious vehicle emissions. The benefit of this has been calculated at £50,000 per site or, for the additional 1,000 sites TfL will deliver, a £50m saving in terms of delay. TfL recently commenced the roll out of a system which will enable SCOOT automatically to measure the benefits it achieves on a site by site basis.

8 SYSTEM ACTIVATED STRATEGY SELECTION (SASS)

8.1 SASS works with SCOOT, iBus or any other system. It uses network intelligence automatically to activate a different pre-programmed signal timing operation at one or more sets of traffic signals in order to respond to or pre-empt a particular traffic problem (for example a bridge lift at Tower Bridge) to help prevent traffic congestion.

8.2 The SASS programme has been expanded and is currently used at some 50 critical locations across London, including at many important gyratory systems (including Hanger Lane) to help improve traffic flow. Last year, SASS intervened 78,000 times at critical traffic signals on the network.

8.3 In February 2009, a SASS scheme was introduced at the car park exit at the O2 Arena. Prior to the implementation of SASS, there were reports of clearance

9 IBUS AND SELECTIVE VEHICLE DETECTION (SVD)

9.1 This is a real time system, which can be linked with SCOOT to prioritise buses through traffic signals by either extending the green time for a bus if it was about to go red, or by recalling a green time earlier than was expected if the bus arrives on red. Previous studies have indicated that up to five seconds delay per bus can be saved using iBus SVD linked with SCOOT. The aggregated benefits of small time savings to the bus network are significant in terms of improving reliability for bus services and encouraging modal shift.

9.2 Since May 2008 iBus SVD has been enabled at over 1,578 sites.

10 PEDESTRIAN COUNTDOWN AT TRAFFIC SIGNALS (PCaTS)

10.1 Research undertaken in early 2009 showed that many people (up to 60 per cent) do not understand the current arrangement of pedestrian signals in London. They often assume it is only safe to cross the road while the green man is displayed. The green man is actually an ‘invitation’ to start to cross, not the actual time allowed to get from one side of the road to the other. The ‘blackout period’ following the green man continues to give pedestrians right of way to complete their crossing.

10.2 A Pedestrian Countdown system will help signalised junctions operate more efficiently, by providing pedestrians with clear information about how long they have to cross the road, and, depending on pedestrian demand, reallocating any saved green man time to traffic or other pedestrian phases. Results from off-street trials undertaken by TfL indicate that 75 per cent of people understand the proposed countdown system.

10.3 TfL is working closely with the Department for Transport and Highways Agency to secure the necessary approval to undertake on-street trials of Pedestrian Countdown at eight carefully selected sites in the summer 2010. TfL submitted its application for the approval of on street trials to the DfT on 8 March and is hopeful of a positive response in the near future to allow a formal announcement to be made later in May. Subject to approval, TfL anticipates installing the first trial site in late June 2010, and the remaining seven sites shortly afterwards.

11 SIGNALS REMOVAL

11.1 TfL has identified 145 traffic signals across London that may no longer be useful in traffic, pedestrian or safety terms. Of the 145 signals being investigated for removal, 24 are on the Transport for London Road Network (TLRN).

11.2 TfL has collected and analysed traffic flow and collision data for these signals to confirm that they remain valid candidates for removal. TfL will be discussing the potential removal of these traffic signals with stakeholders and the relevant London Boroughs. At present, TfL is also consulting with Highway Authorities to ascertain their general views on signal removal. Funding to remove the traffic

signals and replace them with an alternative means of traffic management will need to be identified.

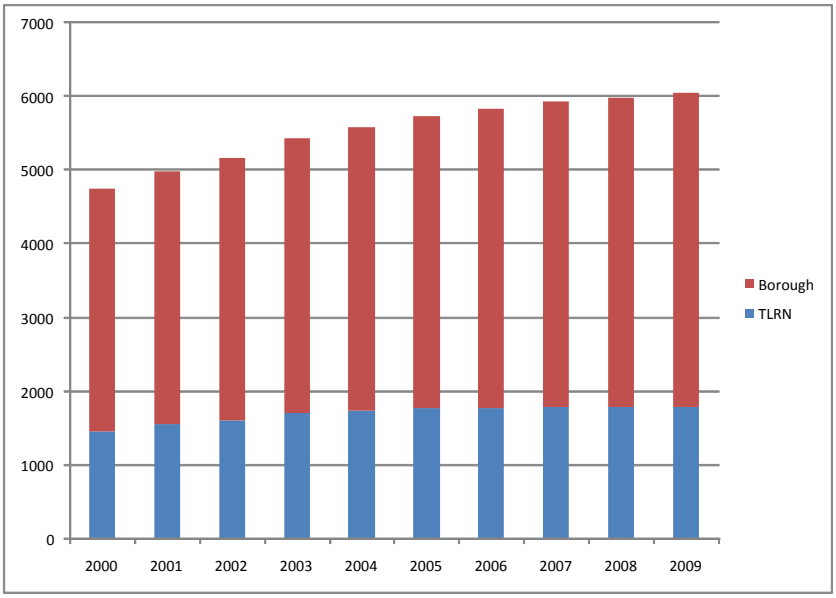
11.3 Two trials are underway in the London Borough of Ealing, sponsored by the borough, in which the signals have been covered and replaced by temporary zebra crossings and give-way junctions. The trials started in December 2009 and the results are expected later in the spring.

11.4 In addition, 29 other sets of traffic signals have been removed by highway authorities this financial year; 11 of these are on the TLRN and 18 on borough roads.

12 NEW SIGNALS

12.1 Traffic signals are, however, still being installed over the network, for various reasons. In the financial year 2009/2010, 69 new traffic signals have been installed in London; 21 of these on the TLRN and 48 on borough roads. Over 50 of these new signal installations were designed to incorporate new pedestrian facilities.

12.2 The graph below demonstrates the growth in traffic signals between 2000 and 2009 and the overall reduction in growth achieved since 2007.



12.3 In order to minimise the number of signals being installed, all schemes incorporating new traffic signals will be reviewed to determine whether alternative means of traffic control might be feasible and affordable.

13 RECOMMENDATION

13.1 The Panel is asked to NOTE the report.

14 CONTACT

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APPENDIX 1

TRAFFIC SIGNAL TIMING REVIEWS 2009/2010

1,003 traffic signal timings were reviewed in the financial year.

Before and After Traffic Data:

Number of occasions when queued traffic will have cleared through the first green phase:

P13 Cumulative	Before%	After%	Change%
Overall	**71.70**	**77.60**	**5.90**
AM Period	53.56	61.62	8.06
Off Peak	66.88	75.40	8.52
PM Peak	51.10	59.64	8.54
Late Evening	85.75	90.78	5.03
Weekend Period	69.45	74.86	5.41
Overnight	97.60	98.28	0.68

Before and After Data for Pedestrians:

Number of occasions when pedestrians waiting to cross the road, easily clear the kerb during the first green man/blackout period:

P13 Cumulative	Before%	After%	Change%
Overall	**94.30**	**94.60**	**0.30**
AM Period	91.64	92.30	0.66
Off Peak	92.63	93.15	0.51
PM Peak	90.19	90.59	0.40
Late Evening	98.10	97.94	-0.16
Weekend Period	92.37	93.18	0.81
Overnight	99.62	99.63	0.02