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1. Introduction

Congestion to most people means a motionless or slow moving line of vehicles. Congestion has many negative social, environmental and economic impacts.

The Traffic Management Act 2004 (TMA) imposed network management duties on local authorities to tackle congestion. Understanding congestion is therefore a key requirement in being able to tackle it.

Oxfordshire has selected to use a mixture of existing and new indicators to inform it on congestion. See table below.

Indicator	2006	2007	2008
Average journey time per mile during the morning peak	–	–	New
Percentage of journey times within 15% of the average - term time only	–	–	New
Percentage of base network with congetstion during the morning peak	–	5.40%	Data due 09/09
Total Area Wide Road Mileage	11.60	11.63	11.69
Number of motor vehicles into central Oxford in the morning peak	10220	9800	9400

To monitor these indicators Oxfordshire uses a mixture of technologies from loops buried in the road to journey time cameras.

2.1 Average journey time per mile in the morning peak (same as National Indicator 167)

Figure 1 is a table showing the Average Journey Time Per Mile for the Oxford network for 2008/09. This figure is calculated from the journey times along the five main inbound routes into Oxford and is weighted by distance and traffic flow. It should be noted that data collected for this calculation began in September 2008.

Figure 1 Average Journey Time per Mile AM Weekday Peak (07:30 – 09:30) 2008/2009

Average journey time per mile in the morning peak (7.30 to 9.30)	Quarter 3		Quarter 4	
	Term Time	Non-Term Time	Term Time	Non-Term Time
London Road (Northfield Road to The Plain)	05:29	03:09	07:10	04:54
Abingdon Road (Kennington Roundbout to Thames Street)	05:38	03:00	05:27	03:24
Botley Road (Ring Road to Frideswide Square)	08:58	02:40	09:14	03:39
Woodstock Road (Ring Road to St Giles)	04:23	02:13	04:06	02:36
Banbury Road (Ring Road to St Giles)	04:50	02:24	05:35	03:44
Beaumont St\Hythe BS (St Giles to Frideswide Square)	_	_	12:46	10:15
Average	**05:21**	**03:00**	**06:30**	**03:55**

The average journey time per mile for Oxford was 6 minutes 30 seconds during January to March 2009. This was a 15% increase when compared to the period October to December 2008. This increase can be explained by the major roadworks taking place along the inbound London Road in early 2009, which caused considerable delays into Oxford city. Another factor that should be considered was the extreme weather in February 2009.

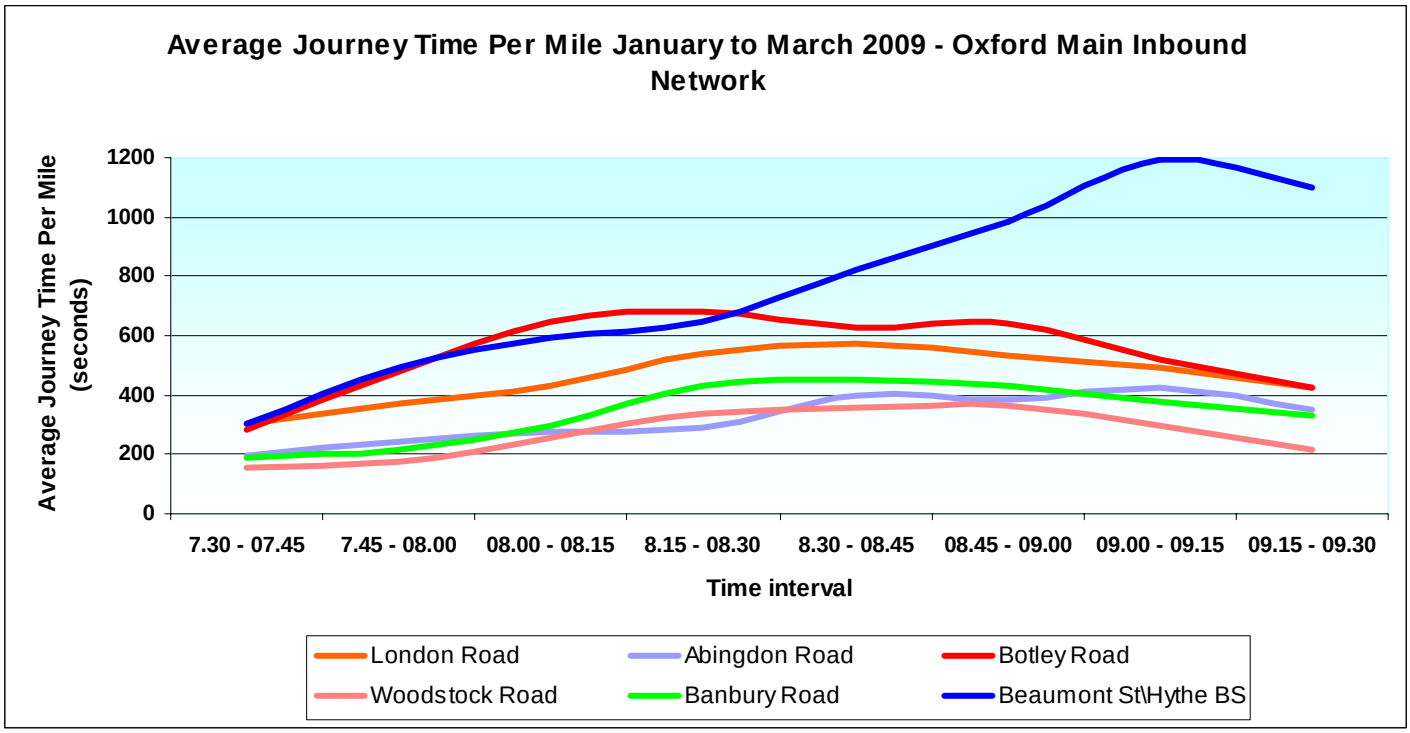
When comparing the five main inbound routes into Oxford, it can be clearly seen that the Botley Road has the slowest average journey time per mile and is therefore the most congested. Conversely Woodstock Road is the fastest route per mile into Oxford city. The period January to March 2009 saw a 6.5% decrease in the average journey time per mile when compared to the previous quarter for vehicles travelling along the inbound Woodstock Road corridor.

The table also shows that the average journey time per mile is considerably higher in the term time when compared to during the school holidays. It takes on average almost 6 minutes per mile longer to travel along the Botley Road corridor, although this is exceptional, on average journey times are approximately 2 – 3 minutes longer for the other main routes.

2.2 Average Journey Time Per Mile broken down by time interval

Figure 2 below shows the Average Journey Time Per mile for the main Oxford inbound routes, broken down into 15 minute intervals over the duration of the AM weekday peak period (07:30 – 09:30).

Figure 2 Average Journey Time per Mile During the Term Time AM Weekday Peak – 15 minute time interval (07:30 – 09:30)



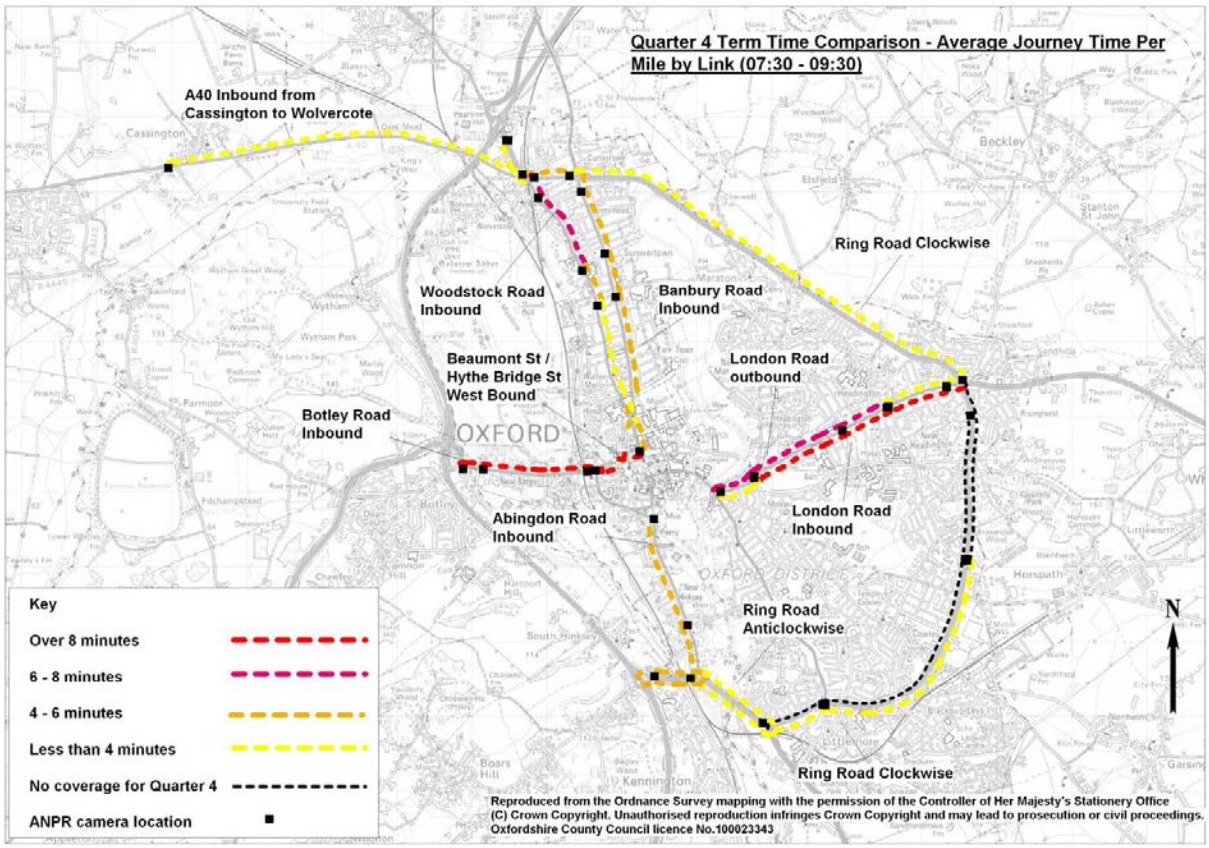
The graph clearly shows that the Beaumont St / Hythe Bridge Street experiences a rapid increase in journey times, peaking between 09:00 and 09:15. The majority of other routes display a steady increase in journey times until a peak is reached between 08:15 and 08:45. The Abingdon Road displays a more gradual increase in journey times, reaching its peak between 09:00 and 09:15.

2.3 Average Journey Time per Mile by Link January to March 2009 (07:30 – 09:30).

Figure 3 is a Map showing the average journey time per mile for each link in the Oxford network where journey times are being collected. The average journey time per mile is indicated by different colours on the map. Each link is broken down into a number of links (section of road).

The inbound corridors for the Botley and London Roads along with the Beaumont / Hythe Bridge Street route, have the links with the highest journey times per mile. These road links are indicated by red on the map with average journey times per mile greater than 8 minutes. In contrast is the clockwise ring road route. Road links along this route have an average journey timer per mile less than 4 minutes. The Kennington Roundabout to the Hinksey Hill interchange link is the exception on this route, with an average journey time per mile of between 4 to 6 minutes. It should be noted that although the yellow shaded links have the lowest average journey times per mile, many of these links still experience extensive delays when compared to the average journey time per mile during non peak times.

Figure 3 Average Journey Time Per Mile by Road Link Map – Term Time AM Weekday Peak January to March 2009 (07:30 – 09:30)



2.4 Percentage of journey times within 15% of the average

Figure 4 is a table displaying the percentage of journey times within 15% of the average. As with the NI167, journey time variability and reliability can be measured accurately using the ANPR cameras in Oxford city, with all the routes covered from January 2009. The 15% threshold indicates that the number of vehicles travelling within 15% of the average journey time is considered to be a reliable journey. Table 2 would suggest that that just over 25% of vehicles had an unreliable journey time when travelling along the main inbound routes into Oxford during term times in the early part of 2009. This was a 5% increase when compared to the previous quarter. This increase can be accounted for by major roadworks along the London Road and also extreme weather conditions during February 2009.

Figure 4 Percentage of journey times within 15 % of the average. Term Time AM Weekday Peak 2008/09.

Percentage of journey times within 15% of the average	Quarter 3		Quarter 4	
	Term Time	Non-Term Time	Term Time	Non-Term Time
London Road (Northfield Road to The Plain)	77.1	80.7	78.1	82.9
Abingdon Road (Kennington Roundbout to Thames Street)	72.8	77.5	74.4	85.5
Botley Road (Ring Road to Frideswide Square)	80.3	87.2	73.4	83.7
Woodstock Road (Ring Road to St Giles)	81.3	86.6	77.3	96.6
Banbury Road (Ring Road to St Giles)	80.3	-	70.8	93.7
Beaumont St\Hythe Brige Street (St Giles to Frideswide Square)	-	-	70.6	76.5
Average	**78.4**	**83.0**	**74.6**	**89.0**

3. County wide congestion monitoring

The automatic number plate recognition cameras are providing some excellent congestion data for the main inbound and orbital routes in Oxford, but what about measuring congestion in the rest of Oxfordshire? The Department For Transport (DFT) in 2008 provided Oxfordshire County Council with journey time data from commercial vehicles fitted with Global Positioning Systems (GPS). This data is used as a tool to calculate and monitor congestion in the county.

Although the data available is historical (2003 -2007), the quantity of data available means that a historical network of congestion for the whole of Oxfordshire can be defined. This is useful for identifying congestion hotspots and monitoring them in the future.

In 2009 the DFT will be providing GPS data to O.C.C. on an annual basis to cover the period from 2007 – 2011. This data should enable the congestion network identified to be monitored and updated on an annual basis until 2011.