

# **ASSOCIATION OF GREATER MANCHESTER AUTHORITIES**

## **GREATER MANCHESTER TRANSPORTATION UNIT**

### **Analysis of Quarterly Average Journey Times on Congestion Routes between 1st September 2006 and 31st August 2009**

**DRAFT**

**GMTU Report 1547      November 2009**

#### **SUMMARY**

Greater Manchester is required to report on seventeen mandatory LTP indicators. One of these indicators (LTP7) is a measure of congestion or vehicle delay on a local network during the morning peak period. LTP7 not only takes account of journey times but also includes vehicle occupancy, flow and modal split in order to give a Person Journey Time (minutes per mile).

This report makes use of the data supplied by Trafficmaster GPS and used by the DfT to calculate journey times for LTP7, to derive annual and quarterly journey times and journey time variability for each of the congestion routes.

This report includes:

- A summary for all 15 congestion routes including a table providing the annual average for journey time and journey time variability for each of the 15 congestion routes.
- An analysis of each of the 15 congestion routes.
- Charts showing the quarterly average journey time for each route
- Charts showing the quarterly average journey time variability for each route.

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GMTU Report 1547  
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November 2009

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Version No.	Purpose/ Changes	Author	Date Changed	Date Issued	To Whom
1	First Version	D Atkin		20/11/2009	
2.	Trend lines added to charts	D Atkin	09/12/2009		

## 1. Introduction

- 1.1 As a Local Transport Plan (LTP) metropolitan area with a population in excess of 250,000 Greater Manchester is required to report on seventeen mandatory LTP indicators. One of these indicators (LTP7) is a measure of congestion or vehicle delay in the morning peak period expressed in Person Journey Time (minutes per mile).
- 1.2 The DfT define the Person Journey Time as “the time it takes an average person to travel one mile on the local congestion network”.
- 1.3 Greater Manchester’s local congestion network consists of 15 routes from around Greater Manchester. There are 6 routes from Manchester and one route from each of the other 9 districts.
- 1.4 In order to calculate journey times on the congestion network the DfT has signed a contract with Trafficmaster for the provision of data collected from in-vehicle GPS tracking devices from which journey times can be derived.
- 1.5 The average journey time for each route is combined with journey time information for stopping buses and is weighted according to flow, modal split and vehicle occupancy, in order to give a person-based indicator.
- 1.6 This report uses the data provided by in-vehicle GPS tracking devices to provide annual and quarterly journey time and journey time variability information for each of the 15 routes.

## 2. Summary

2.1 The table below contains annual averages for each of the 15 congestion routes for the academic years 2006-2007, 2007-2008 and 2008-2009. These figures will differ slightly from those provided by the DfT as they are derived solely from Trafficmaster data. As such they do not account for model split and are based on a two hour average from 07:30 to 09:30 rather than aggregated from two separate hourly average of 7:30 to 8:30 and 8:30 to 9:30

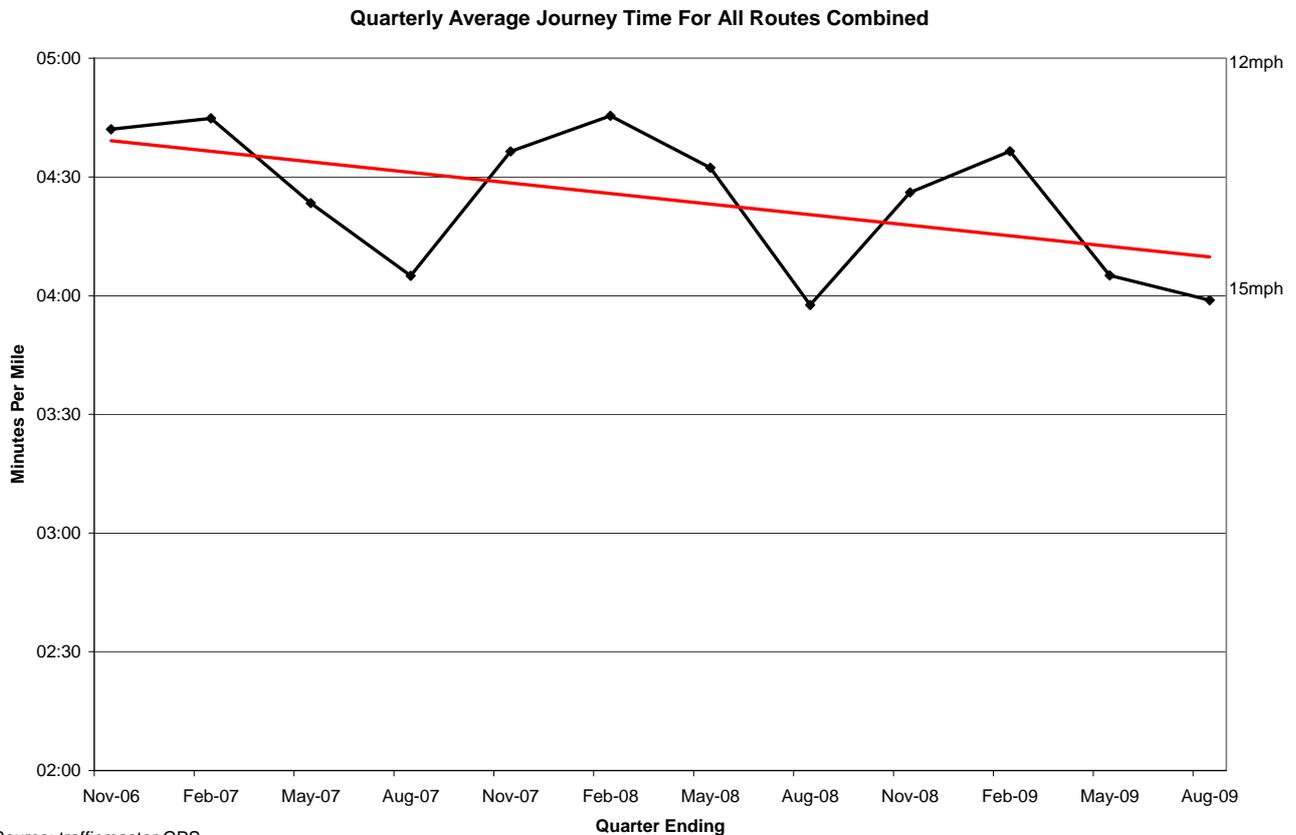
**Figure 1. Table containing journey time and journey time variability information for the 15 congestion routes in the morning peak (0730-0930) during school term time.**

Route Number & Description		2006-2007		2007-2008		2008-2009	
		Average Journey Time	Journey Time Variability (CoV)	Average Journey Time	Journey Time Variability (CoV)	Average Journey Time	Journey Time Variability (CoV)
1	A6 Salford Eastbound	06:37	29%	06:38	33%	05:06	44%
2	A62 Oldham Northbound	03:44	13%	04:02	19%	03:52	26%
3	A62 Manchester Southbound	03:51	14%	04:01	21%	03:48	24%
4	A579 Bolton Northbound	03:38	26%	03:10	19%	03:12	41%
5	A56 Bury Northbound	03:35	20%	03:42	18%	03:33	24%
6	A5103 Manchester Northbound	04:08	23%	03:48	20%	03:51	16%
7	A6 Stockport North-Westbound	07:11	24%	05:57	17%	05:52	22%
8	A6 Manchester North-Westbound	05:24	20%	06:06	17%	06:02	20%
9	A635 Tameside Westbound	04:16	26%	04:21	20%	04:13	16%
10	A5145 Manchester North-Westbound	04:34	14%	04:47	19%	04:56	16%
11	A49 Wigan Southbound	03:02	20%	03:08	25%	03:00	38%
12	A56 Trafford South-Westbound	04:56	20%	05:46	62%	04:46	23%
13	B5117/A6010 Manchester Northbound	05:01	22%	04:49	19%	04:59	17%
14	A665 Manchester North-Westbound	06:05	42%	05:41	33%	05:14	31%
15	A58 Rochdale South-Westbound	04:46	31%	04:31	26%	04:11	21%

2.2 The Coefficient of Variation for route 12 in academic year 2007-2008 is considerably higher than in academic year 2006-2007. This is because average journey times for two days (10th December 2007 and 12th March 2008) were significantly higher than the average end-to-end journey time for the year (approximately 1 hour 40 minutes and 1 hour 45 minutes compared to an average daily journey time for the year of around 18 minutes). If these days are excluded from the sample the Coefficient of Variation can be recalculated to be 31%.

2.3 Figure 1 shows that there were some significant reductions in average journey time on some of the routes during 2008-2009. For example the average journey time for route 1 fell from 6 minutes and 31 seconds in 2007-2008 to 5 minutes and 6 seconds in 2008-2009 and the average journey time for route 12 fell from 5 minutes and 46 seconds in 2007-2008 to 4 minutes and 46 seconds in 2008-2009.

**Figure 2. Chart plotting the average quarterly term time journey time for all 15 congestion routes .**

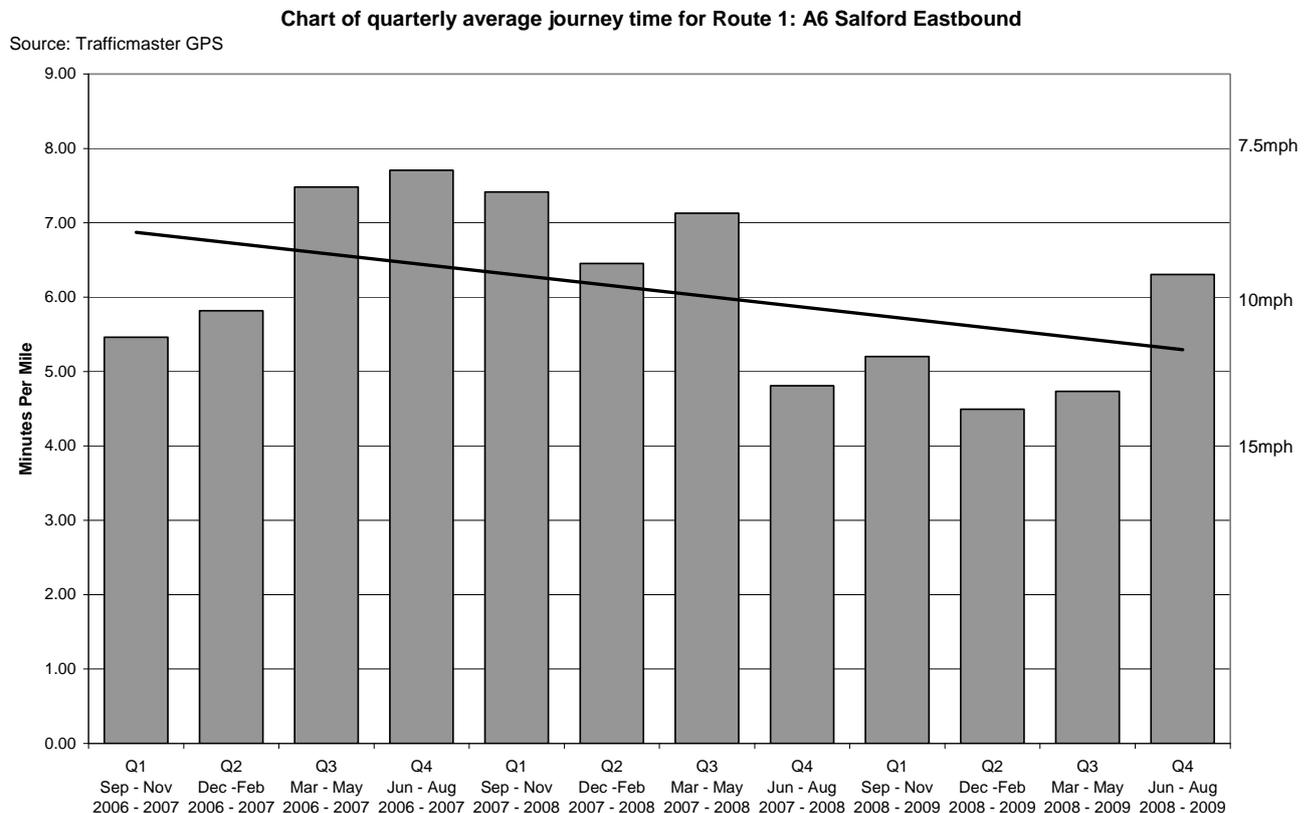


Source: trafficmaster GPS

- 2.4 The chart above shows the journey time and average speed for all 15 congestion routes combined in each academic year quarter between September 2006 and August 2009. The chart shows that the peak journey time for each academic year occurs in the same quarter, December to February. Seasonal factors such as the increased traffic flow observed in the lead up to Christmas and the effects of poor weather and shorter daylight hours on traffic speeds are likely to contribute to the peak journey time being in this period.
- 2.5 Additionally the chart also shows that the minimum journey times for each academic year occurs in the same quarter June to August. This may be caused by the reduced traffic flow associated with the summer period.
- 2.6 A trend line has been added to the chart. This trend line shows a decrease in average journey times (increase in average speeds) on the combined congestion routes throughout the period covered by the chart.
- 2.7 The data collected from the in-vehicle GPS devices can also be used to derive quarterly information for each route. The sections that follow contain a chart of quarterly journey time and a chart of quarterly coefficient of variation for each on the routes. A table containing all the quarterly data can be found in the appendix.

### 3 Route 1: A6 Salford Eastbound

**Figure 3. Chart of the quarterly average journey times for Congestion Route 1: A6 Salford Eastbound during the morning peak in school term time.**

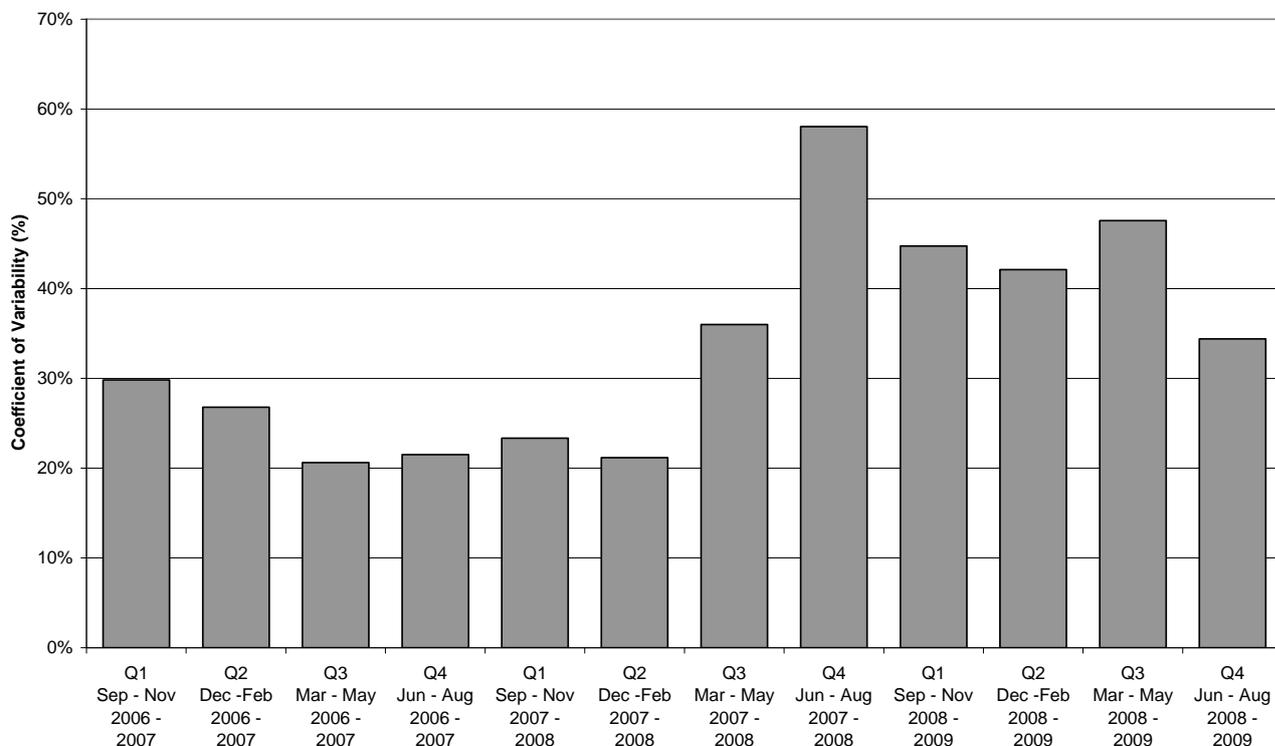


- 3.1 Figure 3 shows that there was a marked decrease in journey time from Q4 (June to August) of academic year 2007-2008 to Q3 (March to May) of academic year 2008-2009. This decrease in journey time may be related to the decrease in traffic flow associated with the economic down turn (figures from the DfT show there has been approximately a 3% fall in traffic flow nationally during the first 12 months of the recession).
- 3.2 According to figures released by the office for national statistics the UK economy began to contract between April and June 2008. This quarterly fall in GDP signalled the start of the recession and has been followed by four consecutive quarters of declining GDP.
- 3.3 Figure 3 shows the marked decrease in journey time during June to August 2008 coincided with the early stages of the recession. As the recession persisted so journey times have remained below their pre-recession levels.

**Figure 4. Chart of the quarterly average journey time variability for Congestion Route 1: A6 Salford Eastbound during the morning peak in school term time.**

**Chart of quarterly average journey time variability for Route 1: A6 Salford Eastbound**

Source: trafficmaster GPS

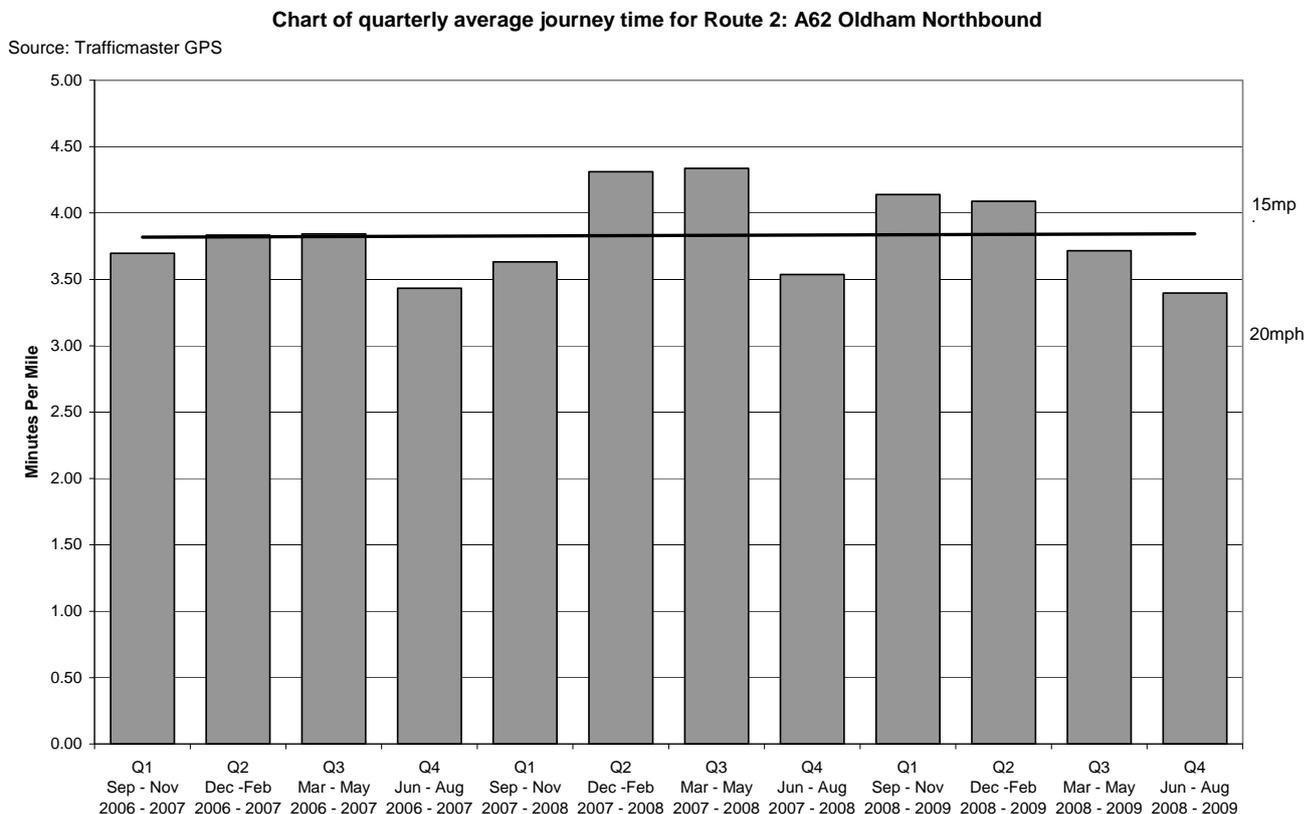


3.4 Figure 4 shows there was an increase in journey time variability from Q4 (June to August) of academic year 2007-2008.

3.5 This increase in journey time variability coincided with the decrease in average journey times seen in figure 3. This suggests that on route 1 there is an inverse relationship between journey time and journey time variability.

4 Route 2: A62 Oldham Northbound

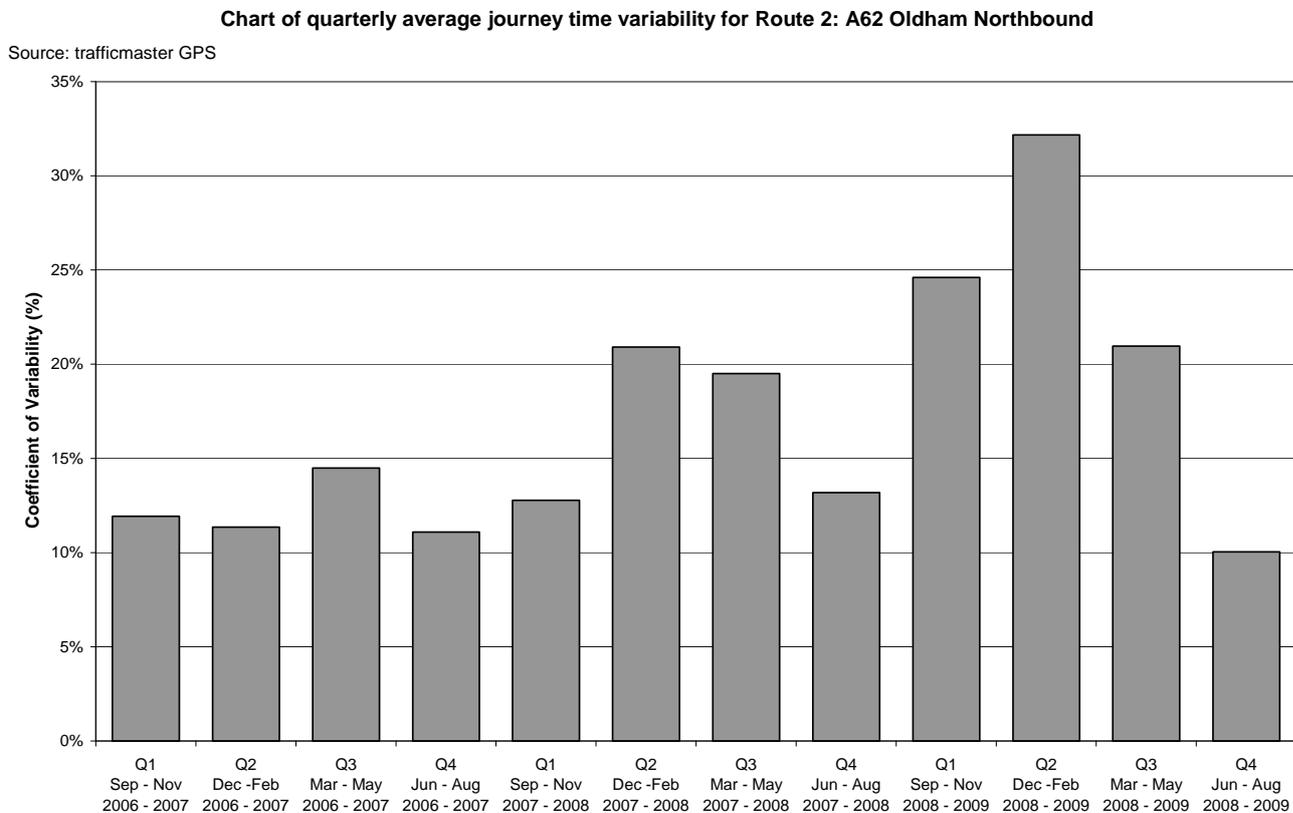
**Figure 5. Chart of the quarterly average journey times for Congestion Route 2: A62 Oldham Northbound during the morning peak in school term time.**



4.1 Figure 5 shows that the lowest quarterly journey time for route 2 in each year covered by the chart (2006-2007, 2007-2008 and 2008-2009) occurred in the quarter June to August. This may be attributable to the reduced traffic flow associated with the summer period.

4.2 Additionally the trend line of average journey times in figure 5 is relatively level showing that journey times on this route are consistent.

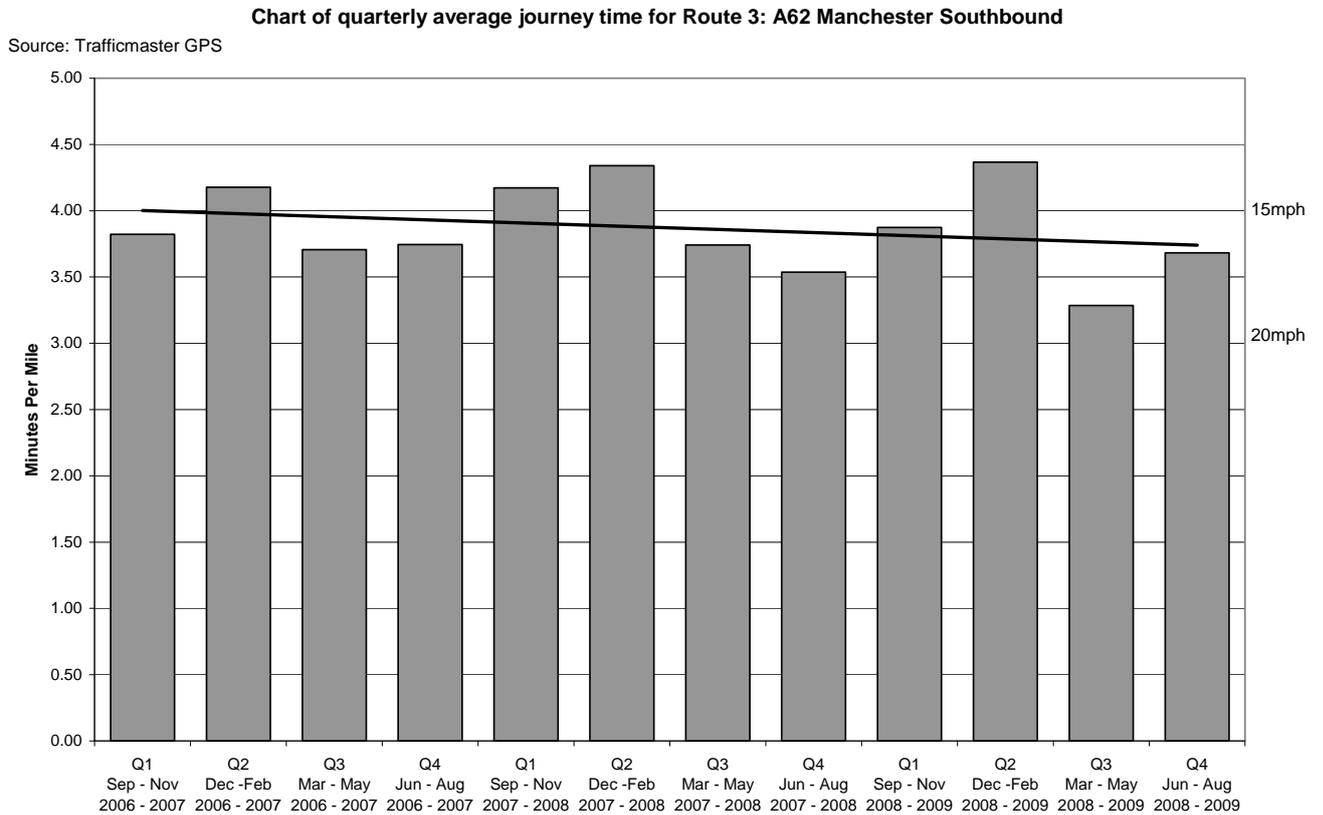
**Figure 6. Chart of the quarterly average journey time variability for Congestion Route 2: A62 Oldham Northbound during the morning peak in school term time.**



4.3 Figure 6 shows that journey time variability spiked in the quarter December to February 2008-2009. One possible explanation for this is the disruption caused the the heavy snow in February 2009. Given the geographical characteristics of Oldham this distruption may have been more pronounced on this route.

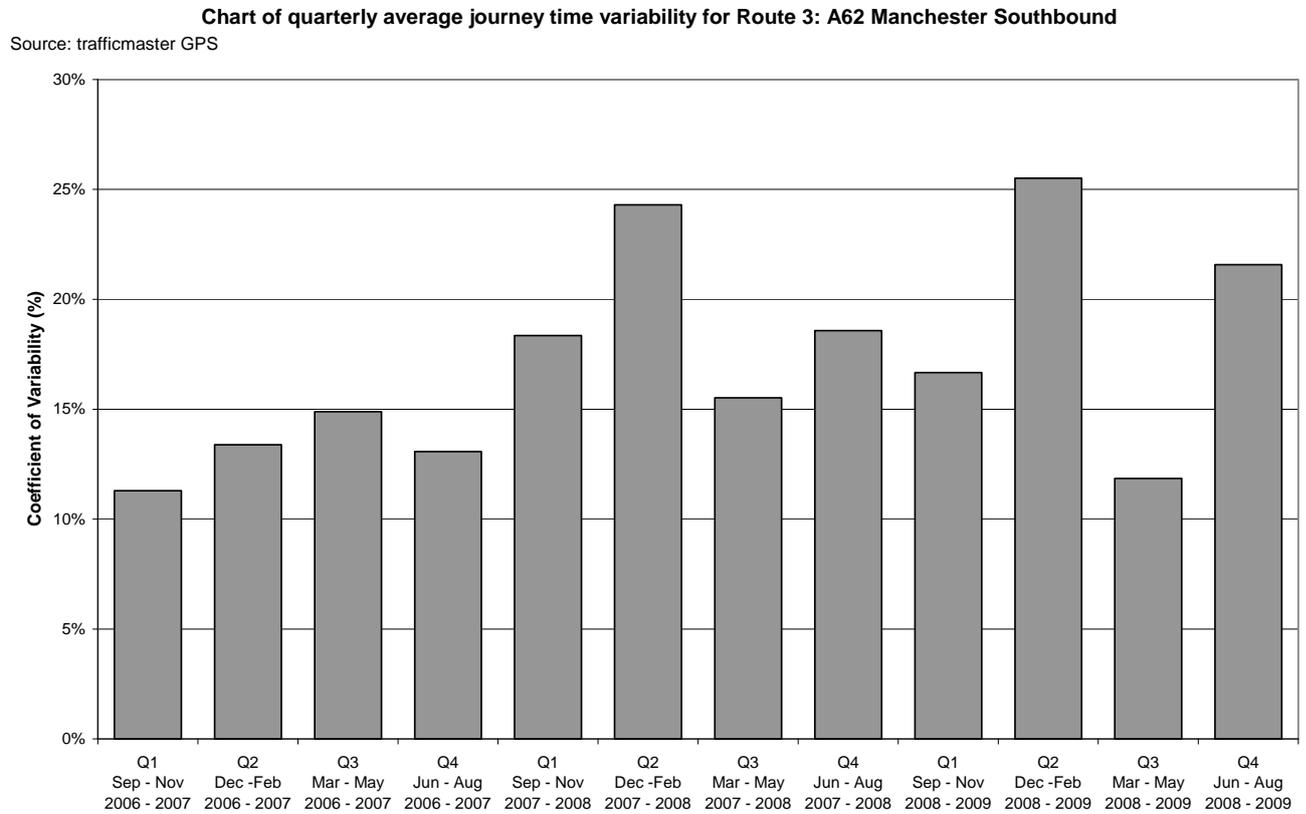
**5 Route 3: A62 Manchester Southbound**

**Figure 7. Chart of the quarterly average journey times for Congestion Route 3: A62 Manchester Southbound during the morning peak in school term time.**



- 5.1 Figure 7 shows that the peak quarterly journey time for each of the years covered by the chart (2006-2007, 2007-2008 and 2008-2009) occurs in the quarter December to February.
- 5.2 Additionally the trend line for average journey times on route 3 shows there has been a slight downward trend for quarterly journey times on this route.

**Figure 8. Chart of the quarterly average journey time variability for Congestion Route 3: A62 Manchester Southbound during the morning peak in school term time.**



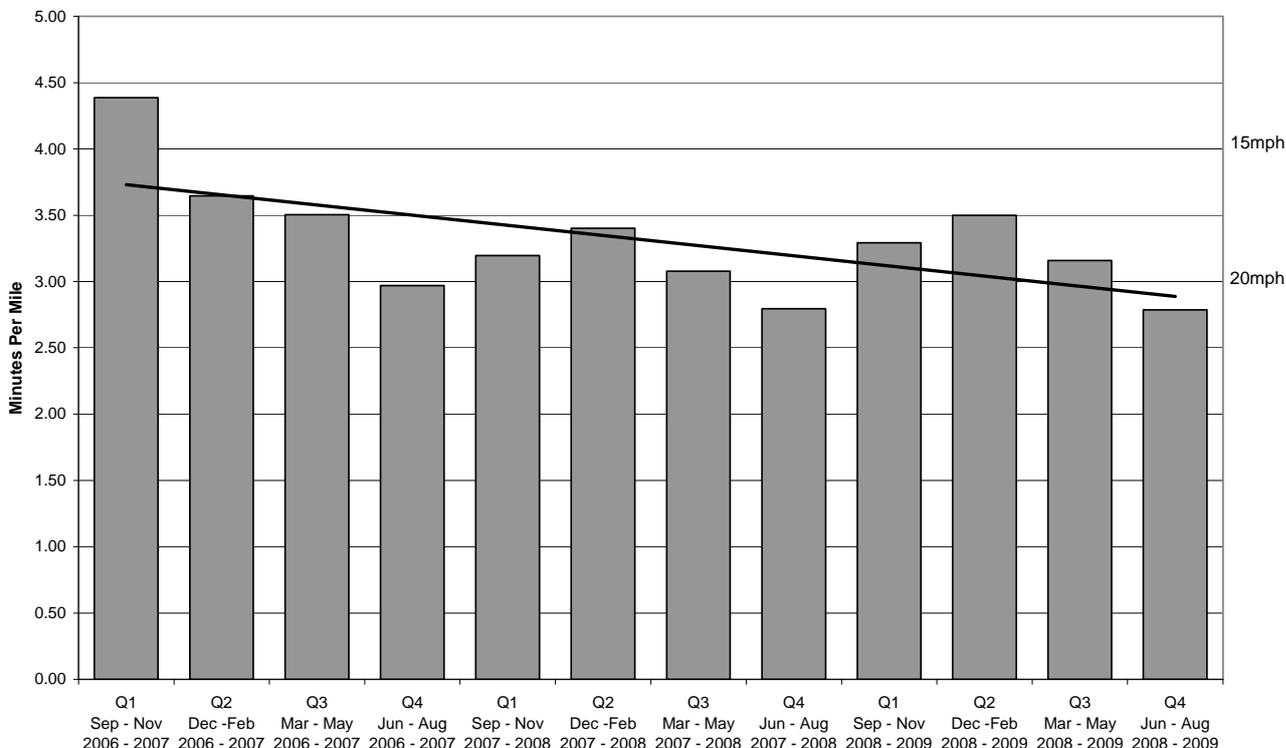
5.3 As with route 2 the peak quarterly variability for route 3 occurred in December to February 2008-2009. Again it is likely that the disruption caused by the heavy snow in February meant that journey times in this quarter were more variable.

**6 Route 4: A579 Bolton Northbound**

**Figure 9. Chart of the quarterly average journey times for Congestion Route 4: A579 Bolton Northbound during the morning peak in school term time.**

Chart of quarterly average journey time for Route 4: A579 Bolton Northbound

Source: Traffimaster GPS

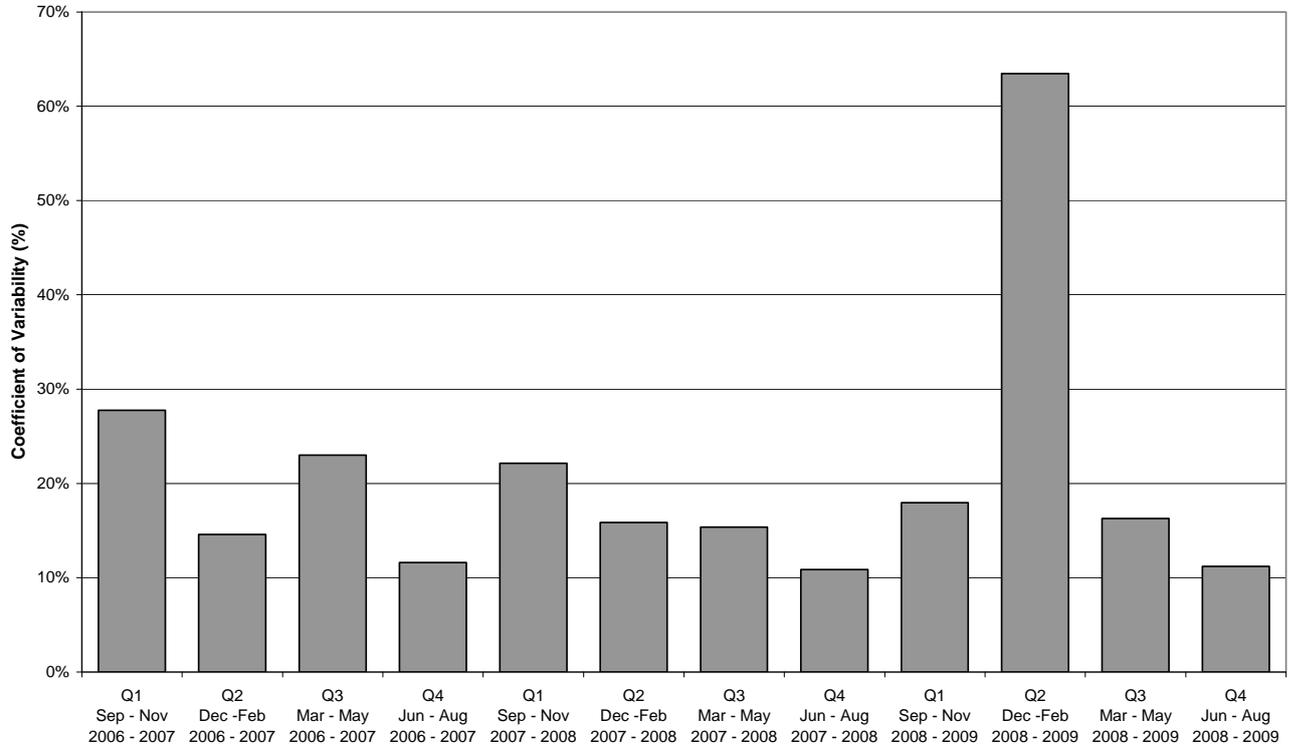


- 6.1 Figure 9 shows that the lowest quarterly journey time for each year covered by the chart (2006-2007, 2007-2008 and 2008-2009) occurred in the quarter June to August. This may be attributable to the reduced traffic flow associated with the summer period.
- 6.2 While the trend line for route 4 shows there has been a downward trend in quarterly journey times over time this is likely to have been effected by the high journey time in September to November 2006/07. If this quarter was excluded the trend line would be more level.

**Figure 10. Chart of the quarterly average journey time variability for Congestion Route 4: A579 Bolton Northbound during the morning peak in school term time.**

Chart of quarterly average journey time variability for Route 4: A579 Bolton Northbound

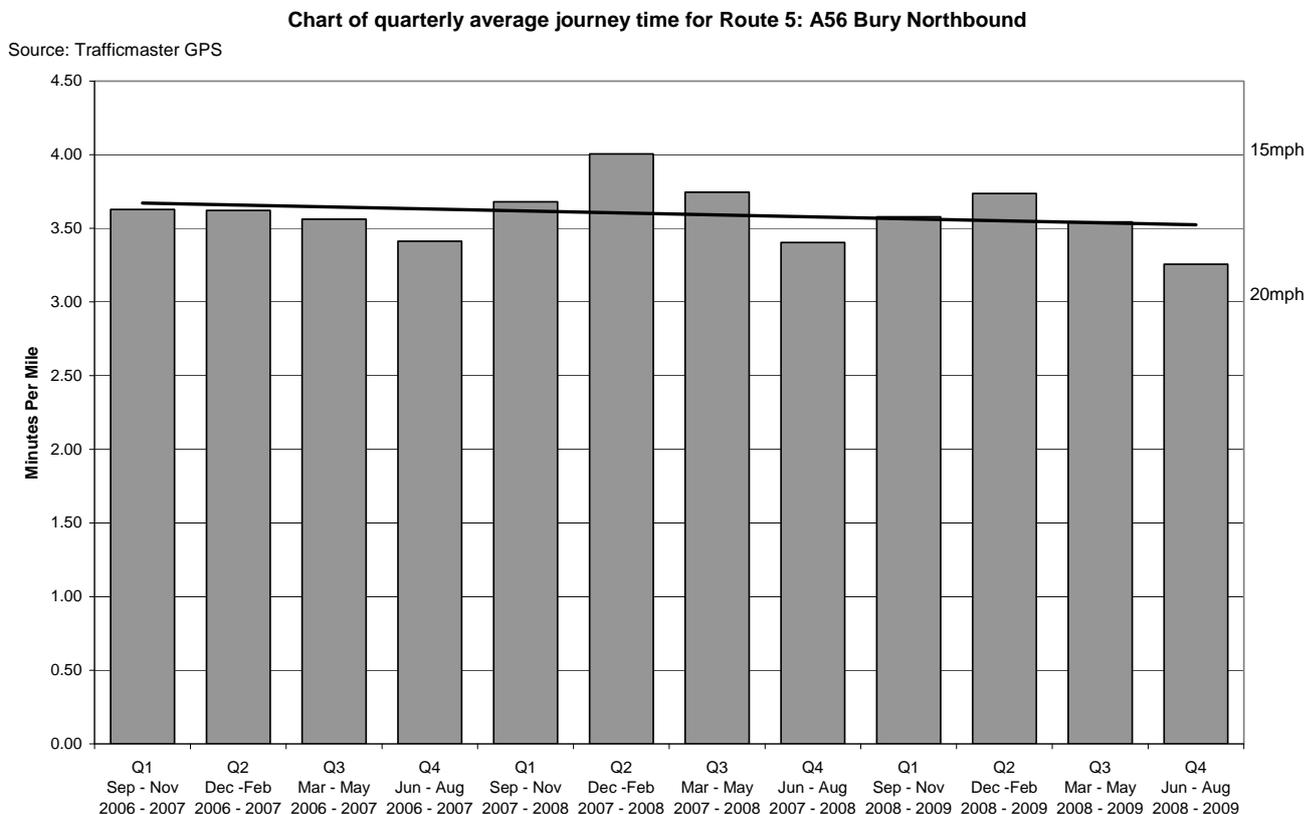
Source: trafficmaster GPS



6.3 As with routes 2 and 3 the peak quarterly variability between September 2006 to August 2009 for route 3 occurred in December to February 2008-2009. Again it is likely that the disruption caused by the heavy snow in February meant that journey times in this quarter were more variable.

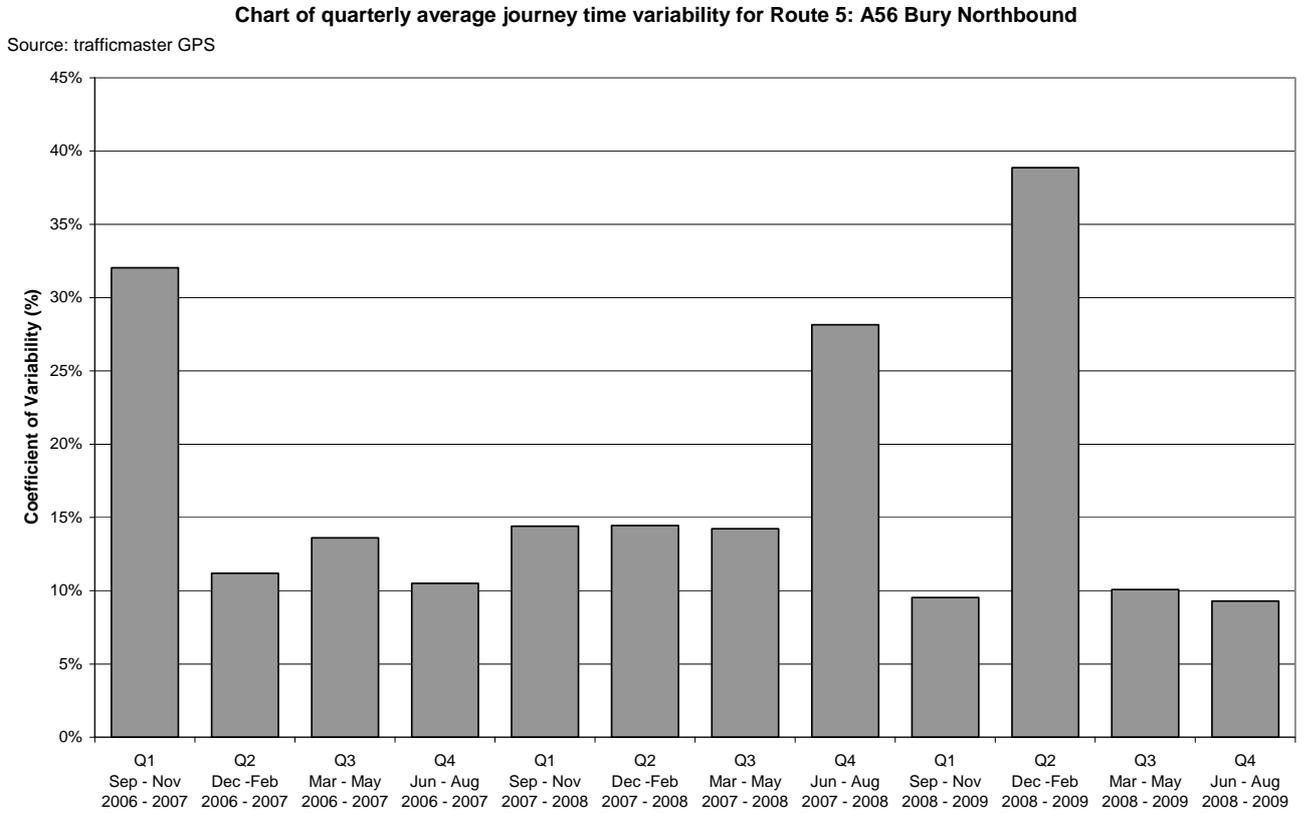
**7 Route 5: A56 Bury Northbound**

**Figure 11. Chart of the quarterly average journey times for Congestion Route 4: A56 Bury Northbound during the morning peak in school term time.**



7.1 Figure 11 shows that the lowest quarterly journey time for each year covered by the chart (2006-2007, 2007-2008 and 2008-2009) occurred in the quarter June to August. This may be attributable to the reduced traffic flow associated with the summer period. Despite this seasonal variation the average quarterly journey times for route 5 were consistent throughout the period covered by the graph.

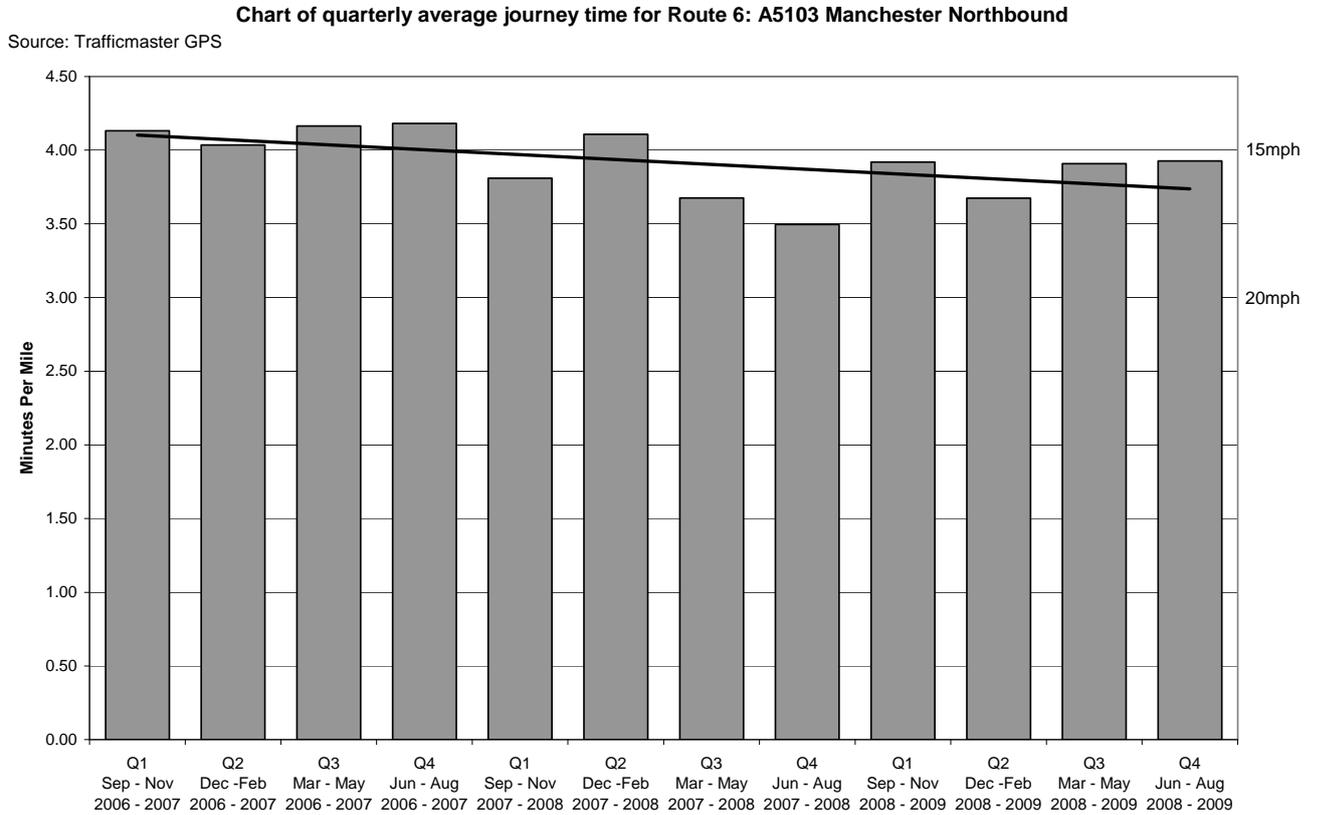
**Figure 12. Chart of the quarterly average journey time variability for Congestion Route 5: A56 Bury Northbound during the morning peak in school term time.**



7.2 As with routes 2, 3 and 4 the peak quarterly variability between September 2006 and August 2009 for route 5 occurred in December to February 2008-2009. Again it is likely that the disruption caused by the heavy snow in February meant that journey times in this quarter were more variable.

**8 Route 6: A5103 Manchester Northbound**

**Figure 13. Chart of the quarterly average journey times for Congestion Route 2: A5103 Manchester Northbound during the morning peak in school term time.**

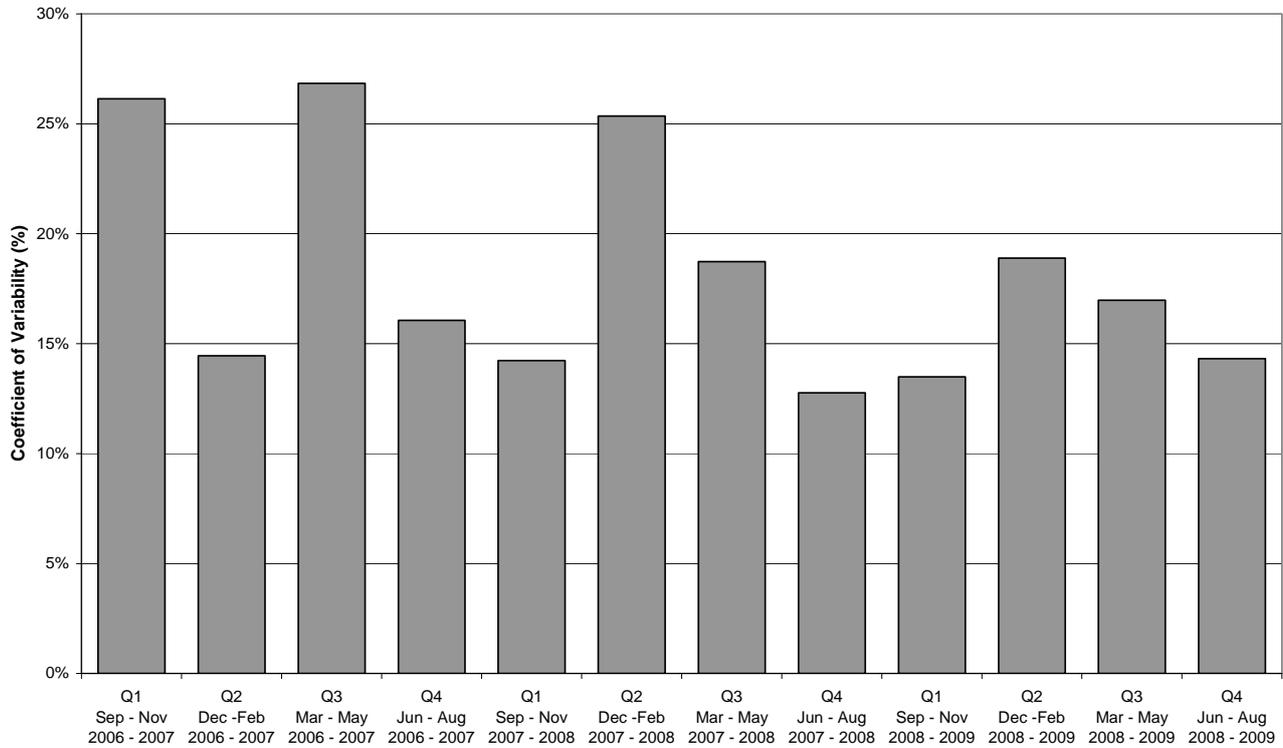


8.1 Figure 13 shows that there has been a slight downward trend in average quarterly journey times for route 6 during the period covered by the graph.

**Figure 14. Chart of the quarterly average journey time variability for Congestion Route 6: A5103 Manchester Northbound during the morning peak in school term time.**

**Chart of quarterly average journey time variability for Route 6: A5103 Manchester Northbound**

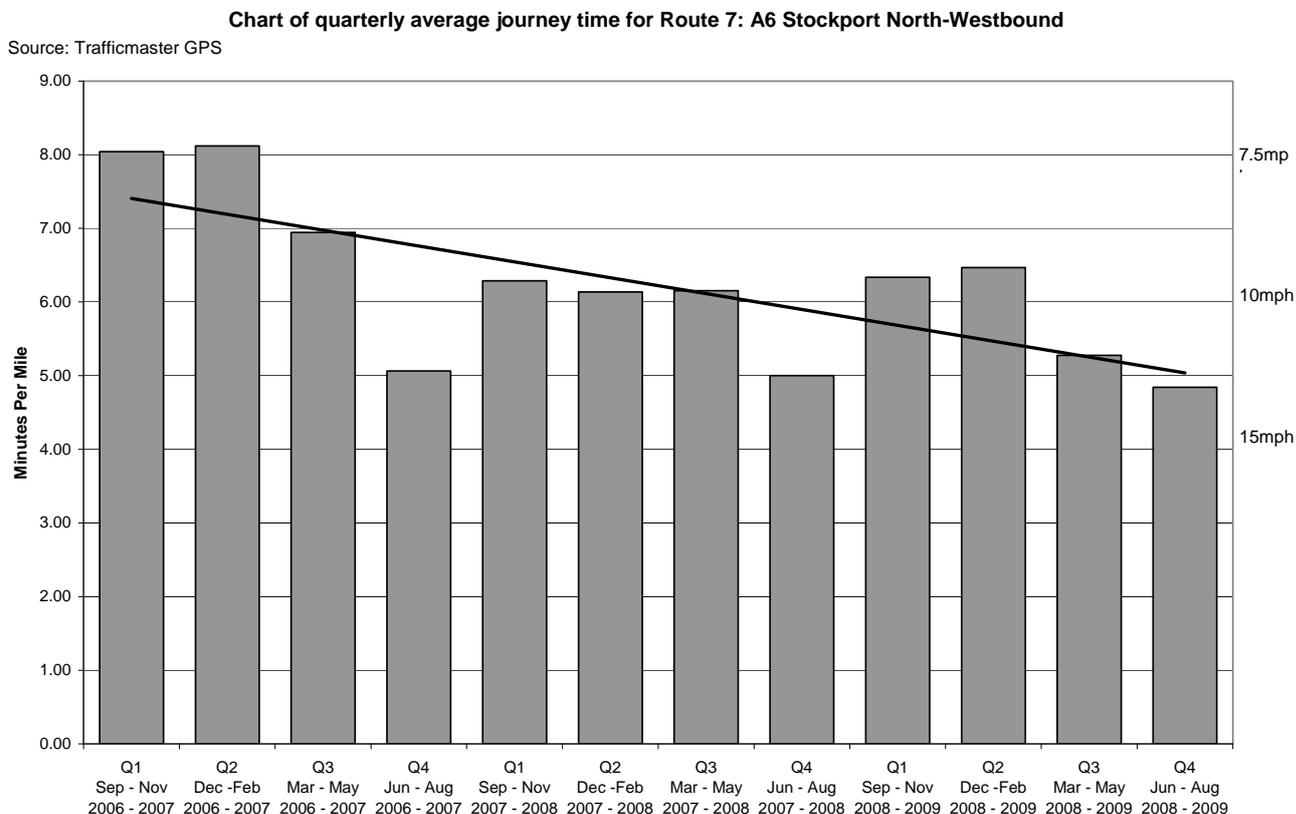
Source: trafficmaster GPS



8.2 Figure 14 shows that there has been less variation in average journey times during 2008-2009 than in 2006-2007 and 2007-2008.

**9 Route 7: A6 Stockport North-Westbound**

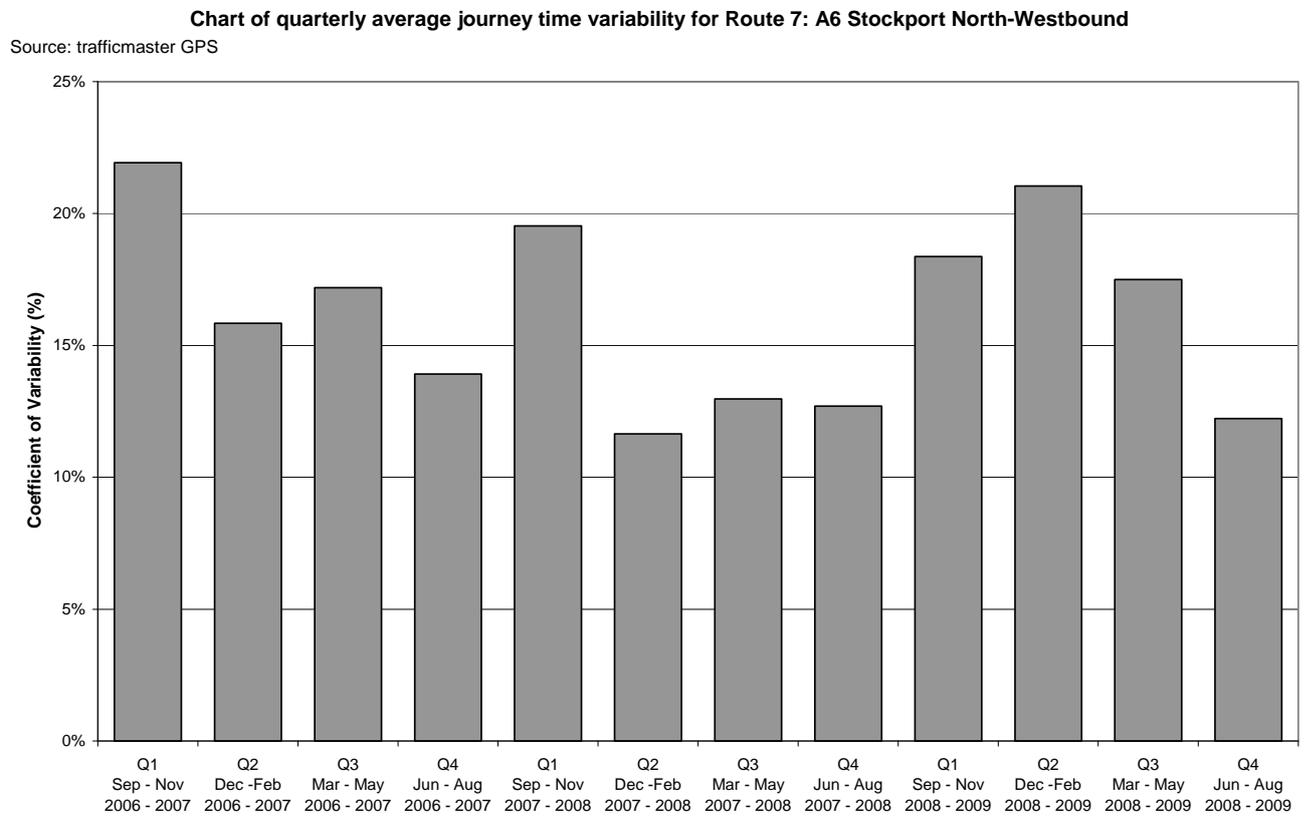
**Figure 15. Chart of the quarterly average journey times for Congestion Route 7: A6 Stockport North-Westbound during the morning peak in school term time.**



9.1 Figure 16 shows that the lowest quarterly journey time for each year covered by the chart (2006-2007, 2007-2008 and 2008-2009) occurred in the quarter June to August. This may be attributable to the reduced traffic flow associated with the summer period.

9.2 Figure 16 also shows that there is a downward trend in quarterly journey times on route 7.

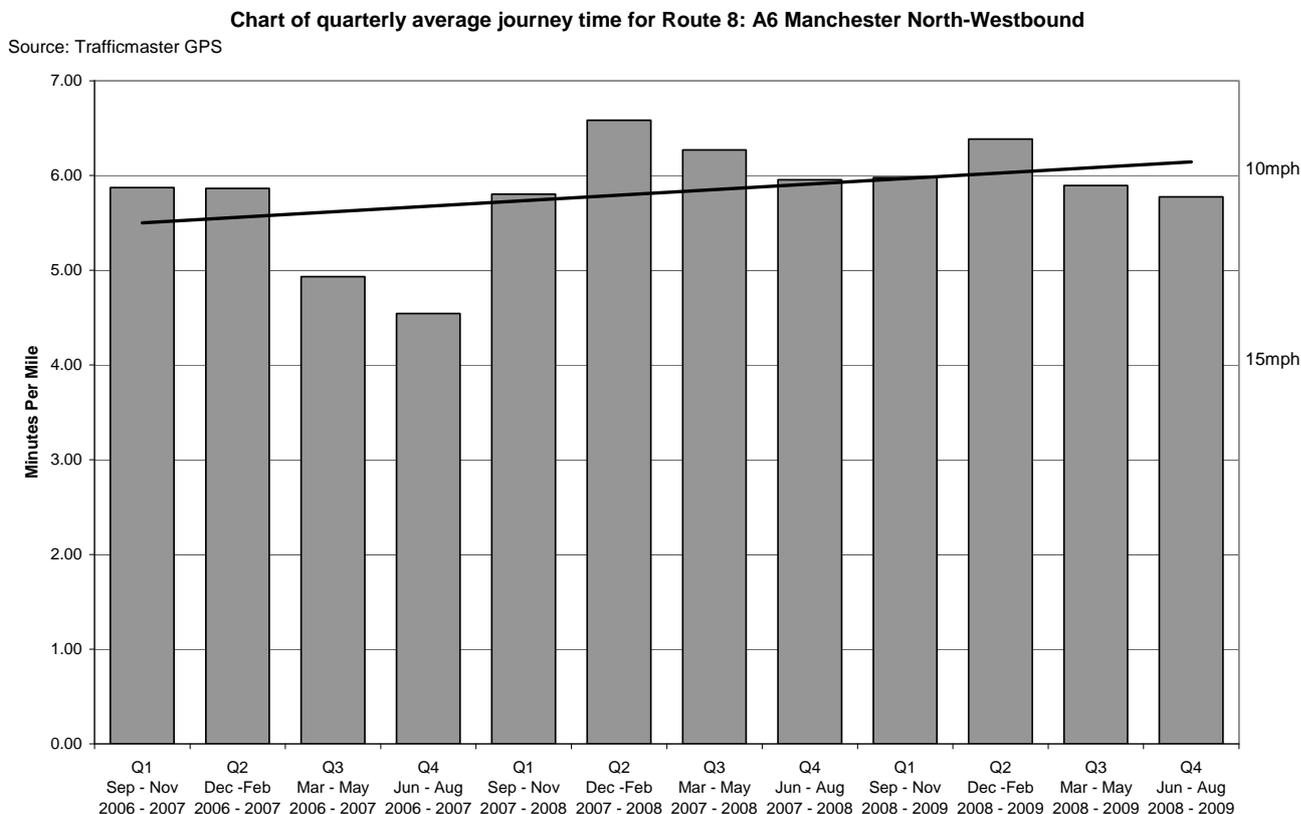
**Figure 16. Chart of the quarterly average journey time variability for Congestion Route 7: A6 Stockport North-Westbound during the morning peak in school term time.**



9.3 Figure 16 shows that journey time variation has been fairly consistent throughout the period covered by the chart with only a 10% difference between the highest and lowest variable quarters.

**10 Route 8: A6 Manchester North-Westbound**

**Figure 17. Chart of the quarterly average journey times for Congestion Route 8: A6 Manchester North-Westbound during the morning peak in school term time.**

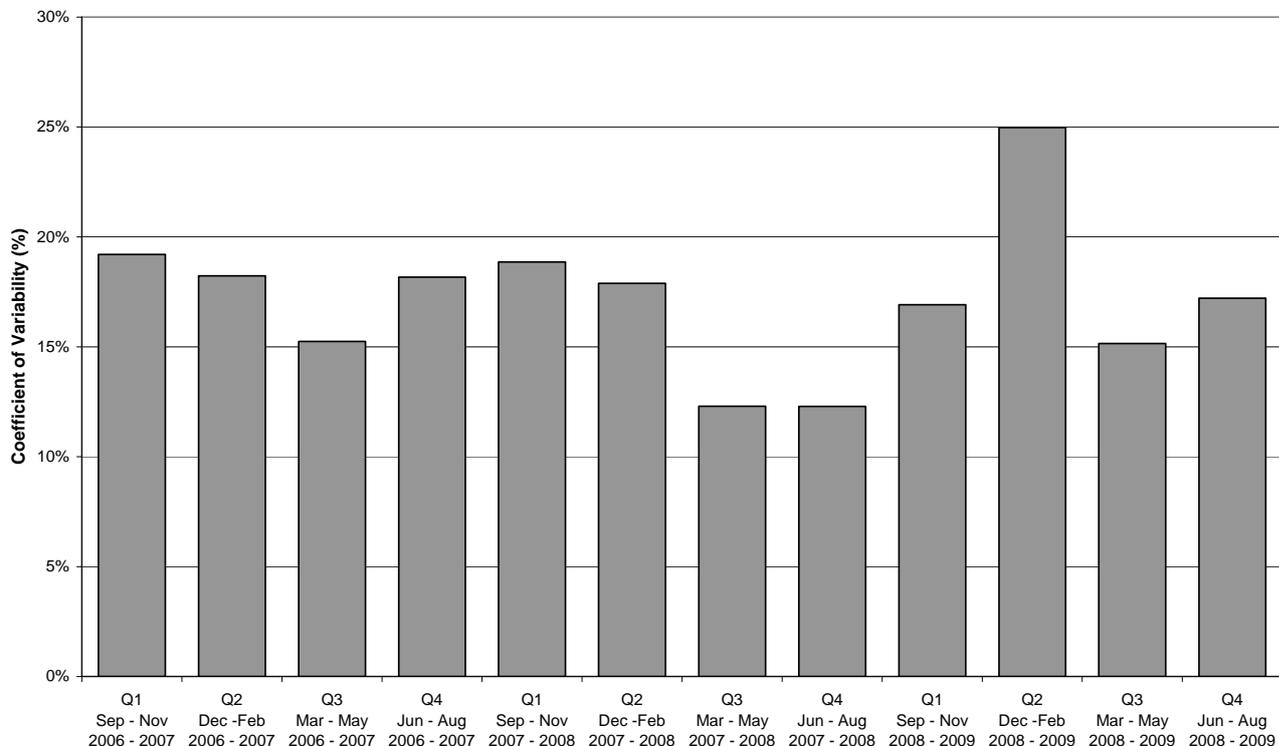


10.1 Figure 17 shows that the lowest average quarterly journey times were during academic year 2006-2007. During 2007-2008 journey times increased and have remained relatively consistent during 2008-2009. These changes in journey times are reflected in the positive slope of the trend line. Of the 15 congestion routes only 3 have a positive gradient with this route having the steepest with a gradient of 0.06.

**Figure 18. Chart of the quarterly average journey time variability for Congestion Route 8: A5103 Manchester Northbound during the morning peak in school term time.**

**Chart of quarterly average journey time variability for Route 8: A6 Manchester North-Westbound**

Source: trafficmaster GPS



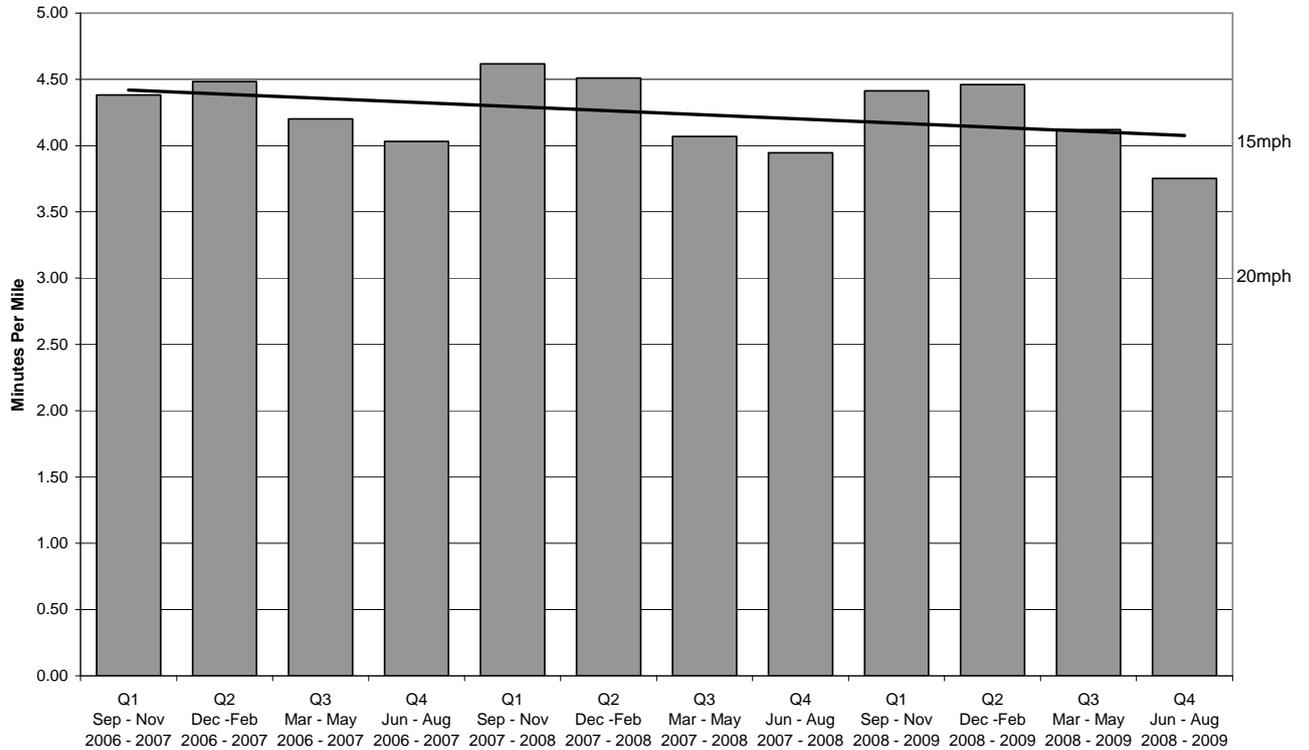
10.2 As with routes 2, 3, 4 and 5 the peak quarterly variability between September 2006 to August 2009 for route 8 occurred in December to February 2008-2009. Again it is likely that the disruption caused by the heavy snow in February meant that journey times in this quarter were more variable.

**11 Route 9: A635 Tameside Westbound**

**Figure 19. Chart of the quarterly average journey times for Congestion Route 9: A635 Tameside Westbound during the morning peak in school term time.**

**Chart of quarterly average journey time for Route 9: A635 Tameside Westbound**

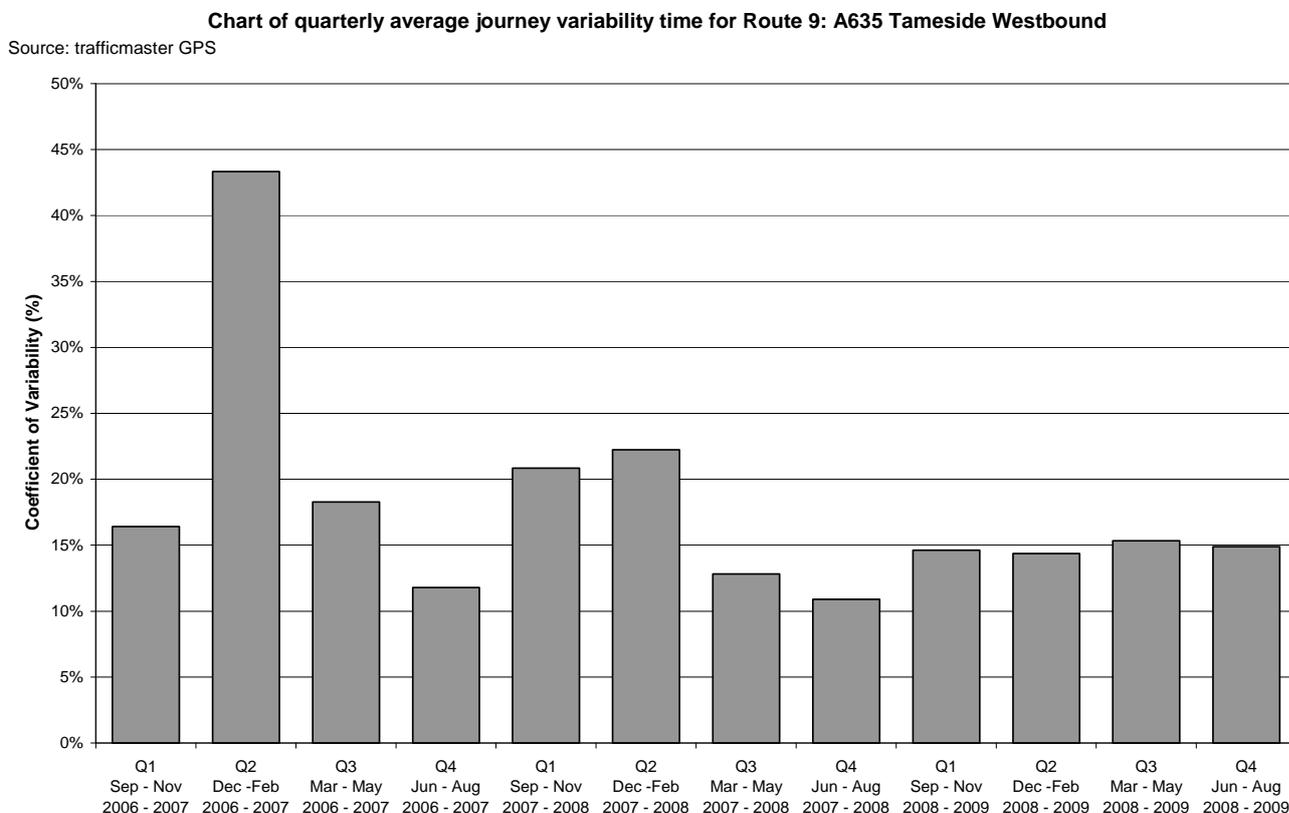
Source: Traffimaster GPS



11.1 Figure 19 shows that there is a slight downward trend in the average quarterly journey time for route 9 during the period covered by the chart.

11.2 Additionally figure 19 shows that the lowest average quarterly journey time in each of the years covered by the chart are the quarters between June and August. This may be attributable to the reduced traffic flow associated with the summer months.

**Figure 20. Chart of the quarterly average journey time variability for Congestion Route 9: A635 Tameside Westbound during the morning peak in school term time.**

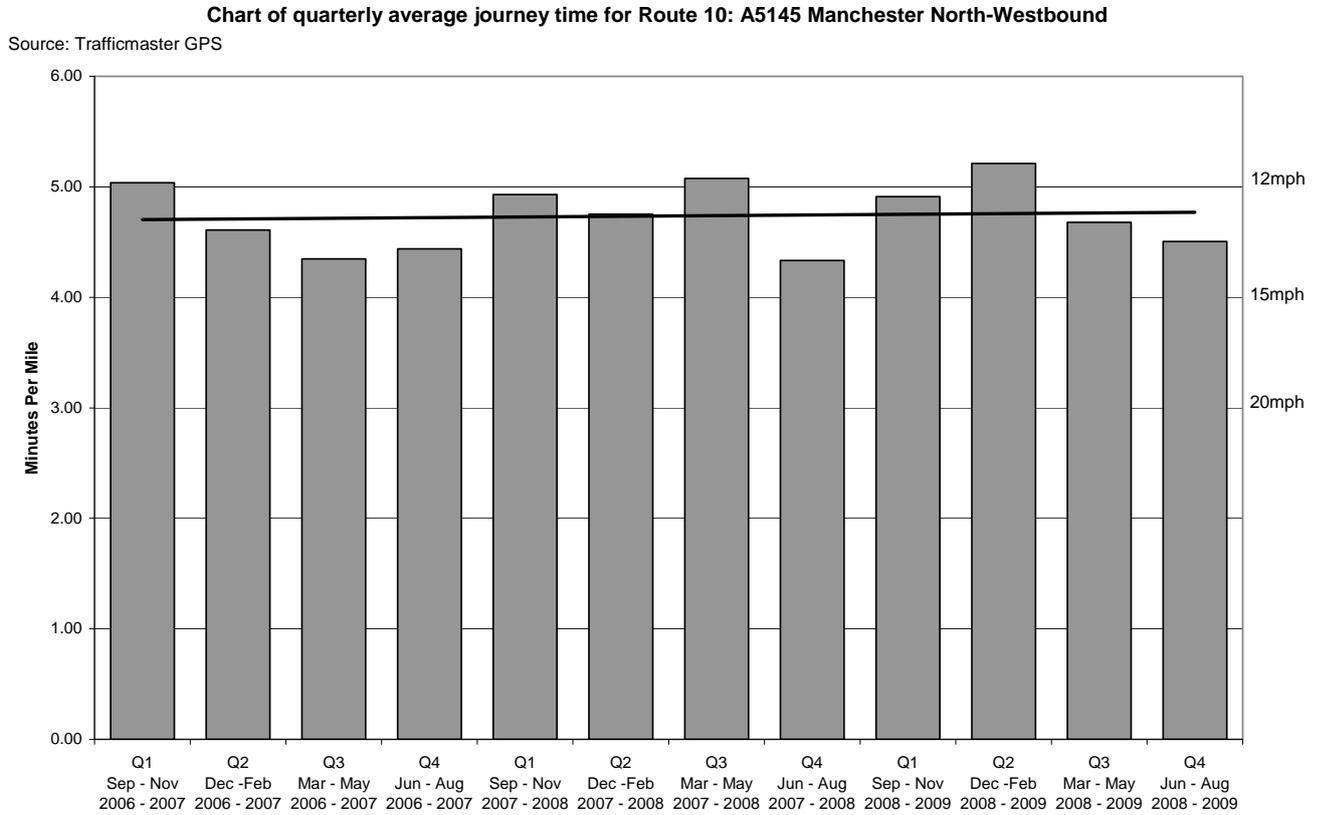


11.3 Figure 20 shows that the quarterly coefficient or variation was significantly higher during the quarter December to February in 2006-2007 than in any of the other quarters covered by the chart.

11.4 This spike in quarterly variation can be traced to the impact of a single day. The average end-to-end journey time for the 24th January 2007 was approximately 33 minutes compared to an average end-to-end journey time of approximately 9 minutes and 30 seconds. If this day is excluded from the calculation the coefficient of variation for this quarter reduces to 16%.

**12 Route 10: A5145 Manchester North-Westbound**

**Figure 21. Chart of the quarterly average journey times for Congestion Route 10: A5145 Manchester North-Westbound during the morning peak in school term time.**

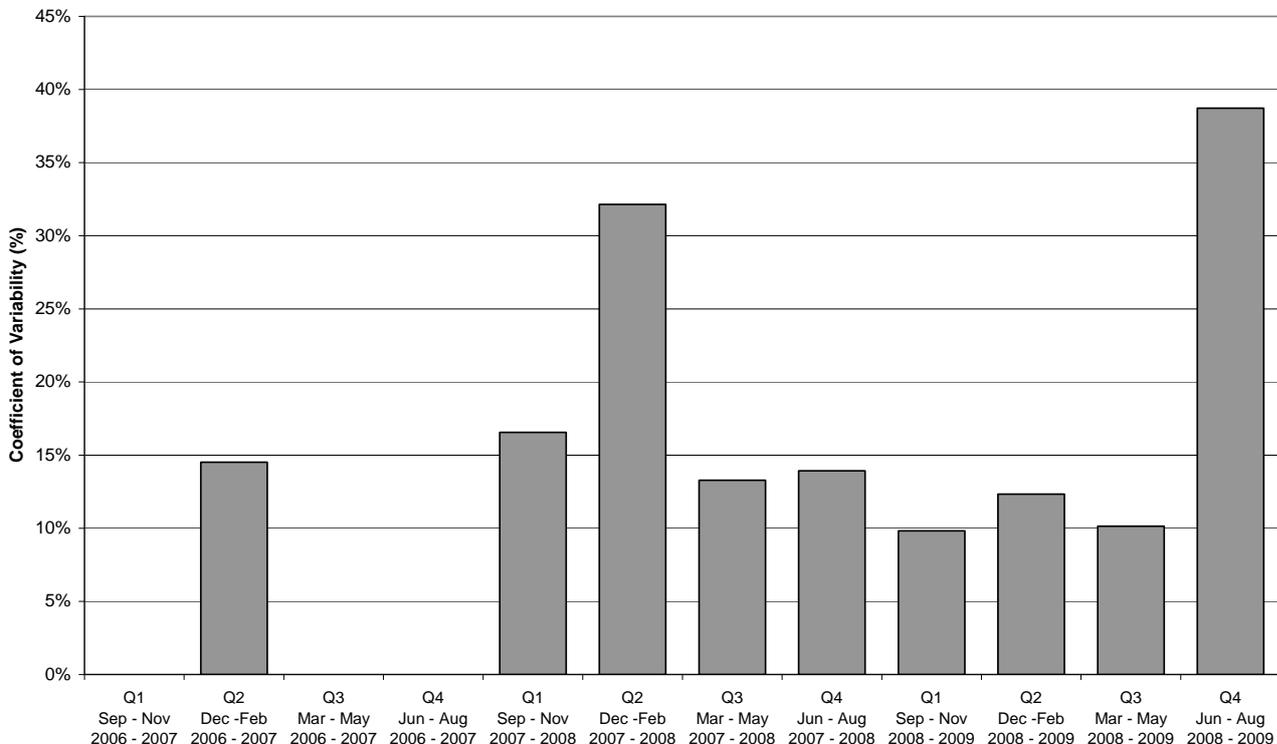


12.1 Figure 21 shows that the average journey times for route 10 have been consistent during the period covered by the chart.

**Figure 22. Chart of the quarterly average journey time variability for Congestion Route 10: A5145 Manchester North-Westbound during the morning peak in school term time.**

**Chart of quarterly average journey time variability for Route 10: A5145 Manchester North-Westbound**

Source: trafficmaster GPS



12.2 Three of the quarters in 2006-2007 (September to November, March to May and June to August) have no entry in figure 22. This is because there is not sufficient information to calculate the coefficient of variation in these quarters.

12.3 The coefficient of variation represents the variability in the average daily journey time for each day where there is at least one observation on all the ITN links that make up the congestion route. For route 10 there are not enough days with observations on all of the links in three of the quarters in 2006-2007 to calculate the coefficient of variation.

**13 Route 11: A49 Wigan Southbound**

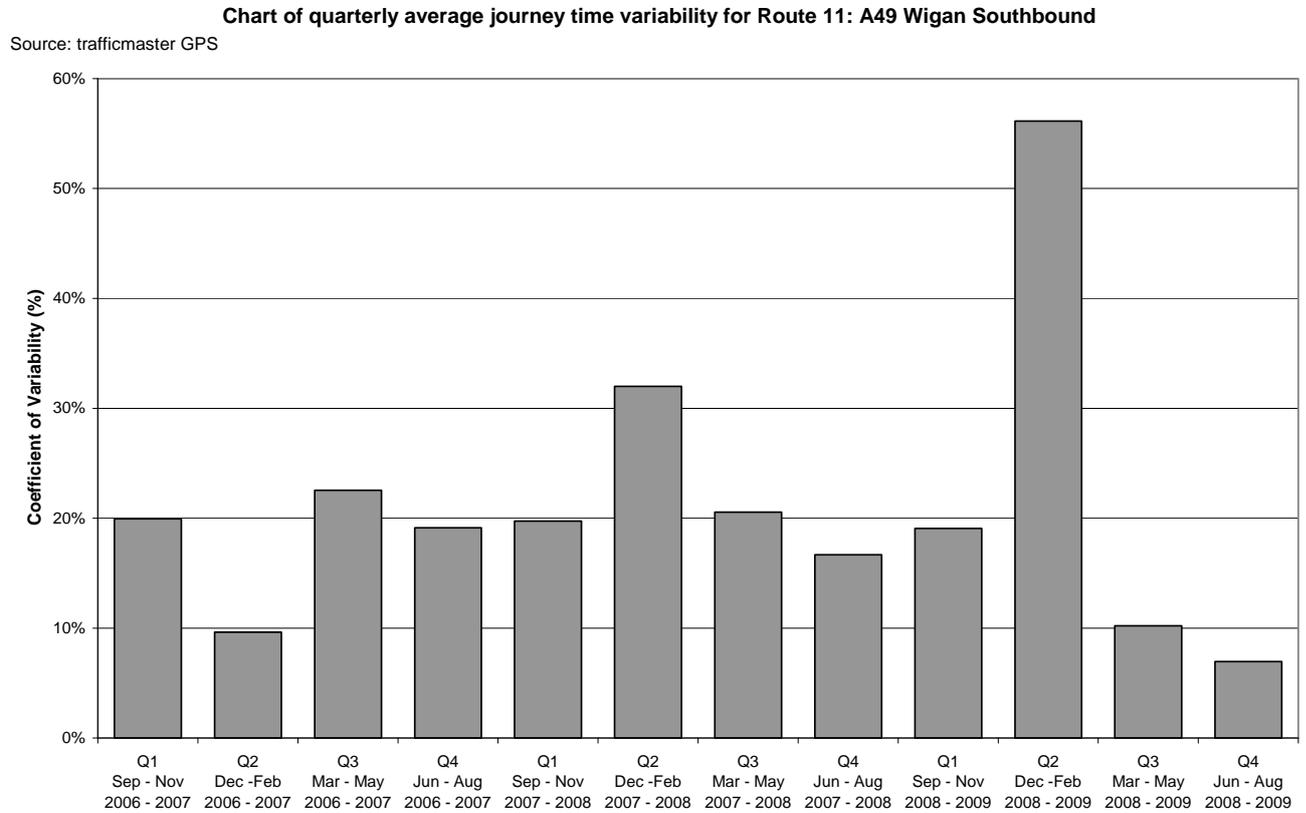
**Figure 23. Chart of the quarterly average journey times for Congestion Route 11: A49 Wigan Southbound during the morning peak in school term time.**



13.1 Figure 23 shows that the quarters March to May and June to August in academic year 2008-2009 have the lowest average journey time. This could have been a result of a reduction in traffic flow caused by the recession.

13.2 The highest quarterly journey time was in the quarter from December to February 2008-2009. This higher average journey time may have been caused by the impact of heavy snowfall in February 2009 on vehicle journey times.

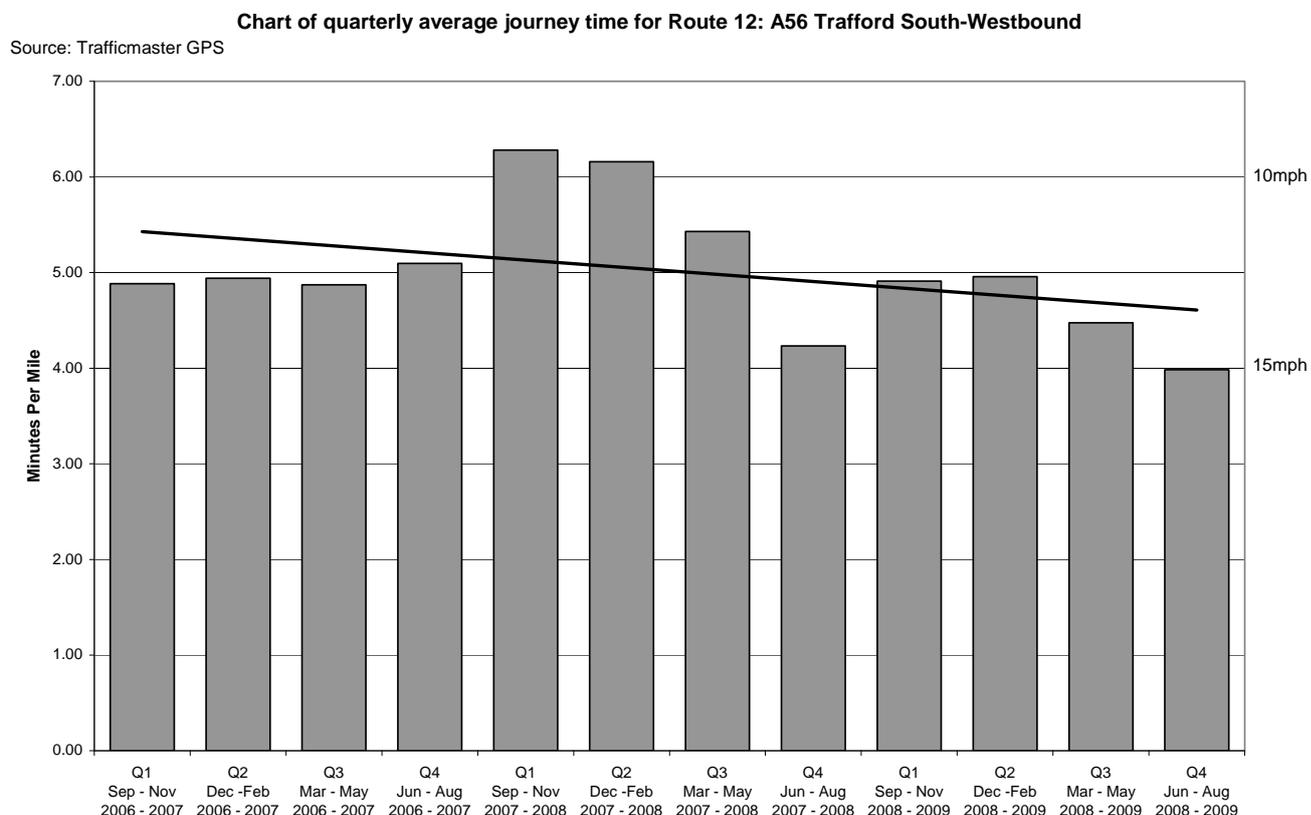
**Figure 24. Chart of the quarterly average journey time variability for Congestion Route 11: A49 Wigan Southbound during the morning peak in school term time.**



13.3 Similarly to a number of other congestion routes the peak quarterly variability between September 2006 to August 2009 for route 11 occurred in the quarter December to February 2008-2009. Again it is likely that the disruption caused by the heavy snow in February meant that journey times in this quarter were more variable.

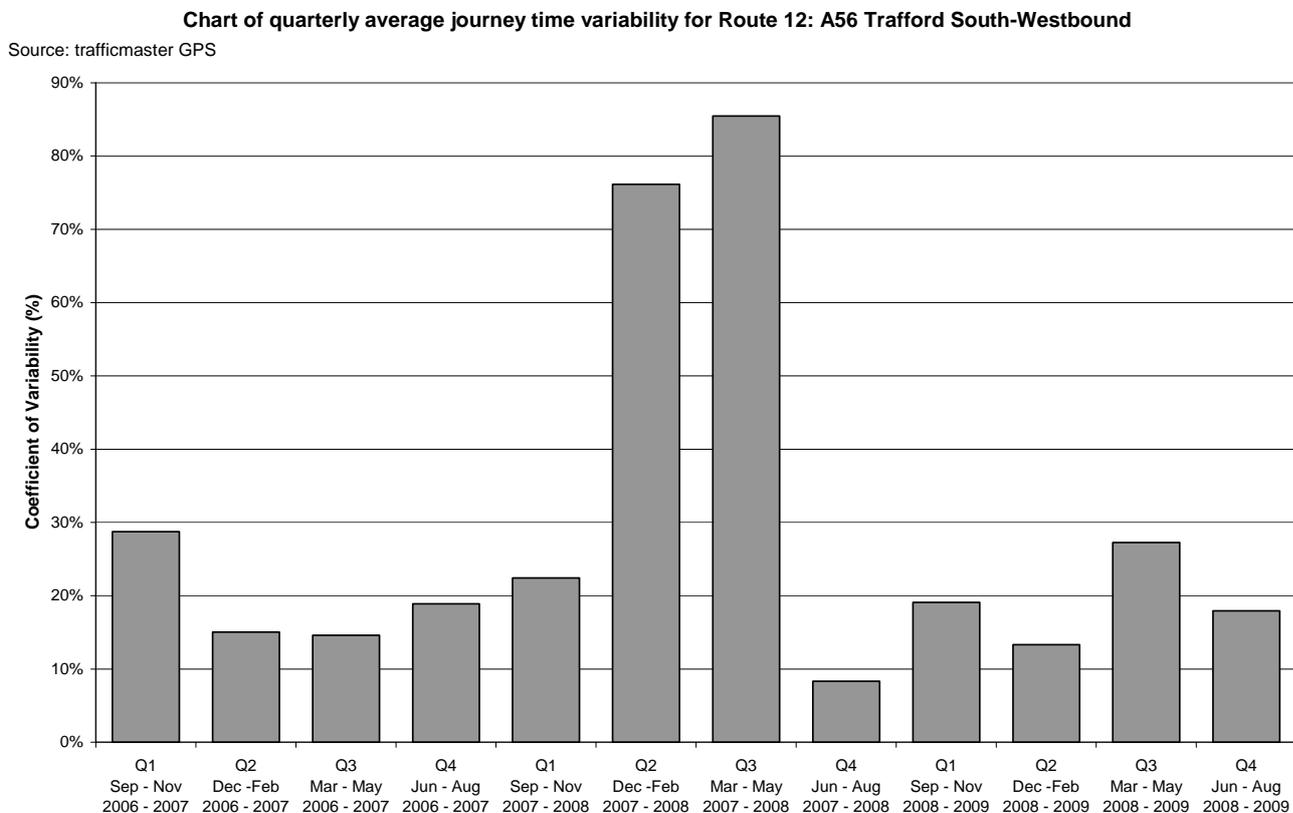
**14 Route 12: A56 Trafford South-Westbound**

**Figure 25. Chart of the quarterly average journey times for Congestion Route 12: A56 Trafford South-Westbound during the morning peak in school term time.**



14.1 Figure 25 shows that a three of the lowest quarterly journey times occurred since the start of the recession (According to figures released by the office for national statistics the UK economy began to contract between April and June 2008). This could have been a result of a reduction in traffic flow caused by the recession (figures from the DfT show there has been approximately a 3% fall in traffic flow nationally during the first 12 months of the recession).

**Figure 26. Chart of the quarterly average journey time variability for Congestion Route 12: A56 Trafford South-Westbound during the morning peak in school term time.**

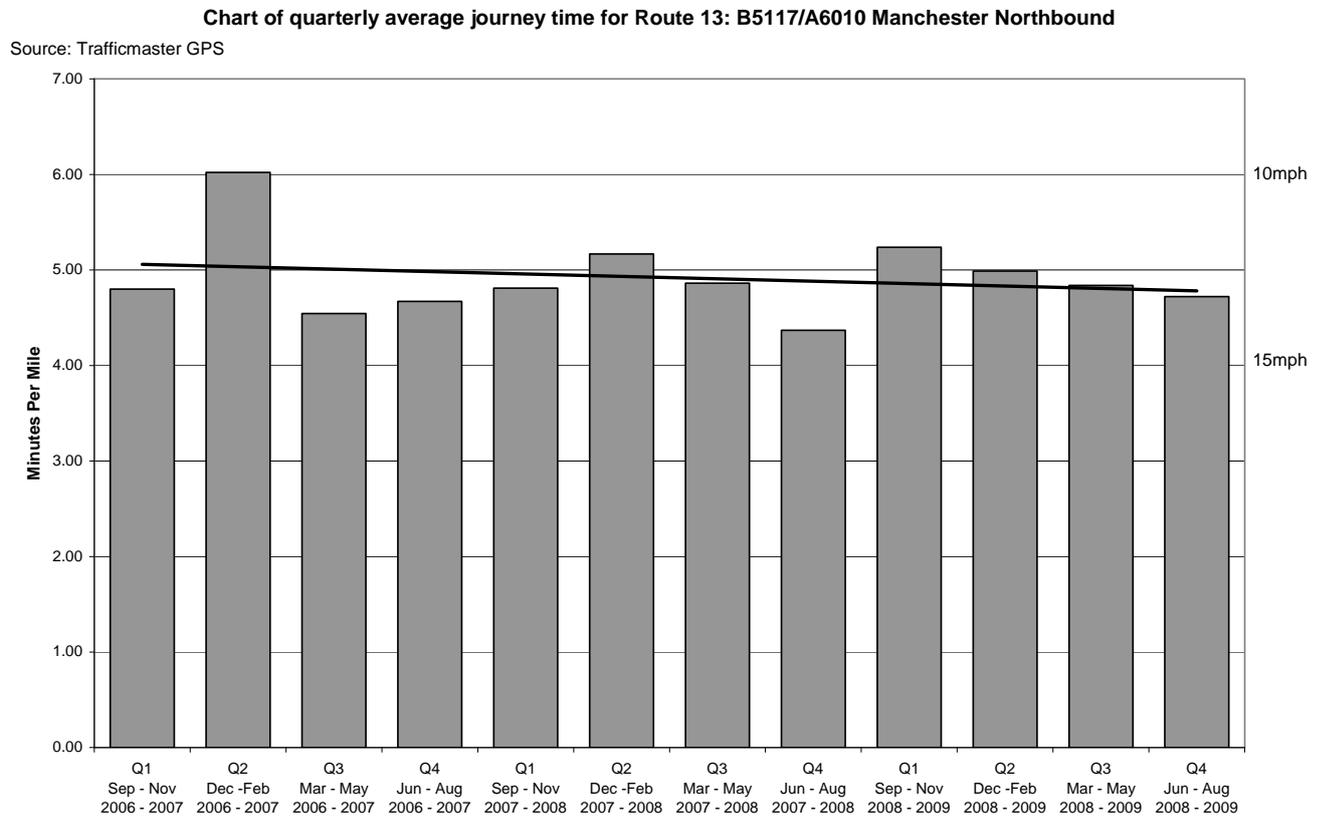


14.2 Figure 26 clearly shows that the variability of journey time on route 12 peaked in the two quarters between December 2007 and May 2008. This peak can be traced to the effects of two dates where the average journey time for that date was significantly higher than the average for the quarter.

14.3 For example in the quarter March to May 2007-2008 on the 12<sup>th</sup> March the daily average journey time was approximately 5.5 times greater than the quarterly average journey time. If this date is excluded from the sample the coefficient of variation falls to 24%. In order to establish the reason for this high journey time a check of the road accident database was performed. No injury accidents were reported on route 12 on this date, however this does not exclude a road traffic accident as a possible cause of the delay as there may have been a damage only accident on the route. Damage only accidents are not included in the accident database.

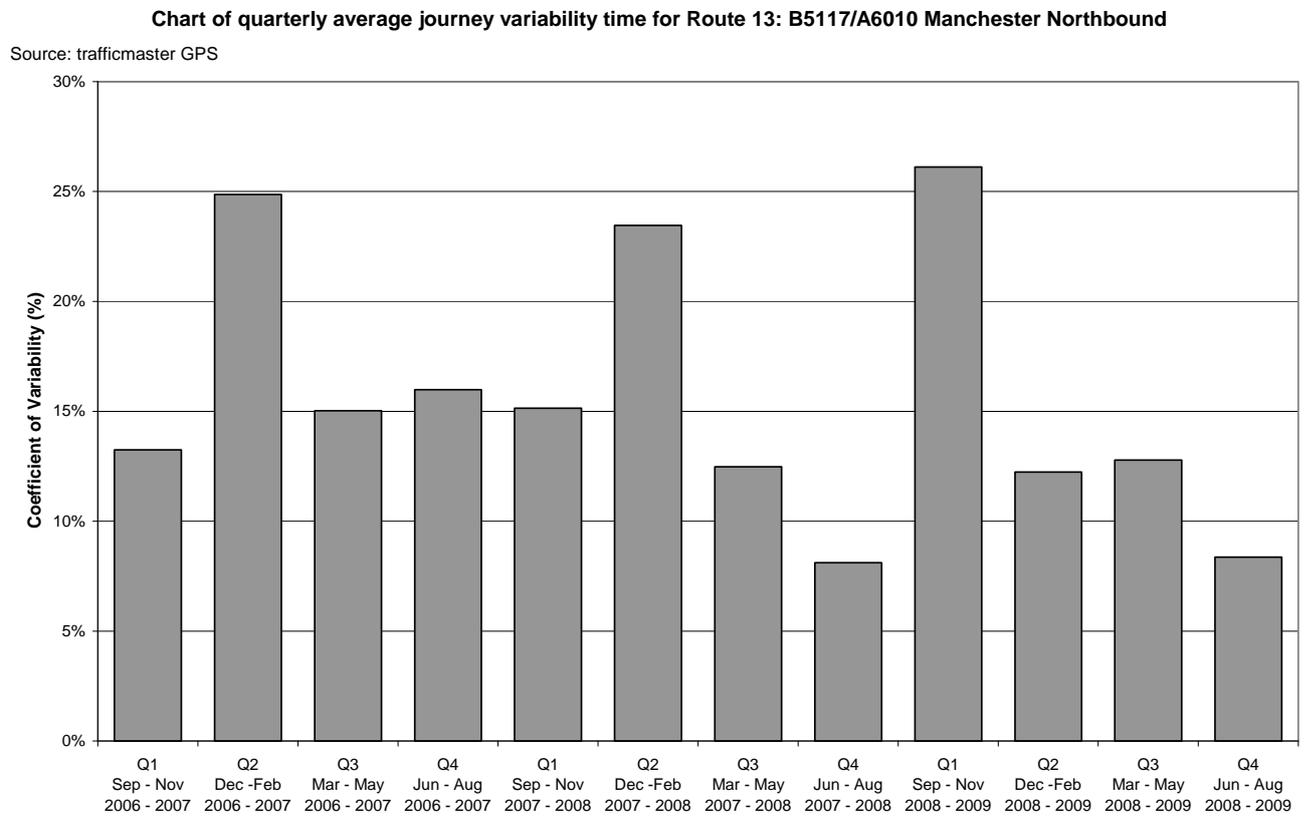
**15 Route 13: B5117/A6010 Manchester Northbound**

**Figure 27. Chart of the quarterly average journey times for Congestion Route 13: B5117/A6010 Manchester Northbound during the morning peak in school term time.**



15.1 Figure 27 shows that, with the exception of December to February 2006-2007, quarterly journey times for route 13 was fairly consistent throughout the period covered by the chart.

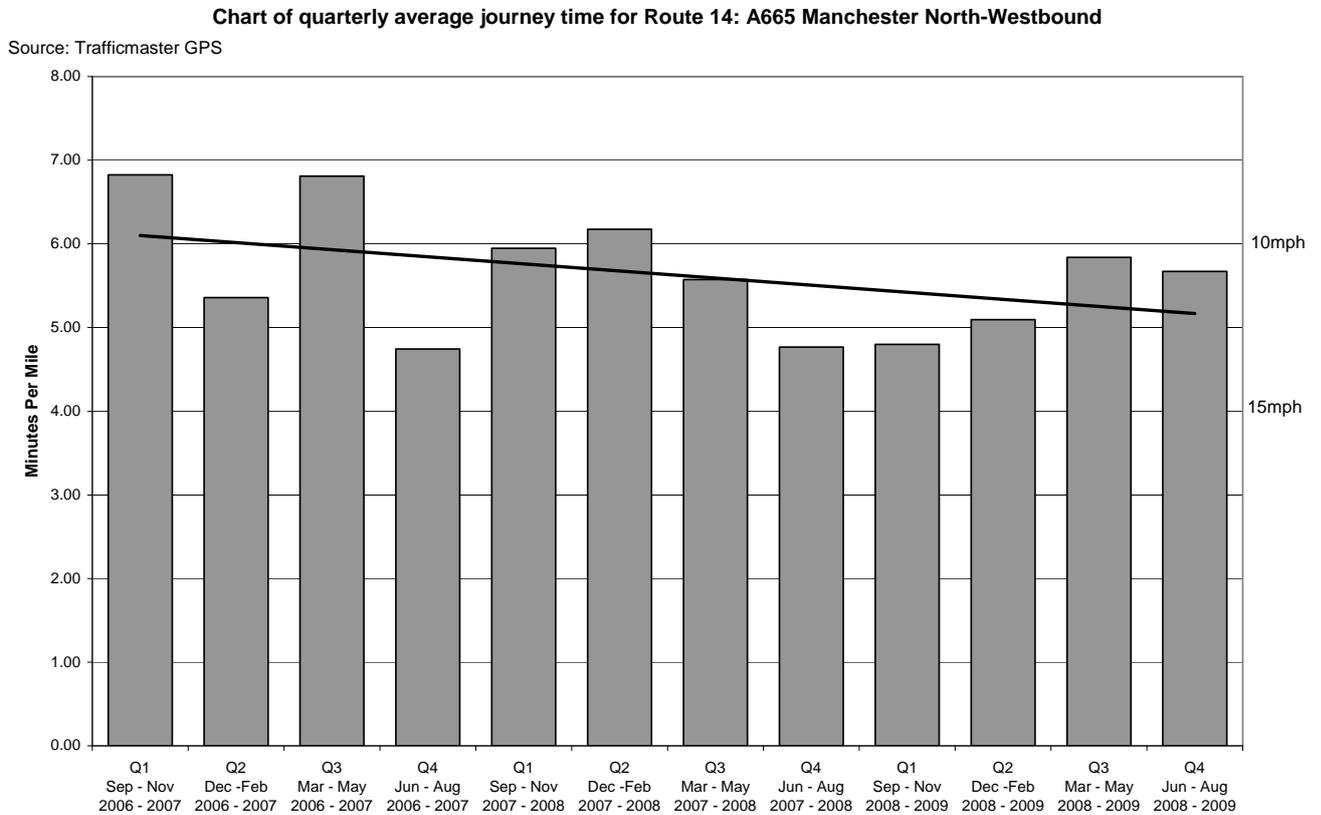
**Figure 28. Chart of the quarterly average journey time variability for Congestion Route 13: B5117/A6010 Manchester Northbound during the morning peak in school term time.**



15.2 Figure 28 shows that the coefficient of variation in journey time in the quarter from June to August in both 2007-2008 and 2008-2009 was lower than the coefficient of variation in the other periods covered by the chart. This may be attributable to the reduced flow associated with the summer months reducing the amount of congestion related delay.

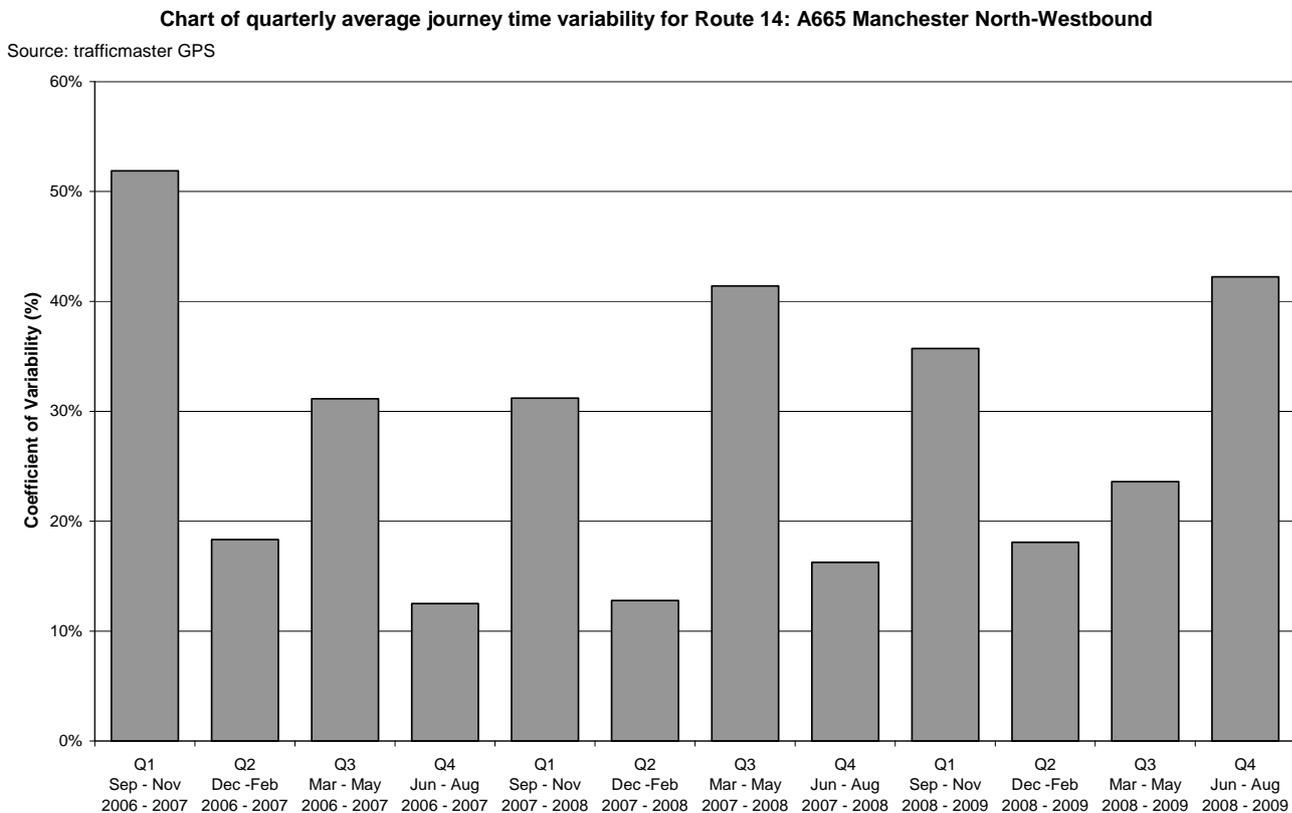
**16 Route 14: A665 Manchester North-Westbound**

**Figure 29. Chart of the quarterly average journey times for Congestion Route 14: A665 Manchester North-Westbound during the morning peak in school term time.**



16.1 Figure 29 shows that there was a downward trend in the average quarterly journey time during the period covered by the chart.

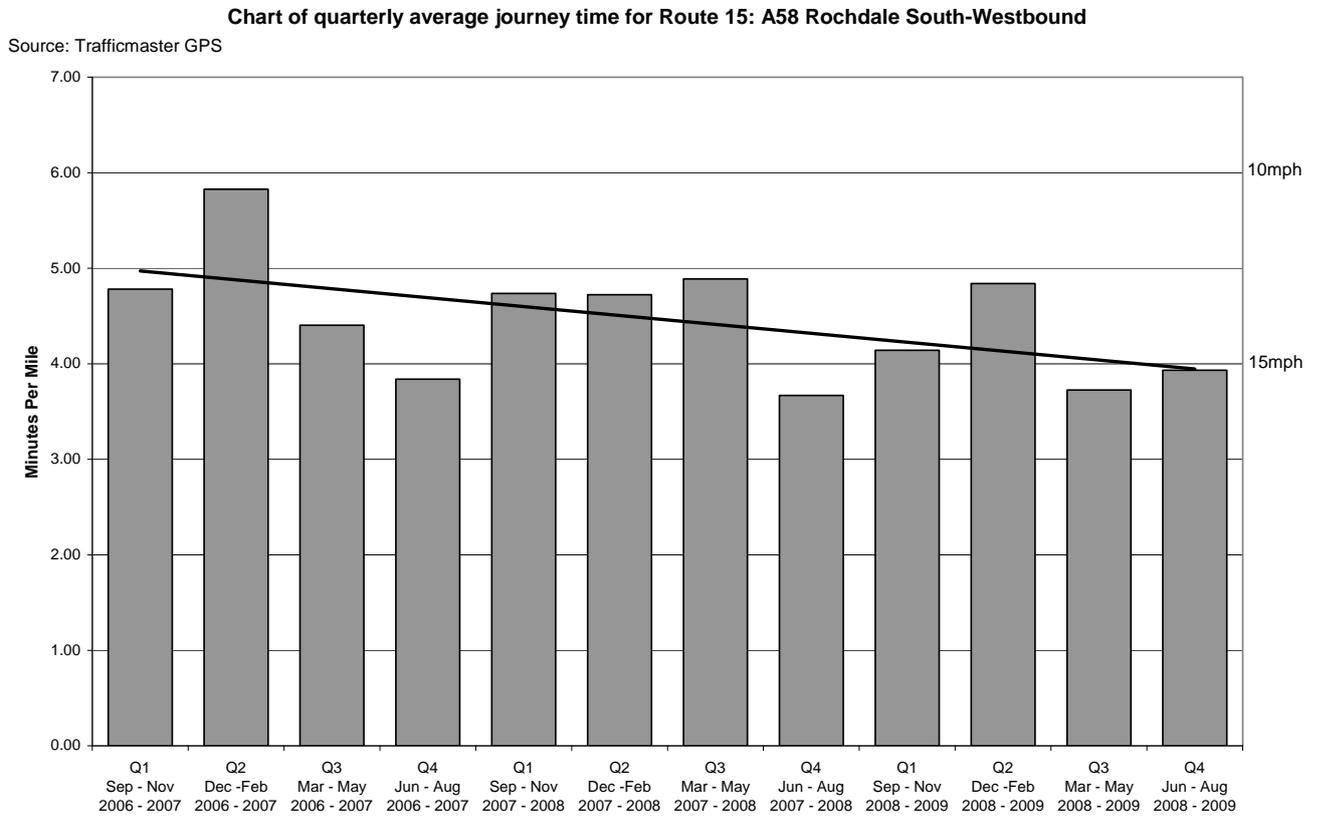
**Figure 30. Chart of the quarterly average journey time variability for Congestion Route 14: A665 Manchester North-Westbound during the morning peak in school term time.**



16.2 Figure 30 shows that journey time variability for Route 14 is inconsistent. In academic year 2006-2007 the coefficient of variation for September to November was 52%. This fell to 18% for December to February before increasing to 31% for March to May before again falling to 13% during June to August.

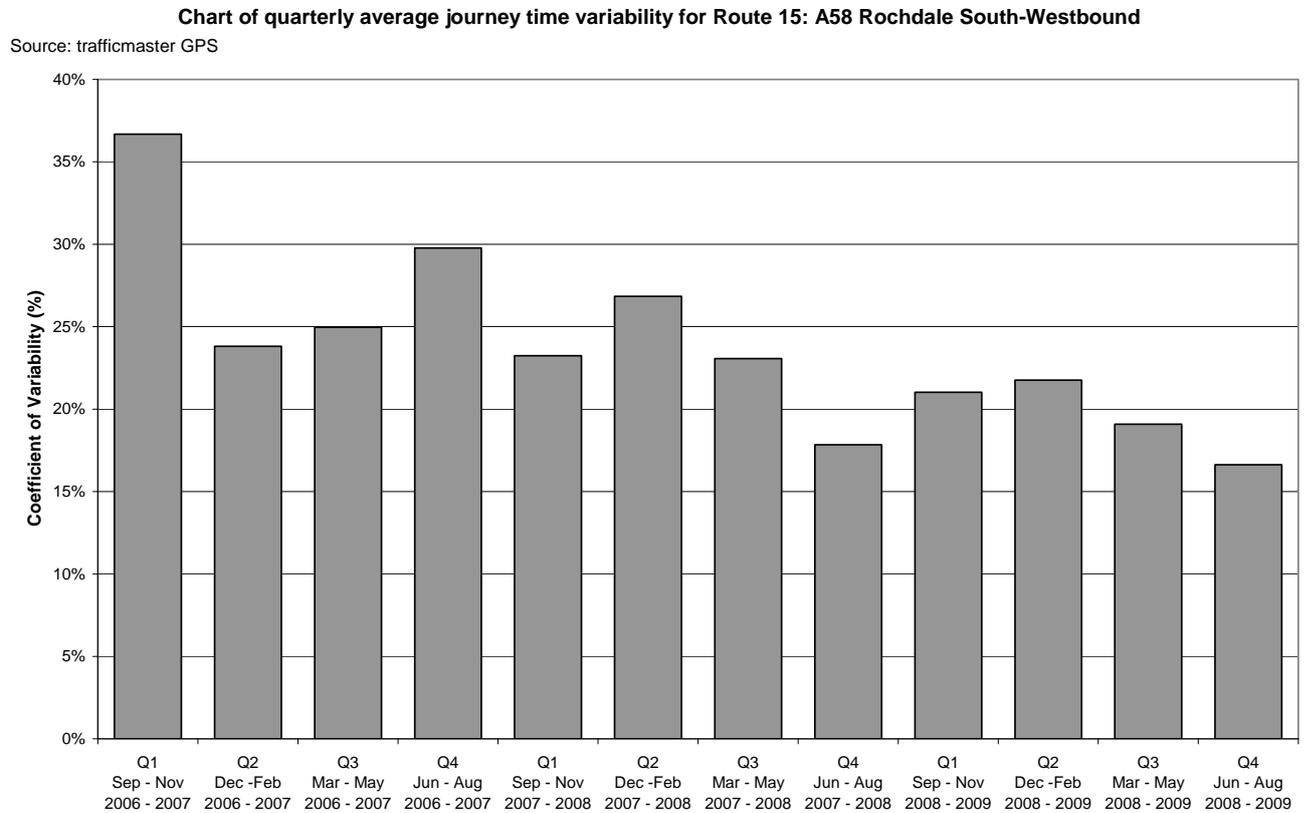
**17 Route 15: A58 Rochdale South-Westbound**

**Figure 31. Chart of the quarterly average journey times for Congestion Route 15: A58 Rochdale South-Westbound during the morning peak in school term time.**



17.1 Figure 15 shows the seasonal effect on journey times. Journey times during the summer months were comparatively lower while journey times during December to February.

**Figure 32. Chart of the quarterly average journey time variability for Congestion Route 15: A58 Rochdale South-Westbound during the morning peak in school term time.**



17.2 Figure 32 shows that journey time variability has been consistently lower since June to August 2008 than in the previous quarter covered by the chart.