

September  
2024

# Wales 20mph First Year Analysis

Independent analysis of vehicle speeds in the first year after the implementation of a default 20mph speed limit in Wales



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## INTRODUCTION

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On the 17<sup>th</sup> September 2023 the default urban speed limit in Wales changed to 20mph from the existing 30mph on ‘restricted’ roads (usually those with streetlights). On the 25<sup>th</sup> September 2023 Agilysis published a report<sup>1</sup> analysing the change in speeds on nearly 500km (310 miles) of roads in ten Welsh towns and cities that demonstrated a 2.9mph drop in average (median) speeds. This groundbreaking research used data from the mapping company TomTom collected from hundreds of thousands of journeys in the period immediately after the change.

Measured speeds dropped from an average of 22.7mph down to 19.8mph in the analysis period immediately after the change. Following publication of the results there has been considerable debate about the policy, implementation, and long-term benefits.

Data published by the Welsh Government comparing casualty statistics for the first six months of the change, compared with the same period in the previous year indicated a drop in casualties. In Q4 2023 there were 32% fewer casualties on 20 / 30 mph roads than in Q4 2022. In Q1 2024, the comparison with Q1 2023 showed a decrease of 26%. Once further data are available it will be possible to carry out a more detailed analysis of the statistics to understand more about changes in casualty severity

Agilysis have now undertaken another, independent analysis of vehicle speeds on the same roads as studied in the previous analysis to see what the impact has been one year after the change. As well as updating the headline data, this report also reviews which types of roads have seen the greatest change in speeds by reviewing impact based on previous speeds in one mile per hour bands.

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<sup>1</sup> <https://agilysis.co.uk/2023/09/25/wales20/>

Since producing the initial report, Agilysis have begun working with several other authorities to understand the impact of 20mph implementation, as well as other changes to road networks. For more information about our products and services visit <https://agilysis.co.uk/trafficsights/>

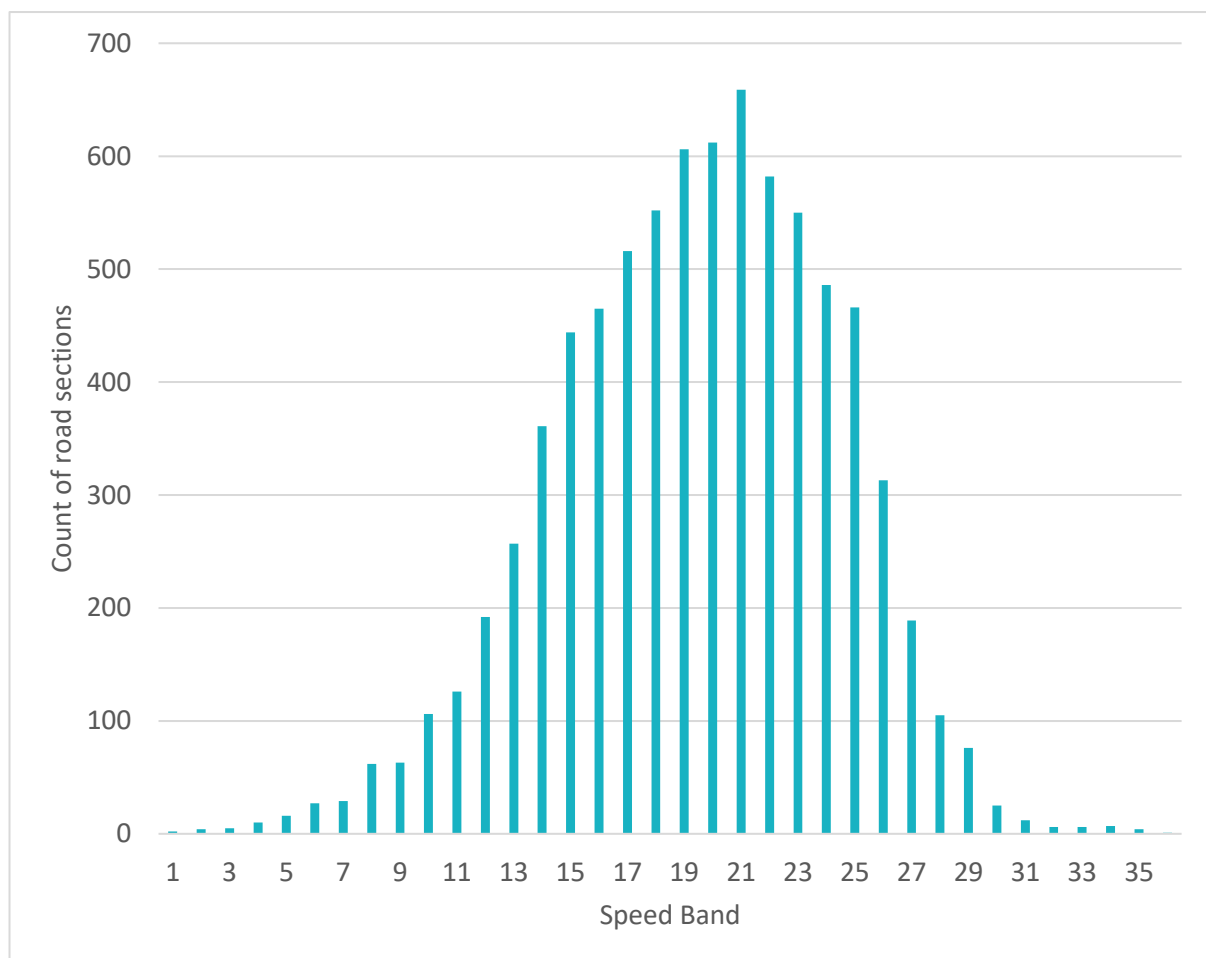
## METHODOLOGY

The methodology for our work has been set out in detail in the previous publication<sup>2</sup> and included in this report as an appendix. The selected roads have remained the same and the selection criteria (weekdays, 6am – 6pm) is consistent. The dates included in the analysis were the 9<sup>th</sup> – 13<sup>th</sup> September 2024 which correlates most closely to the ‘before implementation’ period used previously.

The first calculation was to estimate the average speed (median) on roads in the sample area in this period and compare them to the previous analysis. This means we now have four time periods to consider; one week prior to the change in limits, one week after, three months after, and one year after.

The second analysis is a new approach to assess the change in speeds based on grouping roads by their previous recorded speeds in one mile per hour bands. Data for over 10,000 road links were grouped by 1 mph which were distributed as shown in Figure 1. Data for speeds pre-implementation were compared with those after one year.

*Figure 1 – Number of roads sections by speed band*



<sup>2</sup> <https://agilysis.co.uk/download/165/white-papers-reports/7353/wales-20mph-impact-analysis-report.pdf>

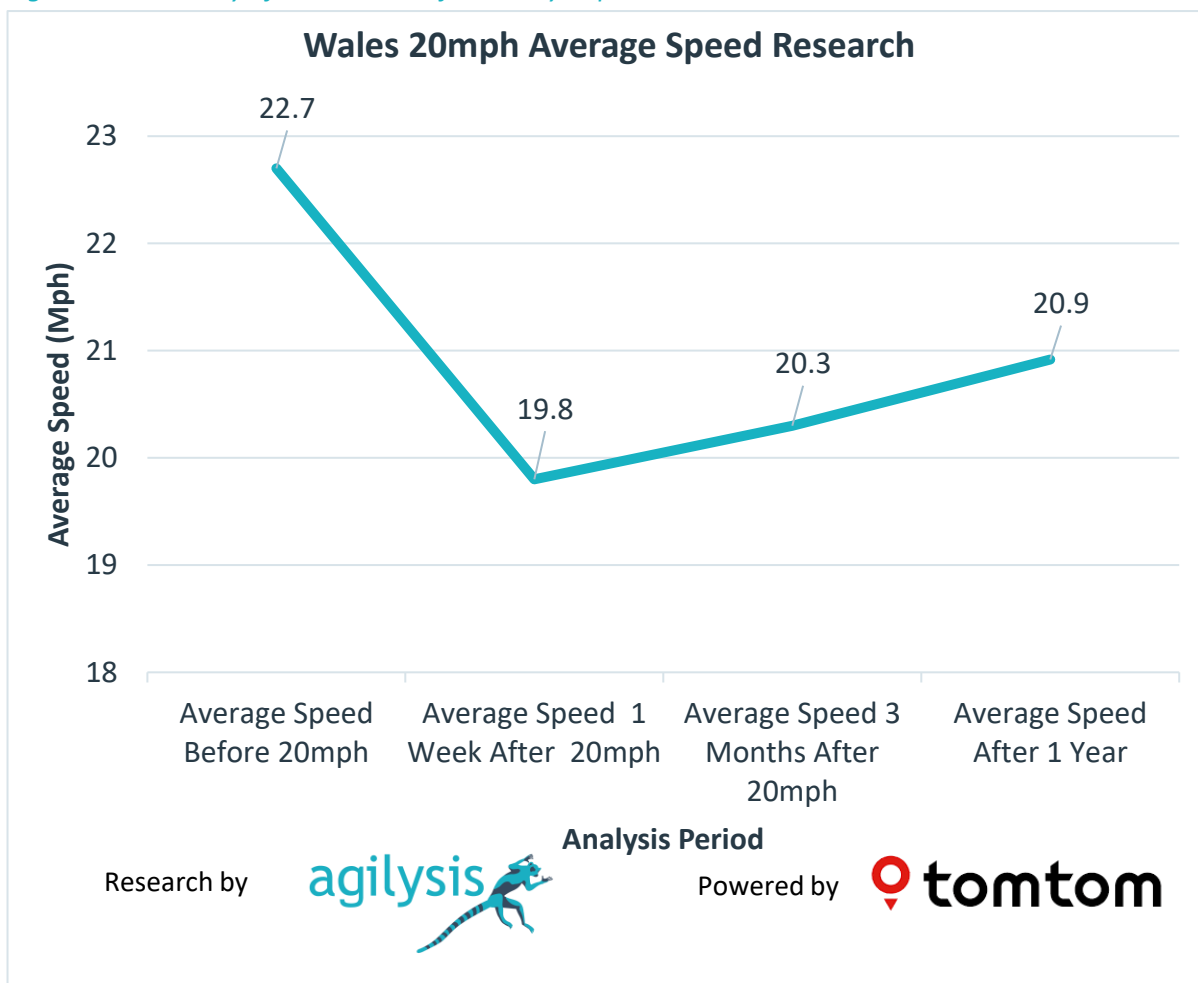
## RESULTS

### CHANGES IN AVERAGE SPEEDS

The results of the one-year-post-change speed analysis (Figure 2) shows that, compared to speeds when the limit was 30mph, there has been a long-term reduction of 1.8mph. Immediately after the change in limit, speeds were down by 2.9mph and the trend over time shows there has been a moderate increase in speeds. This reduction aligns with results seen elsewhere in Great Britain and Europe, as shown in the LUSTRE report produced by PACTS in 2023<sup>3</sup>. It is worth noting that our research included a wide variety of roads with traffic flows as low as ~800 vehicles per day. Other analysis of speeds tend to focus on roads with higher traffic volumes and higher pre-implementation speeds.

An analysis of changes in vehicle speeds by location has also been included in the report. Although the road lengths are lower, and attract lower sample sizes, they do demonstrate significant differences in speed reductions and residual average speeds. Merthyr Tydfil has the lowest reduction in speeds (0.3mph) with Rhyl & Prestatyn seeing the greatest reduction. The average speed values in September 2024 across the sample areas in Wales are 20.9mph with fluctuations of around 1mph in individual areas.

Figure 2 – Summary of results in the four analysis periods



<sup>3</sup> <https://www.pacts.org.uk/wp-content/uploads/Lustre-Report-2023-Funded-by-the-RST.pdf>

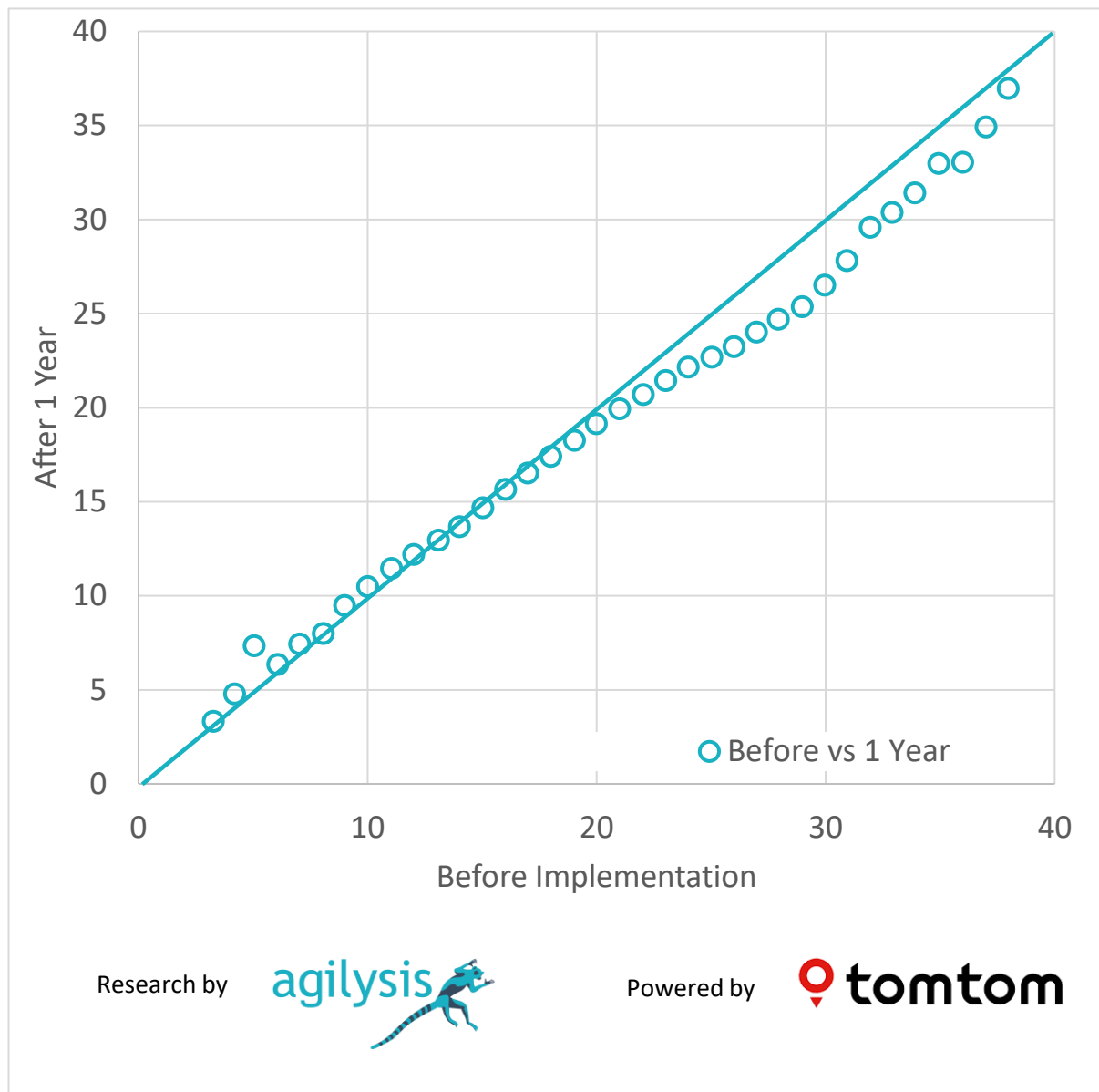
Table 1 – Summary of results in the four analysis periods

	Average Speed Before 20mph	Average Speed 1 Week After 20mph	Average Speed 3 Months After 20mph	Average Speed After 1 Year	1 Year Change (MPH)
<b>Bangor</b>	22.0	18.7	18.8	19.8	-2.2
<b>Cardiff</b>	22.6	19.7	20.3	20.9	-1.6
<b>Haverfordwest</b>	22.9	19.8	20.9	21.3	-1.6
<b>Lampeter</b>	23.7	20.5	21.2	21.5	-2.1
<b>Merthyr Tydfill</b>	22.2	20.9	20.9	21.9	-0.3
<b>Newport</b>	22.8	19.5	20.3	21.1	-1.7
<b>Newtown</b>	21.2	18.6	18.6	19.1	-2.1
<b>Rhyl &amp; Prestatyn</b>	23.2	19.6	20.4	20.7	-2.5
<b>Swansea</b>	22.1	20.5	20.5	21.0	-1.2
<b>Wrexham</b>	23.2	19.6	20.4	20.9	-2.3
<b>Wales Average</b>	<b>22.7</b>	<b>19.8</b>	<b>20.3</b>	<b>20.9</b>	<b>-1.8</b>

#### RELATIVE CHANGES IN AVERAGE SPEEDS FOR SPEED BANDS

In this research update we have chosen to look at how speeds have changed relative to the pre-implementation speed in 1mph increments or bands. This analysis (Figure 3) groups roads according to the pre-implementation speed and then reviews the average change in speeds after one year. In Figure 3, the solid line represents no change in speed, and the circles represent observed change for each 1mph speed band. As expected, roads where speeds were already below 20mph show little or no change, and the greatest reduction appears to be in the range of 25-30mph. Beyond this, roads with much higher pre-implementation speeds, results are less pronounced. Understanding this phenomenon requires further analysis and review of individual roads and their characteristics including traffic volumes, pre-existing free-flow traffic levels (congestion), and proximity to speed limit changes. The results do give an indication of where there is greatest potential for success in implementing sign-only limit changes. Roads with low pre-existing speeds will see little change; roads with speeds between 20 and 24 mph will see smaller reductions and broad compliance with the new limit, roads with speeds beyond this and up to 30mph will see the greatest speed reductions (up to 3.6mph), and beyond this, further measures may be required to achieve desired results.

Figure 3 – Change in vehicle speeds by 1mph speed band



## CONCLUSION AND RECOMMENDATIONS

There has been some notable change following the initial analysis immediately after the change in speed limit. Although the change in traffic speeds on urban roads in Wales has been impressive, the long-term effects are broadly in line with results seen elsewhere. Following the implementation of widespread 20mph limits speeds have increased over the last year but remain much lower than before the change.

This next point is critical: **A speed reduction of 1.8mph may seem insignificant compared to a 10mph reduction in speed limit but this highlights a misunderstanding of traffic speeds on our urban roads where the limit is 30mph by default. On the roads we sampled, average speeds were already way below the posted speed limit which means they were never going to reduce by 10mph. Achieving this reduction in the long-term does represent some measure of success, although we have highlighted that not all roads are seeing acceptable levels of compliance.**

As we reach the first anniversary of the change in limits across Wales, this seems like the appropriate time to review performance on individual roads and consider what further interventions are required. The power and availability of new data sources affords opportunities for local authorities and police forces to have a greater understanding of vehicle speeds across road network, either post-implementation of speed limit change or before new limits are put in place. This is critical in addressing specific issues at certain high-risk locations.

Agilysis are continually exploring the opportunities offered by this powerful source of data from TomTom and are implementing new projects in countries all over the world to help road authorities understand the key link between traffic speeds and road safety.

## ABOUT AGILYSIS AND TOMTOM TRAFFIC STATS

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Agilysis are a specialist consultancy helping road authorities, governments, charities, and other stakeholders in a variety of ways. We provide advice on strategy, conduct independent research, and deliver power data solutions in the UK and around the world.

We have partnered with TomTom to access connected vehicle data for this project, and we already supply this data for analysis on congestion management and road safety projects. Our expertise in analysing connected vehicle data is significant, delivering solutions to several dozen GB road safety organisations, private companies, and research organisations. We are grateful to TomTom for allowing free use of their Traffic Stats solution to carry out this research without charge.

To find out more about Agilysis and our solutions please visit [www.agilysis.co.uk](http://www.agilysis.co.uk) and for more information on our Traffic Insights solution go to <https://agilysis.co.uk/trafficsights/>.



## ABOUT THE AUTHOR

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Richard Owen is our CEO and has 20 years of experience in analysing road safety data. He has led our partnership with TomTom and worked with our team of talented analysts and data scientists to understand the potential for this type of research.

He is a significant figure in road safety both in the UK and overseas, with experience of delivering award-winning projects covering multiple disciplines.



Richard regularly provides policy and strategy advice to organisational leaders and has appeared at conferences and events across the globe.

## APPENDIX

### METHODOLOGY – ADAPTED FROM ORIGINAL REPORT

The data is provided by connected vehicles that upload data anonymously to allow the assessment of vehicle speeds. More information on the [TomTom Traffic Stats](#) product can be found on their website<sup>4</sup>. Although the data does not comprise 100% of all vehicles using the roads, it is a very significant sample and more than sufficient for this type of analysis. Roads with low probe counts (*probe* is the technical term used to describe a vehicle or device that provides anonymised GPS data) are excluded from the research. The vehicles providing the probe data are a mixture of privately owned cars, vans, plus commercial vehicles. Motorcycles and bicycles are not included in the data.

#### *Area Selection*

We wanted to select parts of towns and cities that will provide a good sample of roads. As mentioned previously, not all roads will be analysed. The total road lengths included in the study are shown in [Table 1](#) below. Roads have been selected based on the speed limit stated in the TomTom database prior to the changeover. These stated limits have been cross-referenced against other sources including DataMapWales<sup>5</sup> and [www.speedmap.co.uk](http://www.speedmap.co.uk). Only roads that are changing from 30mph to 20mph will be analysed.

Minor local roads including quiet residential roads have been excluded from the analysis as they will not have sufficient sample sizes for the time periods selected. Analysis over a longer time period, say several weeks or months would allow for an analysis on these quieter roads.

*Table 2 – Road Lengths (km) in study areas*

Town / City	Road Length Selected for Analysis
Cardiff	94.3km
Newport	52.3km
Swansea	78.2km
Wrexham	60.9km
Rhyl/Prestatyn	85.8km
Merthyr Tydfil	40.7km
Lampeter	10.2km
Bangor	25.1km
Haverfordwest	22.2km
Newtown	21.9km
<b>TOTAL</b>	<b>491.8km</b>

We have chosen over ten thousand road sections to analyse in our study. In urban environments with frequent junctions, roundabouts and side roads, the average section length will be shorter than in rural areas or on motorways for example. The decisions on network selection and methodology we made at the start of the study and have not been influenced by the data. We welcome further analysis of this type of data to gain a greater understanding of the nuances within the selected road networks and choice of speed metrics.

<sup>4</sup> <https://www.tomtom.com/products/traffic-stats/>

<sup>5</sup> <https://datamap.gov.wales/maps/roads-affected-by-changes-to-the-speed-limit-on-re/view#/>



### *Speed Measurement*

There are many different metrics provided in the data from TomTom including average (mean) and median speeds. We have chosen to use the median speed value as it more closely represents free-flow speeds on congested roads. There can be significant differences on busy roads, or those with lots of turning traffic with mean speeds reported as being lower than median speeds. Significant consideration was given in the 2018 report published by the Department for Transport reviewing 20mph speeds<sup>6</sup>. This report concluded that the use of the median speed was the most appropriate as it “is least affected by the slow-moving vehicles, and therefore most closely represents typical performance”. We have analysed speeds on weekdays only between 6am and 6pm. It would have been possible to define alternative periods but we felt that this selection most closely represented driver’s experiences of road traffic. This does mean that we will not be reviewing speeds in the late evening and at night-time which are expected to be higher.

For each town or city, and for all roads combined, we have used three values to create a weighted average for each road section. Using a weighted average is essential as it allows us to place appropriate emphasis on longer road sections and those with higher traffic rates. The method used is as follows:

1. Define areas, time periods and dates to order and download data from the TomTom Traffic Stats portal.
2. Import GeoJSON files that include road geometry and data for traffic movements, and process through to a Geodatabase for matching and analysis.
3. Check and exclude road sections that have not changed to 20mph.
4. Exclude road sections with probe counts lower than 100 vehicles in the pre- and post-implementation periods.
5. Create the weighted median speed for each link using the formula.

$$\text{WeightedSpeed} = \frac{\sum \text{SampleSize} \cdot \text{Distance} \cdot \text{MedianSpeed}}{\sum \text{Distance} \cdot \text{MedianSpeed}}$$

6. Calculate average weighted median speed in the pre- and post-implementation periods.

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[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/784905/technical-appendix-2-20mph-gps-journey-speed-analysis-report.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/784905/technical-appendix-2-20mph-gps-journey-speed-analysis-report.pdf)



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