



Department for Transport

Travel time measures for the Strategic Road Network and local 'A' roads, England: January to December 2018

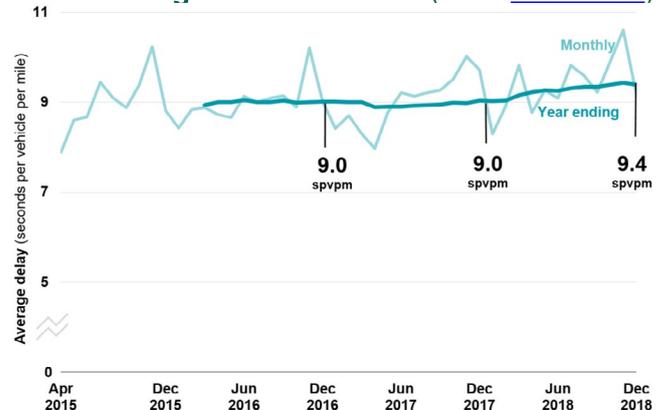
In 2018, average delay on the Strategic Road Network increased by 0.4 seconds per vehicle per mile (up 3.9%), and average delay on local 'A' roads increased by 0.4 seconds per vehicle per mile (0.8%).

Key Statistics

On the Strategic Road Network (SRN) in 2018:

- ▶ The **average delay** is estimated to be **9.4 seconds per vehicle per mile compared to speed limits**, a 3.9% increase on previous year.
- ▶ The **average speed was 59.0 mph**, down 0.6% on previous year.
- ▶ The reliability of travel times is measured using the Planning Time Index. This presents **68.4% of additional time needed compared to speed limits**, on average, on individual roads sections to ensure on time arrival. This is up 0.7 percentage points compared to the previous year.

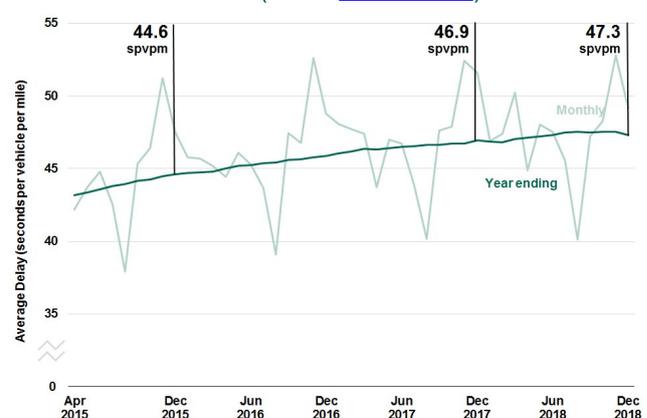
Figure 1: Average delay, compared to speed limits, on the Strategic Road Network (Table CGN0402a)



On local 'A' roads in 2018:

- ▶ The **average delay** is estimated to be **47.3 seconds per vehicle per mile compared to free flow**, a 0.8% increase on the previous year.
- ▶ The **average speed was 24.9 mph**, down 1.3% on the previous year.

Figure 2: Average delay, compared to free flow, on local 'A' roads (Table CGN0502a)



About this release

This statistical release presents information about travel times on Strategic Road Network (roads managed by Highways England) and local highway authority managed 'A' roads in England. The measures in this release are estimated using in-vehicle Global Positioning Systems. (GPS) observations.

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RESPONSIBLE STATISTICIAN:

Helen Sleight

Email: congestion.stats@dft.gov.uk

FURTHER INFORMATION:

Media: 020 7944 3066

Public: 020 7944 5850



Summary

Definitions

Average speed is in miles per hour and is an estimate of the physical level of congestion.

Free flow speed is the estimated speed of the traffic if there was no congestion. This is calculated differently for SRN and local 'A' roads.

Average delay is the difference between speed limit (SRN) or free flow (local 'A' roads) travel times and average journey times.

LCV - Light Commercial Vehicles

Strategic Road Network, in 2018

Average delay

seconds per vehicle per mile (spvpm)

9.4  **0.4** spvpm
3.9% increase on 2017

Reliability



68.4%
additional time is
needed compared to
speed limits

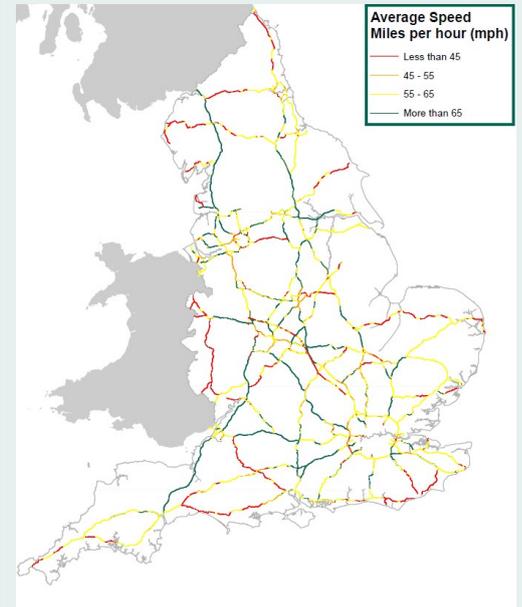
 up 0.7 percentage
points on 2017

Sample

100 %  Monthly average,
cars over 30,000 cars

Average speed

miles per hour (mph)



59.0  **0.4** mph
0.6% decrease on 2017

Local 'A' Roads, in 2018

Average delay

seconds per vehicle per mile (spvpm)

47.3  **0.4** spvpm
0.8% increase on 2017



Urban

80.5 spvpm



Rural

22.0 spvpm



Weekday morning
(7am - 10am)

56.9 spvpm



Weekday inter peak
(10am - 4 pm)

47.6 spvpm



Weekday evening
(4pm - 7pm)

66.4 spvpm



Weekday off peak
(7pm - 7 am)

20.4 spvpm

Sample



66%

34%



Monthly average, over 115,000 cars and LCVs

Average speed

miles per hour (mph)

24.9  **0.3** mph
1.3% decrease on 2017

Note about Strategic Road Network (SRN) and local 'A' road figures

This release brings together figures from the SRN and local 'A' roads. It presents an overview of the national measures for congestion across the two road networks and highlights methodological differences.

The figures produced in the publication are average measures across the whole network, therefore they are likely to differ from the average value of specific sections of road, time periods and vehicle types. Where breakdowns are presented for both local 'A' roads and SRN, there are some methodological differences (see [Background Quality Report](#)) so **figures should not be directly compared for the two road networks.**

Average delay is presented across all 24 hours of the day, on a seconds per vehicle per mile basis. It is important to note that road users often do not expect to encounter free flow conditions (particularly during peak times) and consciously build in additional time for their journey based on their own experience. As a result, drivers may perceive delay relative to their expected (or average) journey time rather than free flow conditions.

It should be emphasised that the reliability measure gives the additional journey time required to travel across one link across the network compared to free flow conditions, rather than expected total travel time. Therefore, if a user rarely experiences free flowing conditions on an individual road section during the daytime, 60% additional time compared to free flow on that road section, for example, may reflect a typical travel time to them. These figures are calculated across daytime hours (6am - 8pm) and not over all 24 hours of the day as with the other congestion measures.

When looking at the road level data associated with the maps be aware that the individual road sections are more sensitive to incidents (such as roadworks, accidents, extreme weather conditions) leading to greater possible variance year on year.

STRATEGIC ROAD NETWORK (SRN)

SRN background

The SRN accounts for less than 3% of the road network in England by length and carries around a third of all the traffic.

Geographical network for SRN

These travel time measures are based on data matched to Highways England's National Traffic Information Service (NTIS) network in England.

Introduction to average speed on SRN

This measure reflects the average speed of cars on the SRN across the entire day (24 hour period).

The measure weights speed observations from a sample of vehicles by associated traffic flows so that it is representative of traffic volumes on the roads in different locations and at different times of day (as for average delay).

SRN: Summary figures of average delay, speed and reliability

The summary table below (Figure 3) presents average speed and delay on the SRN in England for 2018. The values for the previous year (2017), and the percentage change in average speeds and delays are also shown.

Figure 3: Summary of recent changes in average speed, average delay compared to speed limit and reliability on SRN in England

(Tables [CGN0401a](#), [CGN0402a](#) and [CGN0403](#))

	Year ending Dec-2018	Year ending Dec-2017	% Change
Average speed (miles per hour)	59.0	59.4	⬇️ -0.6%
Average delay (seconds per vehicle per mile)	9.4	9.0	⬆️ 3.9%
Reliability (% additional time)	68.4%	67.7%	⬆️ 0.7pp

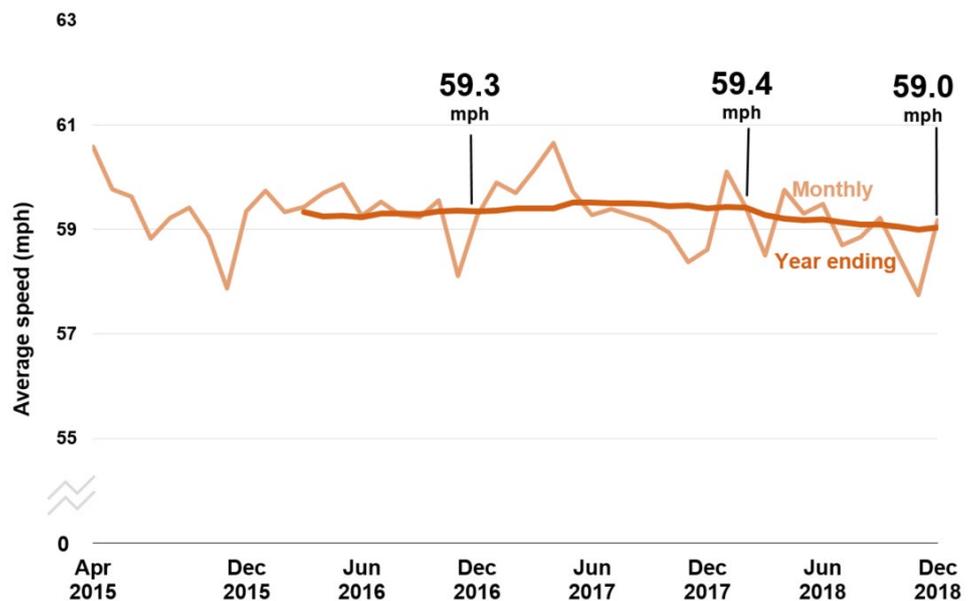
pp = percentage point

SRN: Average speed

For **2018**, the **average speed on the SRN** was **59.0 mph**. This is **0.6% down on 2017**, which means on average vehicles were moving at a slightly lower speed in 2018 compared to 2017.

The annual average speed remained levelled for the last 3 years, since December 2016 the average speed decreased by **0.3 mph**, which is a **0.5%** decrease.

Figure 4: Average speed on the Strategic Road Network (Table [CGN0401a](#))



Free Flow on SRN

Free flow travel times, which apply to both the average delay and reliability measures, are currently set equivalent to the speed limit, for each individual road section.

SRN: Average delay

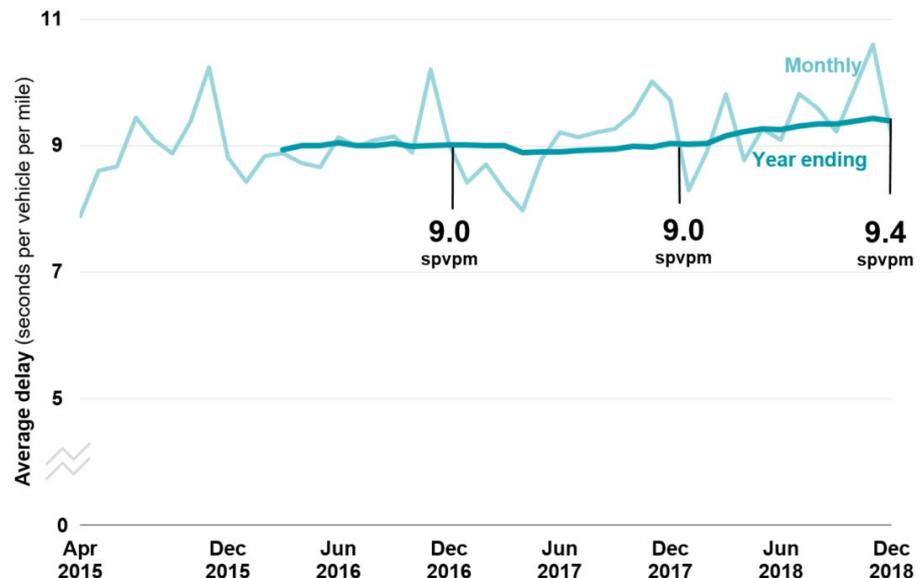
For **2018**, the **average delay on the SRN** is estimated to be **9.4 seconds per vehicle per mile (spvpm)** compared to speed limits. This is **3.9% higher compared to 2017**, which means on average there was more delay in 2018 compared to 2017.

The congestion data shows some seasonality particularly when we move to and from British Summer Time. The average delay is slightly higher when clocks go back at the end of October which might be attributed to darker mornings leading to people getting up later, therefore there are more people on the roads during peak time. In April, when we move to British Summer Time the average delay is slightly lower, which could be attributed to people getting up earlier as it is lighter so there is fewer people on the roads during peak time.

In March 2018 the average delay was higher (up 1.5 spvpm) compared to March 2017 which could be due to bad weather conditions (the “beast from the east”).

The annual average delay remained stable in the last 3 years, since December 2016 it increased by **0.4 spvpm (up 4.1%)**.

Figure 5: Average delay on the Strategic Road Network (Table [CGN0402a](#))



Average Delay Example

Consider a road section of 10 miles, with a free flow speed of 60 mph. If a vehicle was able to travel at the free flow speed, it would take 10 minutes to traverse this section of road

If, instead, the vehicle is only able to travel at an average speed of 50 mph, it would take 12 minutes to traverse the road section.

As this would take an extra 2 minutes (or 120 seconds) to travel the 10 miles, the average delay for this vehicle per mile would be 12 seconds.

Technical note for reliability on SRN

For reliability measure there are several further definitions. A 'journey' represents travel across one link on the network. An 'on time journey' is defined as one which is completed within a set reference time. Free flow reference times are based on actual speed limits.

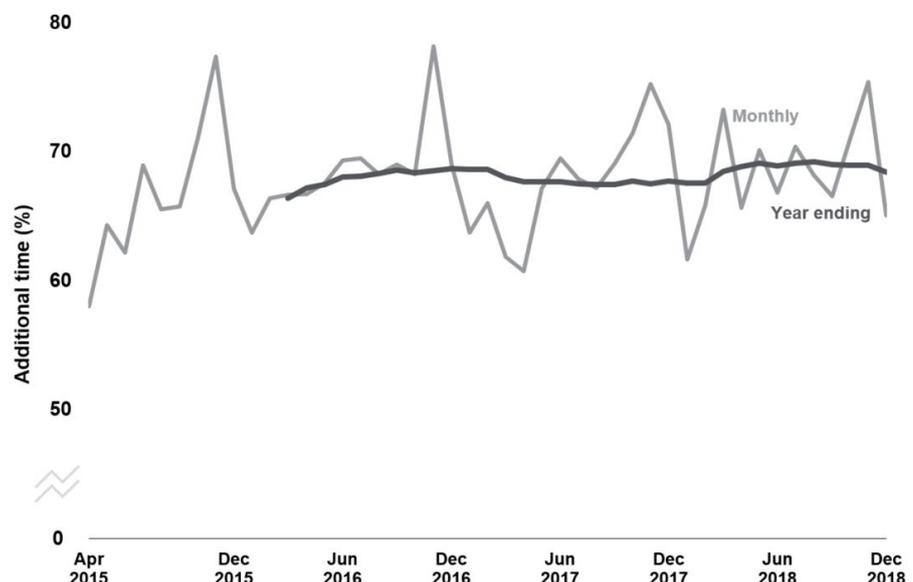
Unlike the average delay and average speed figures, which are calculated across all 24 hours of the day, the reliability figures are calculated across daytime hours (6am to 8pm) - where network demand is at its highest.

SRN: Reliability

For 2018, on average, **68.4% of additional time was required compared to speed limits**, to ensure on time arrival on individual road sections of the SRN. This is **up 0.7 percentage points** compared to 2017, so on average, a **slightly higher proportion of additional time** is required to ensure on time arrival. This means on average the network is slightly less reliable.

Since December 2016 the index of reliability decreased by **0.3 percentage points** compared to December 2018, so on average a **slightly lower proportion of additional time** was required to ensure on time arrival.

Figure 6: Additional time needed compared to free flow to ensure on time arrival on the Strategic Road Network (Table [CGN0403](#))



The Planning Time Index (PTI or Reliability) monitors the amount of time that would need to be added to speed limits travel times to have a 95% chance of a journey arriving at a destination on time. This is measured as a percentage.

Reliability on the SRN as a whole is calculated by averaging the Planning Time Index (PTI) across individual road sections, weighting by daytime (6am to 8pm) traffic flows for each section. The PTI does not represent the reliability of start to end journeys, across several road sections.

Reliability Example

As an illustrative case, consider an individual road section with a PTI of 60%, for a given year. If the travel time for this section in free flow conditions is 10 minutes, 95% of users leaving 16 minutes to traverse that road section would have arrived on time. Equivalently, users leaving 16 minutes to traverse the same road section would have been on time 19 times out of 20 in the year.

Junction level figures

While changes in speed and delay between years may appear large in some cases, the variations should be interpreted with caution. When travel time figures are based on data from a single road they are more sensitive to disturbances such as road works and other local events. Therefore, road level speed and delay are expected to have greater variation from year to year than national figures.

Junction level tables

Travel time measures for individual junctions on the SRN are available from 2017 onwards.

The annual **average speed** and **Average delay** for individual junctions can be found in Tables [CGN0401b](#) and [CGN0402b](#)

SRN: Junction level travel time measures

Figure 7 shows the average delay on the SRN in England at a junction level to give more granularity.

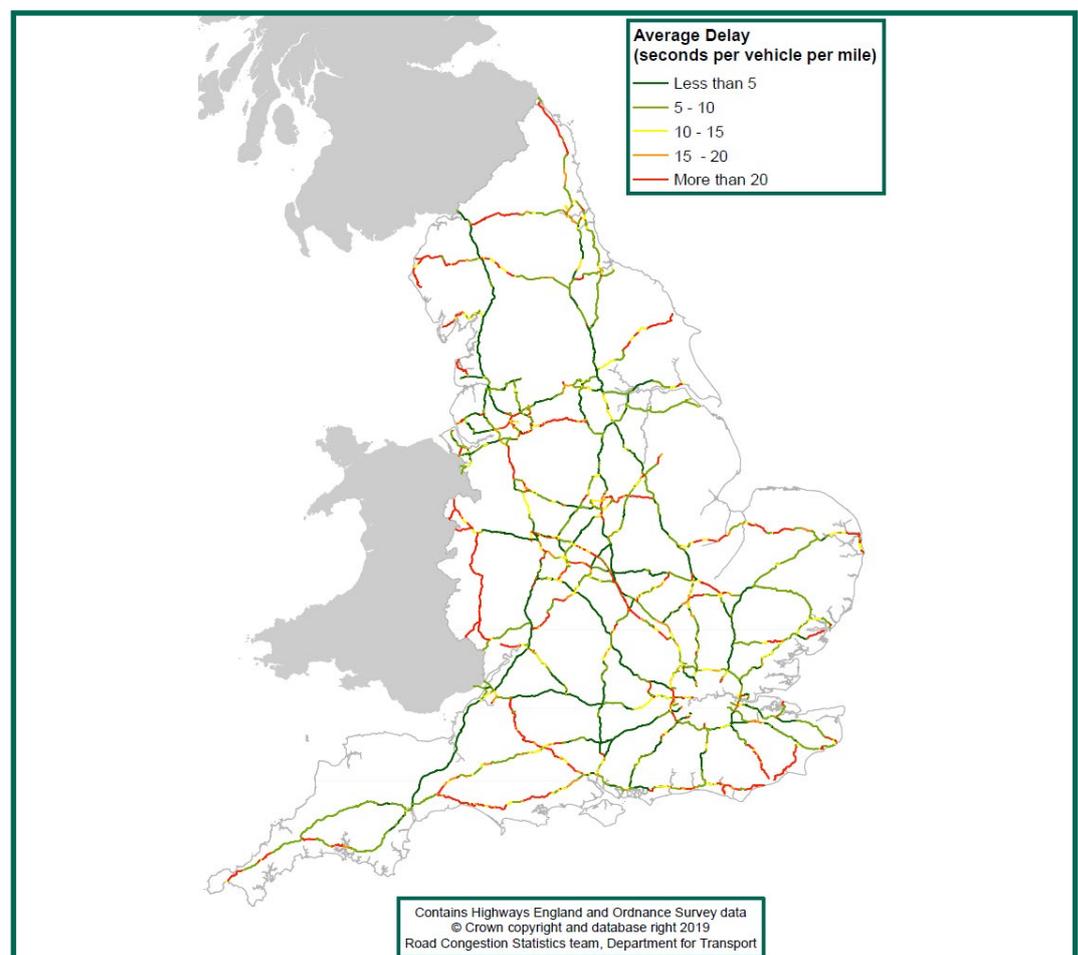
Average speed

For the majority of junctions the average speed was over 50mph, in 2018. However there are few roads where the average speed is below the national average, less than 45mph such as the A1 in the North East, A66 in the North West, A47 in the East of England, A49 in the West Midlands, A21 in the South East and A36 in the South West. This might be due to the road type, as it is harder to achieve a high speed on a single carriageway.

Average Delay

In line with the national figure, the average delay on individual junctions is less than 10 seconds across England in 2018. Around major cities, the delay is around 20 spvpm, this could be due to the high demand on the network around them relative to their capacity. There are few roads such as mentioned above where the average delay is more than twice the national average (over 20 spvpm), these are mainly single carriageways where disruptions have more of an impact.

Figure 7: Average delay on the Strategic Road Network in England, 2018



Local 'A' roads fact

The local 'A' road network accounts for around 10% of all English roads by length, but carries around a third of all traffic.

Local 'A' roads: Summary figures of average speed and delay

The summary table below (Figure 8) presents average speed and delay on local 'A' roads in England, for specified time periods and by road type, in 2018. The value for the previous year (2017), and the percentage change in average speeds and delays are also shown.

Figure 8: Summary of recent changes in average speed and average delay compared to free flow on local 'A' roads in England

(Tables [CGN0501a](#) and [CGN0502a](#))

	Year ending Dec-18	Year ending Dec-17	% Change
Average speed (miles per hour)			
All day (24 hour period)	24.9	25.2	⬇️ -1.3%
Time periods			
Weekday morning peak (7am-10am)	23.3	23.7	⬇️ -1.6%
Weekday inter peak (10am-4pm)	24.8	25.1	⬇️ -1.4%
Weekday evening peak (4pm-7pm)	21.9	22.2	⬇️ -1.3%
Weekday off peak (7pm-7am)	30.7	31.0	⬇️ -1.0%
Road classification			
Urban roads	17.8	18.4	⬇️ -3.3%
Rural roads	35.5	36.2	⬇️ -2.0%
Average delay (seconds per vehicle per mile)			
All day (24 hour period)	47.3	46.9	⬆️ 0.8%
Peak times			
Weekday morning peak (7am-10am)	56.9	56.1	⬆️ 1.5%
Weekday inter peak (10am-4pm)	47.6	47.1	⬆️ 1.1%
Weekday evening (4pm-7pm)	66.4	65.8	⬆️ 0.9%
Weekday off peak (7pm-7am)	20.4	20.7	⬇️ -1.4%
Road classification			
Urban roads	80.5	77.5	⬆️ 3.9%
Rural roads	22.0	21.6	⬆️ 2.0%

Introduction to average speed on local 'A' roads

This measure reflects the average speed of vehicles on local 'A' roads across the entire day (24 hour period).

The measure weights speed observations from a sample of vehicles by associated traffic flows so that it is representative of traffic volumes on the roads in different locations and at different times of day (as for average delay). The weighting for local 'A' roads also weights by hour, day type, month, urban and rural classification and local authority.

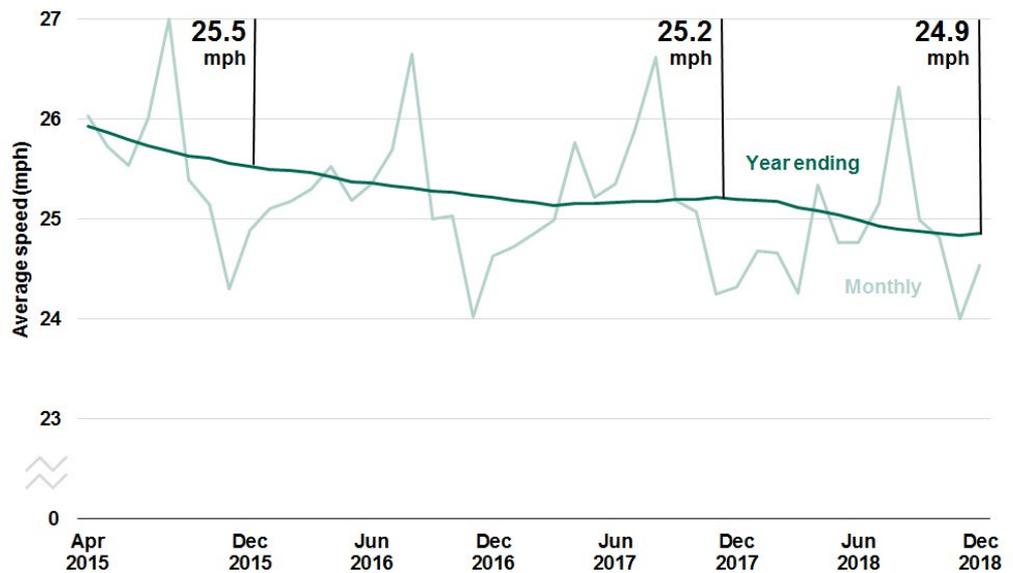
Local 'A' roads: Average speed

National overview of average speed

The **average speed on local 'A' roads in England** across 24 hours in **2018** is estimated to be **24.9 mph**. There has been a small decrease in average speed compared to the previous year (**down 0.3 mph**), which means vehicles were moving slower on average.

In March 2018 monthly speed dropped to 24.3 mph, this may be attributed to adverse weather conditions at this time.

Figure 9: Average speed on local 'A' roads in England (Table [CGN0501a](#))



Between 2015 and 2018, average speeds (across the entire 24 hour period) have decreased by 0.7 mph (or 2.6%).

Geographical network for local 'A' roads

These travel time measures are based on data matched to the Ordnance Survey ITN Mastermap representation of the local 'A' road network in England.

Average speed at peak times

Average speeds on local 'A' roads during the **weekday morning peak** (7am to 10am) and the **weekday evening peak** (4pm to 7pm) were **23.3 mph** and **21.9 mph**, respectively, in 2018.

Since 2015, decreases in average speed have been observed during both the weekday morning peak (7am to 10am) and the weekday evening peak (4pm to 7pm). Over this time period, the decrease in average speed was greater for morning peak (3.1%) than for evening peak (2.7%).

Figures for inter peak (10am to 4pm) and off peak (weekdays 7pm to 7am) are available from 2017 and onwards. Average speeds on local 'A' roads were **24.8 mph** at **inter peak** periods and **30.7 mph off peak** in 2018.

LOCAL 'A' ROADS

Definition

For statistical purposes, DfT defines 'urban' roads to be those within a settlement of 10,000 people or more. This is consistent with the [Rural and Urban Area Classification 2011](#). All other roads are defined as 'rural'.

Free flow on local 'A' roads

Free flow travel times (used to calculate the average delay measure) are currently calculated using the 85th percentile speed observation, for each individual road section. These are 'capped' at national speed limits.

Average speed on urban and rural roads

On **urban classified local 'A' roads**, average speeds were **17.8 mph** in 2018, compared to **35.5 mph on rural local 'A' roads**.

Since 2015, there has been a reduction in average speed for both urban and rural local 'A' roads (0.9 and 1.4 mph respectively). However, drivers on urban and rural local 'A' roads may perceive the changes in speed levels differently. While drivers on rural roads have seen the largest reduction in speed, the percentage change is greater for urban roads (a decrease of 4.7%) compared to rural roads (a decrease of 3.8%).

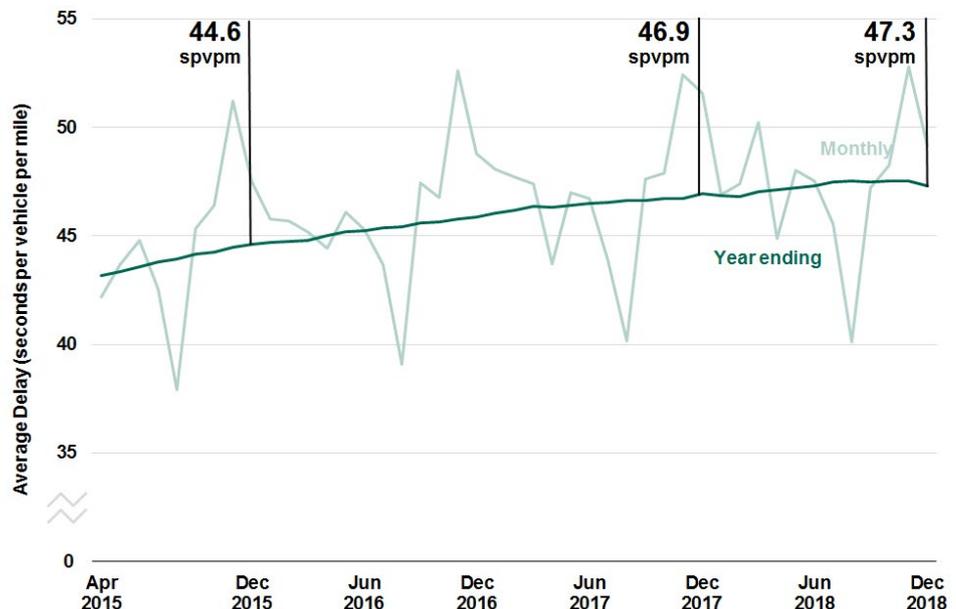
Local 'A' roads: Average delay

National overview of average delay

The **average delay on local 'A' roads in England** across 24 hours in **2018** is estimated to be **47.3 seconds per vehicle per mile (spvpm)** compared to free flow. This is a 0.4 spvpm increase or **0.8% increase** compared to 2017, which means that on average there was more delay.

In the last four years, up to December 2018, average delay compared to free flow has increased by 2.7 spvpm (or 6.0%), since December 2015.

Figure 10: Average delay on Local 'A' roads (Table [CGN0502a](#))



Average delay at peak times

In 2018, average delay on local 'A' roads during the **weekday morning peak** (7am to 10am) was **56.9 spvpm** and **weekday evening peak** (4pm to 7pm) was **66.4 spvpm** compared to free flow. This represents a 0.8 spvpm (or 1.5%) increase for weekday morning peak, and a 0.6 spvpm (or 0.9%) increase for weekday evening peak, compared with 2017.

Since 2015, average delay during weekday morning peak has increased by 3.7 spvpm (6.9%). Average delay during the weekday evening peak has increased by 3.4 spvpm (5.3%) over the same time period.

Outside of peak hours, delay in the **inter peak** period (10am to 4pm) increased to **47.6 spvpm** (up 1.1%) in 2018. The weekday off peak period (7pm to 7am) was the only delay figure that saw a decrease in 2018. **Off peak** delay was **20.4 spvpm** in 2018, down 1.4% compared to 2017.

Local 'A' roads fact

Almost one third of the English local 'A' road network is classified as urban with the remaining two-thirds classified as rural.

Average delay on urban and rural roads

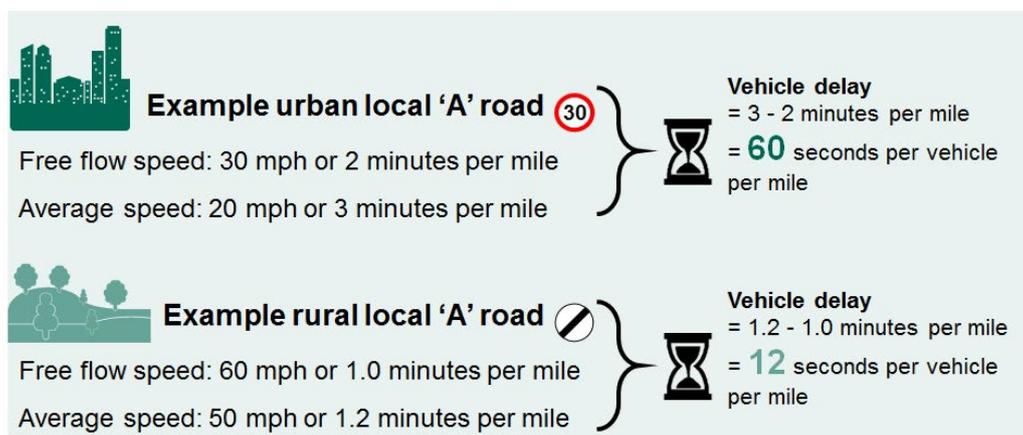
On **urban classified local 'A' roads**, average delay was **80.5 spvpm** in 2018, compared to **22.0 spvpm** on **rural classified local 'A' roads**.

Since December 2015, this represents a rise in average delay of 6.5 spvpm (or 8.8%) on urban local 'A' roads and 2.3 spvpm (or 11.7%) on rural local 'A' roads.

Example: Average delay on urban and rural local 'A' roads

It is important to note that urban roads generally have lower free flow speeds than rural roads. As a result, a fixed absolute decrease in observed speeds will generally translate into a higher level of delay on urban roads relative to rural roads. An example of this is illustrated in Figure 11.

Figure 11: Illustrative example of average delay on urban and rural local 'A' roads



Regional and Local Highway Authority figures

The annual **average speed** for each region and local highway authority can be found in Table [CGN0501b](#).

The annual **average delay** for each region and local highway authority can be found in Table [CGN0502b](#).

Local 'A' roads: Local authority travel time measures

Average speed

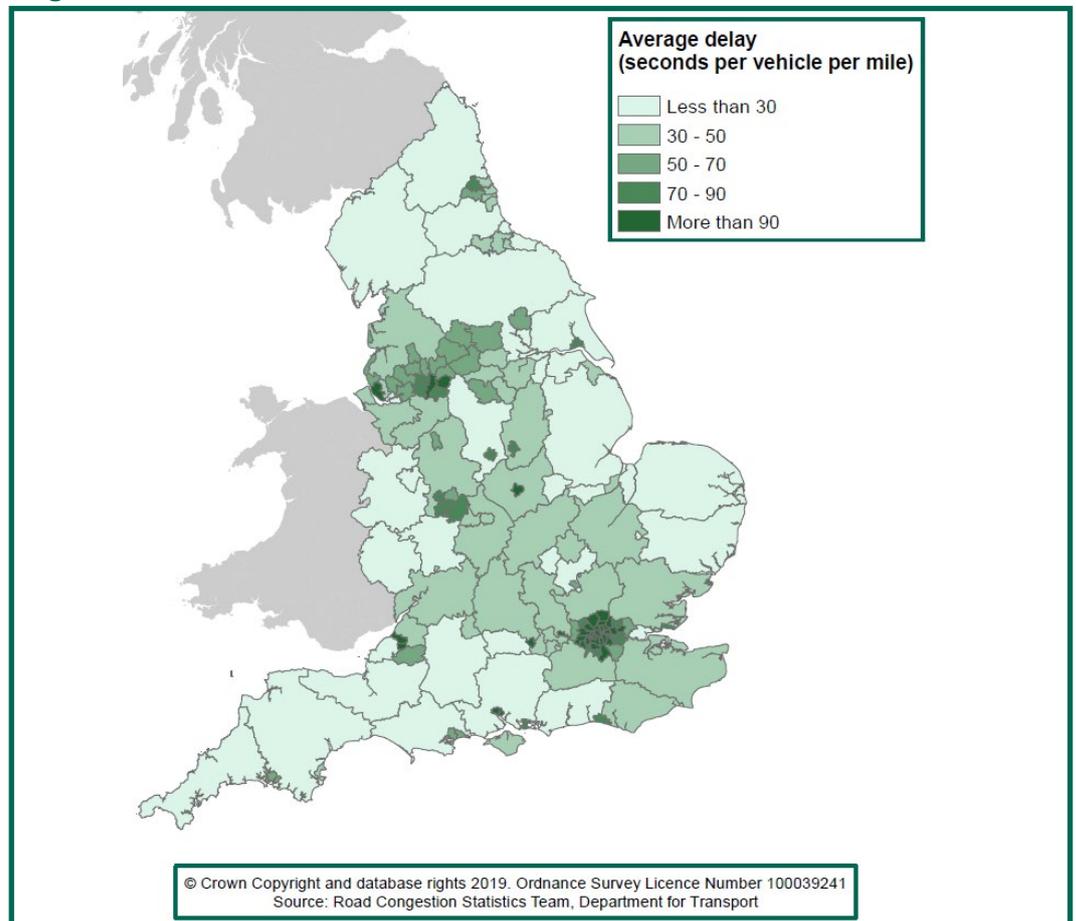
Whilst the average speed at the national level saw a slight decrease in 2018, and the overall trend at the regional level is a decrease in speed, there were significant variations between regions. North West and South East experienced a decline in average speed of 0.5% or less, whereas London saw a decrease of 11.3% in average speed. All other regions saw little overall change.

Average delay

In line with the national figures, average delay has risen in most regions across England in 2018. London remains the region with the highest level of average delay (116.7 spvpm) as well as the region with the highest increase in delay (up 14.5% compared to 2017). East Midlands, West Midlands, and Yorkshire and the Humber all had an increase in delay of 2.5% or more. Everywhere else saw no or minor increases in delay.

The average delay on local 'A' roads in each local authority for 2018 is shown in Figure 12. Overall, levels of average delay are generally higher in local highway authorities within and close to major urban centres.

Figure 12: Average delay on local 'A' roads by local highways authority in England, 2018



Understanding road level figures

While changes in speed and delay between years may appear large in some cases, the variations should be interpreted with caution. When travel time figures are based on data from a single road they are more sensitive to disturbances such as road works and other local events. Therefore, road level speed and delay are expected to have greater variation from year to year than e.g. regional figures.

Road level speed and delay

Travel time measures for individual local 'A' roads are available from 2017 onwards.

The annual **average speed** and **average delay** for individual roads can be found in Tables [CGN0501c](#) and [CGN0502c](#).

Local 'A' roads: Road level travel time measures

This section provides a further breakdown in the form of road level travel time measures. On page 14 is a map (figure 13) showing the average delay on the local 'A' roads network.

Average speed

Overall, roads in Greater London are more likely to have a large percentage reduction in speed between years, while the decrease in speed is smaller. For example A4 in Westminster, where speed was reduced from 8.8 mph to 6.4 mph between 2017 and 2018, a small decrease in absolute terms but equivalent to a 26.6% decrease. In contrast, over the same time period A53 in Derbyshire saw a reduction in speed from 32.4 mph to 24.9 mph, which is equivalent to a 23.2% decrease. While the two examples show a similar percentage change in speed, a driver on the A53 will likely perceive the decrease in speed as more significant.

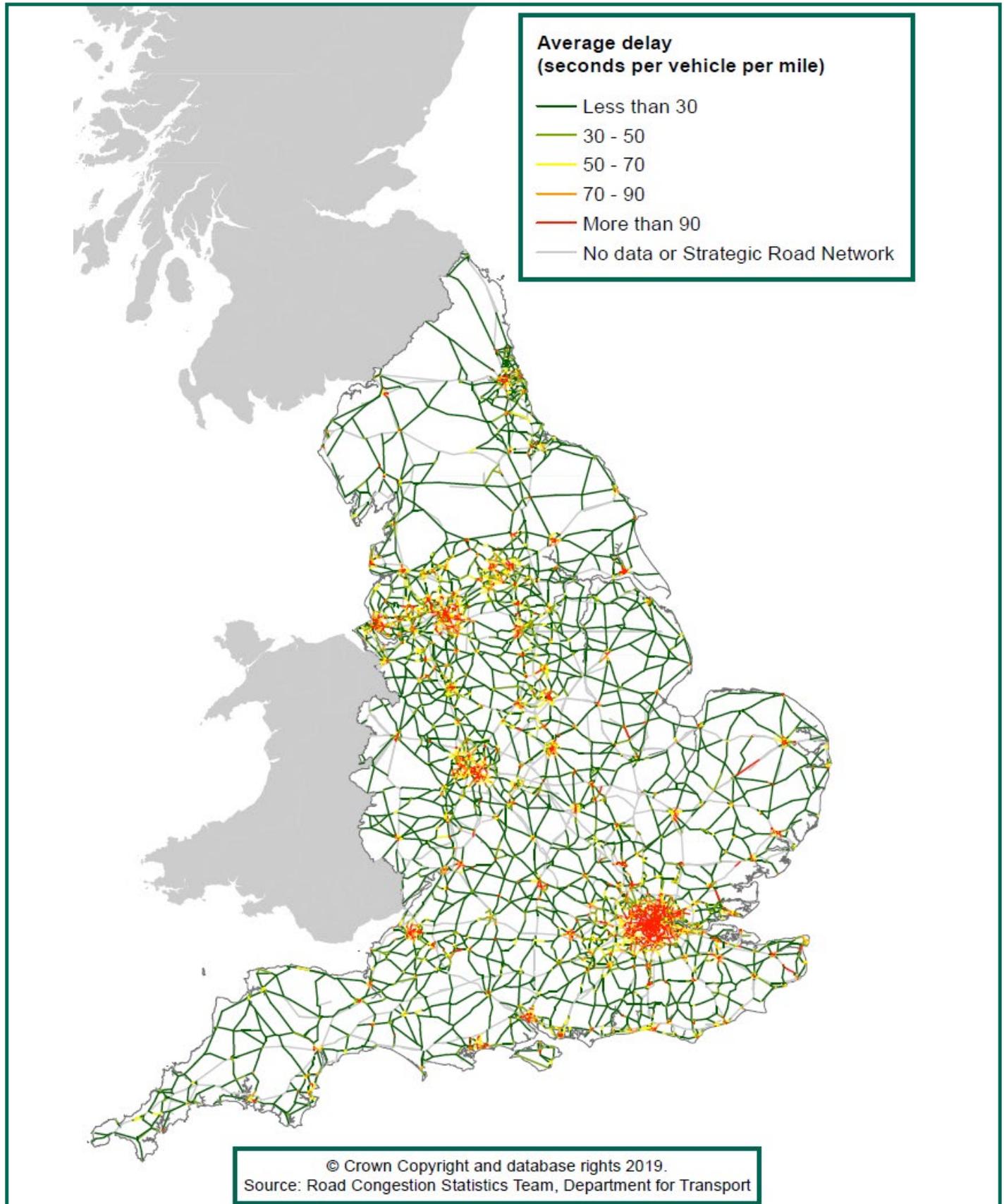
Examples of roads that saw large increases in speed between 2017 and 2018 include: A1016 in Essex (up 10.0 mph); A562 in Halton (up 7.6 mph); and A465 in County of Herefordshire (up 7.3 mph).

Average delay

The average delay on local 'A' roads in England 2018 is shown in figure 13 (overleaf). Generally, the highest levels of average delay occur around larger urban centres, with delay often over 70 spvpm. Drivers on rural roads typically experienced delays of less than 30 spvpm.

Among roads that had large decreases in delay between 2017 and 2018 are: A548 in Cheshire West and Chester (down 30.8 spvpm); A185 in Gateshead (down 32.6 spvpm); and A226 in Medway (down 78.8 spvpm).

Figure 13: Average delay on local 'A' roads in England, 2018



Request for feedback



We are keen to receive feedback from users of transport statistics. If you have any comments about how the statistics in this release are presented or analysed, please contact us using the details listed on the front page of this release.

National Statistics



National Statistics are produced to high professional standards set out in the [Code of Practice](#) for Statistics. They undergo regular quality assurance reviews to ensure they meet customer needs.

Details of ministers and officials who receive pre-release access to these statistics up to 24 hours before release can be found [here](#).

Context and user feedback

Measures for the Strategic Road Network (SRN) were developed as part of the first Road Investment Strategy (RIS1), which sets out a long-term programme for England's SRN.

The local 'A' road measures presented in this release were developed to provide a more complete picture of travel times on local 'A' roads and also to align with measures introduced for the SRN.

Following user feedback this release has developed the statistics to include junction/road level data for the SRN and local 'A' roads. The local 'A' roads tables now include breakdowns for inter- and off-peak average speed and delay at a national level.

We will continue to review the content and presentation of these statistics, which we expect to develop further over time. Please contact us using the details at the bottom of the front page with any feedback you have, or if you would like further information.

Methodology and technical details

1. It is important to note that although there are figures for average speed and average delay on both networks, they are not directly comparable. A full explanation and further information on the data used, methodology, quality assurance and other sources of data can be found in the [Background Quality Report](#).

Revision Note

A discrepancy of vehicle type misclassification has been identified in the GPS dataset. These discrepancies were confirmed as issues in the data from 2012 onwards.

DfT, Highways England and Teletrac Navman have been working together to resolve this issue. The vehicle classification file was reviewed and updated, with 2018 data reprocessed. Figure 14 (overleaf) shows the changes to the published provisional quarterly statistics from 2018.

A new process of utilising the most up to date vehicle classification has been put in place. It has been determined that all live table releases during the year will be treated as provisional until the final annual statistical publication, in order to allow for updates to be incorporated.

Figure 14: Tables comparing published and revised congestion data, 2018

	Comparison of Published and Revised Average Speed, 2018					
	SRN			Local 'A' Roads		
	Original	Revised	Change	Original	Revised	Change
January 2018	60.0	60.1	-0.1	24.8	24.7	0.1
February 2018	59.2	59.4	-0.2	24.8	24.7	0.1
March 2018	58.4	58.5	-0.1	24.3	24.3	0.0
April 2018	59.6	59.8	-0.2	25.4	25.3	0.1
May 2018	59.1	59.3	-0.2	24.9	24.8	0.1
June 2018	59.3	59.5	-0.2	24.9	24.8	0.1
July 2018	58.7	58.7	0.0	25.3	25.2	0.1
August 2018	58.9	58.9	0.0	26.4	26.3	0.1
September 2018	59.2	59.2	0.0	25.1	25.0	0.1

	Comparison of Published and Revised Average Delay, 2018					
	SRN			Local 'A' Roads		
	Original	Revised	Change	Original	Revised	Change
January 2018	8.4	8.3	0.1	46.6	46.9	-0.3
February 2018	9.0	8.9	0.1	47.1	47.4	-0.3
March 2018	9.9	9.8	0.1	49.9	50.2	-0.3
April 2018	8.9	8.8	0.1	44.5	44.9	-0.4
May 2018	9.4	9.3	0.1	47.7	48.0	-0.3
June 2018	9.2	9.1	0.1	47.2	47.5	-0.3
July 2018	9.8	9.8	0.0	45.2	45.6	-0.4
August 2018	9.6	9.6	0.0	39.8	40.1	-0.3
September 2018	9.2	9.2	0.0	46.9	47.2	-0.3

Next update

The next tables in this series are expected to be published in June 2018. This will contain monthly, and annual (year ending) figures, for the period April 2018 to March 2019. This will include new figures for the period January to March 2019.

The next written report is expected to be published in February 2020, and will contain annual figures for 2019.

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