PROJECT REPORT CPR4817

Monitoring and evaluation of the 60 mph trials
Report for the on-road trials of 60 mph on the M6 J13-15 scheme

A Rajasooriya, R Ramnath, S Chowdhury and R Sharp
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<td></td>
</tr>
<tr>
<td>George Beard (Technical Reviewer)</td>
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Executive summary

Temporary mandatory speed restrictions are considered for road works on high-speed roads to limit the risks posed to road users from specific traffic management features. Guidance at the time of the trial recommended a speed reduction of 20mph for many traffic management features. Where safe to do so, a change in the recommended speed reduction could bring about potential benefits to road users in the form of improved journey times and increased satisfaction.

This report presents the findings from the on-road investigation of a 60mph speed restriction on the M6 J13-15 scheme. A 60mph speed restriction was implemented across the northbound carriageway between junctions 14 and 15 within the road works. The impacts of this change on driver behaviour, customer satisfaction, scheme costs and delivery were monitored over an eight-week monitoring period, the penultimate week of which was during the UK COVID-19 pandemic restrictions.

Analysis of the data collected during this monitoring period yielded the following findings:

- Road users responded to the change in speed restriction by increasing their speed; average speeds at the trial location increased from about 47mph before the speed restriction change, to 51mph after the speed restriction change. This resulted in an estimated journey time reduction of approximately 35 seconds per road user.

- This increase in average vehicle speed had a positive impact on the levels of speed compliance shown by road users; compliance observed in the 60mph speed restriction was higher than in the 50mph speed restriction.

- Some statistically significant variations in vehicle composition by lane were found, but these variations were very small in effect size. As such, differences in vehicle composition are unlikely to have impacted vehicle speeds and speed compliance.

- The proportion of HGVs engaged in close following marginally decreased as a result of the change in speed restriction, reducing by around 2% on average. The overall amount of close following observed for all vehicle types also reduced by 2% on average following implementation of the 60mph speed restriction.

- The number of incidents (Road Traffic Collisions and breakdowns) was too small to enable statistical analysis. Some variability in the number of incidents was seen between the baseline and trial periods, but this was observed both at the control and experimental locations. As such, there was no evidence to conclude whether the change in speed restriction had an impact on the number of reported incidents observed at the scheme.

- Generally, workforce survey participants felt that neither the 50mph nor 60mph speed restriction affected their feelings of safety. Most workforce survey participants also felt that both speed restrictions were ‘about right’ in terms of safety.

- For the customer satisfaction survey data, no conclusions could be drawn from the limited number of road users’ responses during the trial period. Survey responses during the baseline period were mixed, but most participants felt the 50mph speed restriction did not affect their feelings of safety or journey satisfaction, and that the
lane widths made them feel unsafe and dissatisfied. Some participants felt the 50mph speed restriction and lane widths were about right in terms of safety and journey satisfaction, whereas others tended to report that the speed restriction was too low and the lanes were too narrow.

Based on these findings, the scheme subsequently implemented a 60mph speed restriction during subsequent phases of work, including the use of it on a new section on the northbound carriageway between junctions 14 and 15.

Results from other investigations undertaken by Highways England at the scheme were as follows:

- Customer audits concluded that all the speed restriction signage was clear and frequently positioned in all cases. All the signage was easily viewable and all auditors were aware of the speed restrictions in place.
- These same audits also suggested that customers felt safe and satisfied travelling at both the 50mph and 60mph speed restrictions, but some customers reported that traffic generally travelled slower than 60mph during the trial period.
- A review of social media ‘conversations’ concluded that customers recognised the change in speed restriction and some customers appreciated the increased speed restriction.

At the time of writing, a further investigation into the use of 60mph speed restrictions is underway. Findings from this additional investigation will be collated with the current findings to produce a toolkit that will provide guidance for future schemes to safely implement 60mph speed restrictions at road works.
1 Introduction

1.1 Background

Safety and customer satisfaction are critical components of Highways England’s vision for the future. As part of this vision, Highways England is committed to improving road user experience through road works by ensuring the appropriate implementation of speed restrictions to minimise disruption for customers, whilst also ensuring risk to road users and road workers is as low as reasonably practicable.

Following on from previous investigations into varying speed restrictions within road works, consultation with stakeholders from across Highways England and the Supply Chain, this project was established to support the safe implementation and monitoring of three new trial scenarios. A key defining feature of many of these scenarios is the trial implementation of a 60mph speed restriction in road works with narrowed lane width restrictions.

1.2 Contents of this report

This report summarises the findings from the on-road trial of a 60mph speed restriction on the M6 J13-15 scheme during early 2020.

The investigation took place across two sections of the scheme’s traffic management, on both the northbound and southbound carriageways. TRL was commissioned by Highways England to monitor driver behaviour (along with customer satisfaction and scheme cost/delivery) to ensure that the safety of road users and road workers was not compromised by the increase in speed restriction during the investigation.

This report outlines the scheme and data collection methodology, presents the results from the monitoring, summarises these findings and outlines the next steps required.

1.3 Study objectives

The key objectives of the research were to gather evidence of the impact of changing the speed restriction on the M6 J13-15 scheme from 50mph to 60mph on:

a) Lane distribution
b) Vehicle speeds
c) The number of non-compliant vehicles
d) The number of incidents
e) The levels of close following (vehicle headway)
f) Customer satisfaction
g) Scheme delivery and cost
2 Method

2.1 Overview of the scheme

To reduce congestion and smooth the flow of traffic across this key strategic route, works started in June 2018 on upgrading the M6 between junctions 13 to 15 into a smart motorway. The package of work was planned for several distinct phases and sections, with the timeline for the work on-site running until spring 2022.

A contra-flow traffic management scenario on the northbound carriageway was chosen to investigate increasing the speed restriction from 50mph to 60mph. The speed restriction within the experimental location, north of junction 14 on the northbound carriageway was changed to 60mph for the northbound direction of travel, while the speed restriction in the control location (south of junction 13) on the southbound carriageway remained at 50mph.

An overview of the monitoring locations used in the investigation can be seen in Figure 1 below.

![Figure 1: Overview of monitoring locations used on the M6 J13-15 scheme investigation (NB = northbound; SB = southbound)](image_url)

2.2 Monitoring approach

The on-road investigation took place between the 27th January and 23rd March 2020 and sought to monitor the effect of the change in speed restriction on driver behaviour and customer satisfaction. The monitoring covered two periods, the ‘baseline’ monitoring period during which both the experimental and control monitoring locations retained a 50mph speed restriction. This was followed by a ‘trial’ monitoring period in which the 60mph speed restriction was implemented on the experimental location while the control location retained a 50mph speed restriction (see Table 1).

<table>
<thead>
<tr>
<th>Dates</th>
<th>Description of activity</th>
<th>Control location (southbound carriageway)</th>
<th>Experimental location (northbound carriageway)</th>
</tr>
</thead>
<tbody>
<tr>
<td>27th Jan – 24th Feb 2020</td>
<td>Baseline monitoring period</td>
<td>50</td>
<td>50</td>
</tr>
</tbody>
</table>
Throughout the baseline and trial monitoring periods the number of lanes open to traffic and the width of those lanes remained constant. The lane configuration used featured the following lane widths on the northbound and southbound carriageway for each direction of travel:

- Lane 1: 3.25m
- Lane 2: 3.25m
- Lane 3: 2.75m

The composition and placement of the traffic management did not vary between the experimental and control monitoring locations, with both locations subject to a contra-flow scenario. The delineation between the work zone and carriageway was provided by a mixture of cones and temporary vehicle restraint system (VRS). The set-back between the VRS and the traffic lanes was 600mm.

### 2.3 Risk assessment

As part of the proposed risk management approach and safety governance for the trialling of 60mph speed restrictions within road works, a programme level safety risk assessment was produced by TRL. This assessment was informed by previous relevant on-road trials, simulator trials, and associated GG 104 risk assessment and was used to feed into the scheme-specific risk assessments carried out by participating schemes (Fordham & Glaze, 2019).

Prior to implementing the change in speed restriction, JacobsAtkins carried out a scheme-specific safety risk assessment in line with GG 104 standards. This assessment examined the risks posed to all affected parties from the change in speed restriction, detailing required mitigation measures to address the potential increase in risks posed from the anticipated increase in vehicle speed.

This assessment concluded that if the change in speed restriction was adopted, the introduction of several additional mitigations must accompany it. Details of these additional mitigations are outlined in the section 2.3.1.

In accordance with the safety governance requirements outlined within GG 104, the schemes existing project safety control review group (PSCRG) reviewed the scheme-specific assessment. This led to a decision to trial a 60mph speed restriction for four weeks between junctions 13 and 15 on the northbound carriageway from January 2020.

The PSCRG is a cross-functional group that reviews ‘safety work’ to agree that the safety risks are correctly identified, reviewed and managed appropriately (Highways England, 2015). The group is required to comprise of principal and specialist members. Principal members collectively determine decisions taken and endorse evidence presented to the group. Specialist members provide additional subject matter specialism experience to the group. A list of required roles for each member type can be seen in Appendix A.
2.3.1 Scheme-specific mitigations

Several additional mitigations, above those already outlined within the programme level risk assessment, were identified as being required to manage risks as part of the scheme-specific risk assessment. These additional mitigations were implemented on the scheme prior to the start of the on-road investigations; they are outlined below.

2.3.1.1 Road Safety Audit (RSA)

A RSA of the proposed layout was undertaken (in accordance with the Major Projects Instruction for Smart Motorway Programme schemes) and was required to specifically consider any location or geometry reasons which would make a 60mph speed restriction unsafe (JacobsAtkins, 2019).

2.3.1.2 Variable message signs

Mobile Variable Message Signs (VMS) were positioned in advance of any change in speed restriction to warn approaching road users (JacobsAtkins, 2019).

2.3.1.3 Temporary traffic regulation order

In order to facilitate an immediate change of the 60mph speed restriction to a 50mph speed restriction, a temporary traffic order for the 50mph speed restriction was put in place (JacobsAtkins, 2019).

2.3.1.4 Road Restraint Risk Assessment Process (RRRAP)

A RRRAP was completed for verge hazards at both 50 and 60mph speed restriction with the introduction of appropriate controls to manage these hazards (JacobsAtkins, 2019).

2.4 Safety reviews and abort process

During the trial monitoring period, weekly safety reports were provided outlining changes in the average speed of vehicles during free-flow periods, the proportion of vehicles over the posted speed restriction during free-flow periods and the proportion of vehicles over the enforcement threshold during free-flow periods. These weekly reports fed into an agreed abort process. The details of this process are outlined in the scheme-specific safety risk assessment; Figure 2 below provides a summary.

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1 ‘Free-flow’ was defined as any period where the one-minute averaged speed of all vehicles across the carriageway was greater or equal to 40mph.
Data from the radar units (outlined in Section 2.5.1) were issued weekly to TRL (on Tuesday mornings) and the Safety Reports were created and issued by TRL before the end of the working day. A scheduled review call was carried out the following day (on Thursday) and during this call the review group discussed the reported safety proxies and any weekly incidents. These review calls acted as the abort decision points outlined within Figure 2 above. An emphasis was placed on any feedback from the Traffic Management Supplier and work crews.

During the four-week trial monitoring period on both investigations, the abort process was not implemented at any point.

2.5 Data collection and statistical comparisons

To achieve the objectives of this research (see Section 1.3), several different data sources were used:

- Radar data
- Incident data
- Survey data
- Workshop data

These data sources, and any statistical comparisons which were made, are outlined in more detail in the following sections. Suitable statistical comparisons were undertaken only when a sufficient sample of data was available.
2.5.1  Radar data

To monitor speed, flow, headway and lane choice during the baseline and trial periods, two temporary radar installations were installed at the scheme. Each radar installation was capable of monitoring traffic on a single carriageway, down to the level of individual vehicles. For the investigation a separate installation was used to monitor the control and experimental locations.

2.5.1.1  Location of radar installations

The radar installations were situated to monitor their respective carriageways within the work zone. The radar unit which monitored the experimental location on the northbound carriageway was located on the verge near marker post 240/5. The unit on the southbound carriageway which monitored the control location was situated on the central reservation near marker post 218/3.

2.5.1.2  Data collected

The radar installations provided data on vehicle flow, speed and headway for each carriageway and lane. These metrics were recorded for each vehicle passing the unit and captured data on vehicle length which were used to classify vehicle types.

2.5.1.3  Data processing

To understand the potential impact of the speed restriction change on vehicle speeds, data on driver behaviour were required for periods when drivers were free to choose their own speed. This required conditions with free-flowing traffic. Periods with congested traffic were therefore removed; defined as periods when the average speed of vehicles in a lane across a minute was lower than 40mph. This resulted in the removal of 1.5% of the available data.

To classify vehicles by type, the following definitions were used:

- Car/LGV (≤25ft)
- HGV (>25ft)

2.5.1.4  Comparison of flow

It was essential to understand how vehicle flow changed between the baseline and trial periods, since any changes in vehicle flow can affect the behaviour of road users and impact their speed. The following comparisons were made:

1. A comparison of overall and daily average vehicle flows between the baseline and trial periods at both experimental and control locations.

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2 Headway was defined as the time separation between vehicles, measured from the front bumper of the first vehicle to the front bumper of the following vehicle, averaged over one-minute intervals.
2. A comparison of average vehicle flow split by vehicle class between the baseline and trial periods.

3. A comparison of average vehicle flow composition by lane at the experimental location.

The results of these comparisons are presented in sections 3.2.1.

2.5.1.5 Comparison of speed

The following comparisons were made using the one-minute average speed data collected from the radars:

1. A comparison of average speed between the baseline and trial periods by monitoring location.

2. Comparison of average speed by lane between the baseline and trial periods at the experimental location.

3. A comparison of average speed by vehicle type between the baseline and trial periods at the experimental location.

4. A comparison of compliance with the posted speed restriction between the baseline and trial periods by monitoring location.

The results of these comparisons are presented in sections 3.2.2.

2.5.1.6 Comparison of congestion

Data collected during periods of congestion were removed from the comparisons of flow and vehicle speed. This allowed for the impact of the speed restriction change to be explored, since comparisons were focused on free-flow conditions where drivers had free choice of speed. It was however also important to understand the impact of the speed restriction change on the levels of congestion seen at the scheme. A comparison of average daily periods of congestion between the baseline and trial periods by monitoring location was made. The results of this comparison are presented in sections 3.2.3.

2.5.1.7 Comparison of close following

The following comparisons were made using the IVD collected from the radars:

1. A comparison of close following\(^3\) between the baseline and trial periods by monitoring location.

2. Comparison of close following by vehicle type between the baseline and trial periods at the experimental location.

The results of these comparisons are presented in sections 3.2.4.

\(^3\) A vehicle was defined as engaging in ‘close following’ if there was a gap of less than two seconds to the vehicle in front.
2.5.1.8  **Statistical comparisons**

Appropriate statistical tests were used to test for significant differences between data recorded during the baseline and trial periods (i.e. to determine if driver behaviour changed following the implementation of the 60mph speed restriction). Three types of statistical tests were used, depending on the type of data available:

- **Chi-squared tests** were used to test for a difference in the distribution of categorical data, for example to test for a difference in the distribution of vehicle flows between the baseline and trial periods.

- **Analysis of Variance (ANOVA)** was used to test for a difference in the mean response between groups, for example to test for a difference in the average speed between the baseline and trial periods.

- **Two-proportion z-tests** were used to test for a difference in proportions, for example to test for a difference in percentage of vehicles close following.

Results were classified as ‘statistically significant’ if the p-value was less than 0.05 (a common standard in behavioural sciences). The p-value is a measure of probability, and a value of less than 0.05 implies that any differences between the groups being tested has a less than 5% chance that the difference occurred at random.

It must be noted that when the sample size is extremely large (as it is in this study), very small differences are likely to be reported as statistically significant. In such cases, an effect size is calculated to measure the magnitude of the phenomenon or the degree of association between two variables. Generally, an effect size of less than 0.2 denotes a small effect, 0.5 is a medium effect and 0.8 denotes a large effect. Throughout the report, the effect size has been reported if any result is statistically significant to understand if the effect is due to large sample sizes or if it implies a strong relationship between two variables.

2.5.2  **Incident data**

Throughout both the baseline and trial phases of the investigation, incidents which occurred within the confines of the scheme traffic management were documented and collated by the scheme’s traffic management contractor. These logs identified the type of reported incidents (breakdowns and road traffic collisions) along with the location of the incident (carriageway and marker post number) and the date it took place.

Comparisons of the number of incidents between the baseline and trial phase were made; a summary of these data is presented in section 3.3.

2.5.3  **Workforce survey data**

To provide further insight into the potential impact of changing the speed restriction at the scheme from 50mph to 60mph, a workforce survey was conducted during the investigation. The survey aimed to capture insight from project managers, site workers and members of the workforce who operate within the carriageway environment.

Comparisons of the survey responses between the baseline and trial periods are presented in section 3.5.
2.5.4 Customer satisfaction survey data

Throughout the on-road investigation, surveys were used to collect information on the impact of increasing the speed restriction on the satisfaction levels of road users travelling through the scheme. These surveys were administered to individuals who had identified themselves as having travelled through the scheme during either the baseline or trial period.

Targeting of these individuals was achieved using a social media advertising campaign, with individuals within a 50km radius of both junctions 13 and 15 of the M6 being targeted to take part in the study. The adverts were also shared with multiple special interest groups on social media platforms. This approach ensured the recruitment of individuals who regularly drove the route during the investigation.

The surveys collected data on customers’ feelings of safety affected by both the posted speed restriction and the width of the scheme’s lanes. Levels of journey satisfaction and how they were affected by the posted speed restriction and the width of the lanes were also captured. Comparisons of the survey responses between the baseline and trial periods are presented in section 3.6.

2.5.5 Delivery and cost impacts

To understand the impact of the change in speed restriction on the scheme’s delivery and costs, a lessons-learned workshop was held after the monitoring periods had ended. The session sought to capture details on any impacts to the scheme associated with implementing the change in speed restriction. Attendees included the scheme’s Highways England Project Manager, Principal Contractor, Traffic Management Supplier, Traffic Officers, Communications Manager and Risk Contractor.

A summary of the findings of this workshop is presented in Section 3.7.

3 Results

3.1 Overview

This section provides an overview of the findings from the on-road trial, and the impact of the change in speed restriction on:

- Driver behaviour
- Incidents and breakdowns
- Journey times
- Welfare of the workforce
- Customer satisfaction
- The scheme’s delivery and cost

The main findings are summarised in Table 2 below, with full results from the detailed analysis presented in the succeeding sections.
Table 2: The key findings from the on-road trials of 60mph on the M6 J13-15 scheme

<table>
<thead>
<tr>
<th>Category</th>
<th>Findings</th>
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<tr>
<td>Vehicle flow</td>
<td>There was a statistically significant difference in average vehicle flow between the control and experimental locations and between the baseline and trial periods with a small effect size (0.02). This suggests that although there is a significant difference in flow, the effect size is small indicating that the significant result may be due to a large sample size rather than a large change in flow.</td>
</tr>
<tr>
<td>Vehicle speed</td>
<td>The free-flow average speed increased from around 47mph in the baseline period to 51mph in the trial period at the experimental location. The compliance rates improved for all vehicles when the speed restriction was 60mph compared with 50mph, and compliance remained relatively constant at the control location where the speed restriction remained at 50mph. There was a statistically significant difference in free-flow average speed ($p &lt; 0.01$) between the baseline and trial periods at the experimental location, explaining around 96% of the total variance. There was no significant difference in average speeds between baseline and trial periods at the control location ($p = 0.12$)</td>
</tr>
<tr>
<td>Congestion</td>
<td>There was minimal routine congestion at the scheme, on both the northbound and southbound carriageway, as the hourly average speed did not fall below 40mph. During the baseline and trial monitoring periods, 2.1% and 1.2%, respectively, of the total time was classified as congested at the experimental location.</td>
</tr>
<tr>
<td>Close following</td>
<td>During the baseline period the proportion of vehicles close following was 29% at the experimental location, but slightly lower (27%) during the trial period. Likewise, the proportion of HGVs engaged in close following decreased from 20% during the baseline period, to 18% during the trial period. These differences were statistically significant ($p &lt; 0.01$), but with a very small effect size of 0.04.</td>
</tr>
<tr>
<td>Incidents and breakdowns</td>
<td>No safety concerns were raised by the scheme around the number of reported incidents during the trial. The number of incidents (Road Traffic Collisions and breakdowns) was too small to enable statistical analysis. Some variability in the number of incidents was seen between the baseline and trial periods, but this was observed both at the control and experimental locations.</td>
</tr>
<tr>
<td>Journey time</td>
<td>Increasing the speed restriction from 50mph to 60mph decreased the average journey time by around 35 seconds per driver.</td>
</tr>
<tr>
<td>Workforce satisfaction</td>
<td>For the workforce satisfaction survey, there were 59 responses relating to the 50mph speed restriction and 22 responses relating to the 60mph speed restriction. Results were mixed, but most participants felt the speed restrictions did not affect their feelings of safety and rated both the 50mph and 60mph speed restrictions as ‘about right’ in terms of safety.</td>
</tr>
<tr>
<td>Customer satisfaction</td>
<td>For the customer satisfaction survey, 71 responses during the baseline period and 16 responses during the trial period were analysed. Due to the limited number of responses during the trial period, no conclusions could be drawn from these data. Responses during the baseline period were mixed, but most participants felt the 50mph speed restriction did not affect their feelings of safety or journey satisfaction, and that the lane widths made them feel unsafe and dissatisfied. Additionally, some participants felt the speed restriction and lane widths were about right in terms of safety and journey satisfaction, whereas others tended to report that the speed restriction was too low and the lanes were too narrow.</td>
</tr>
<tr>
<td>Scheme delivery</td>
<td>Feedback from the scheme suggested that the delivery of the work activities was not impacted by the 60mph speed restriction.</td>
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3.2 Driver behaviour

This section presents the driver behaviour data collected at the experimental (northbound carriageway) and control (southbound carriageway) locations.

3.2.1 Vehicle flow

Figure 3 shows the average daily vehicle flow across the baseline and trial monitoring periods between both monitoring locations.

![Figure 3: Average daily vehicle flow by location and monitoring period](image)

The average daily vehicle flow varied over the course of the investigation at both the control and experimental locations. The control location had an average daily flow of 45,790 during the baseline period and 42,411 during the trial period. The experimental location had lower average daily flows of 34,979 during the baseline period and 35,961 during the trial period, as shown in Figure 3.

A chi-square test was conducted to test for statistically significant differences between the average daily vehicle flow by monitoring period and location. The test found that there was a statistically significant difference in flow between the control and experimental locations and between the baseline and trial periods ($p < 0.05$) with a small effect size of 0.02. This suggests that although there is a significant difference in flow, the effect size is small indicating that the significant result may be due to a large sample size rather than a large change in flow. Therefore, any changes in average speed or compliance with the change in speed restriction may be attributed to changes in driver behaviour rather than changes in flow.
A comparison of the proportion of HGVs by monitoring location and period is presented in Figure 4. This shows that the proportion of HGVs remained reasonably constant at both locations throughout the investigation. The average proportion of HGVs at the experimental location was 22% of all traffic during the baseline period and 23% during the trial period. The proportion of HGVs at the control period was similar throughout the trial with an average of 33% during the baseline period and 35% during the trial period.

A two-proportion z-test indicated that the small difference in the HGV proportions at the experimental location between the baseline and trial periods was statistically significant ($p < 0.01$), with a small effect size of 0.02. Tests also showed that there were significant differences ($p < 0.01$) in HGV proportion between the control and experimental locations during both periods with a medium effect size of 0.26. Therefore, this difference is unlikely to have had a significant impact on driver behaviour.

The distribution of vehicles between Lane 1, Lane 2, and Lane 3 within the experimental location is shown in Table 3.

**Table 3: Distribution of vehicles by lane and monitoring period at the experimental location**

<table>
<thead>
<tr>
<th>Monitoring period</th>
<th>Vehicle type</th>
<th>Lane 1</th>
<th>Lane 2</th>
<th>Lane 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline period</td>
<td>All vehicles</td>
<td>43%</td>
<td>40%</td>
<td>17%</td>
</tr>
<tr>
<td>Trial period</td>
<td>All vehicles</td>
<td>42%</td>
<td>40%</td>
<td>18%</td>
</tr>
</tbody>
</table>

The distribution of vehicles across the three available lanes at the experimental location changed slightly between the baseline and trial periods.

A two-proportion z-test showed that the small variation in vehicle distribution between the baseline and trial periods for each lane at the experimental location was statistically significant ($p < 0.05$) but with a very small effect size of 0.02, 0.01 and 0.02, respectively.
The proportions of each vehicle type in Lane 1, Lane 2, and Lane 3 within the experimental location is shown in Table 4.

**Table 4: Composition of vehicles by lane and monitoring period at the experimental location**

<table>
<thead>
<tr>
<th>Monitoring period</th>
<th>Vehicle type</th>
<th>Lane 1</th>
<th>Lane 2</th>
<th>Lane 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline period</td>
<td>Cars + LGVs</td>
<td>75%</td>
<td>78%</td>
<td>87%</td>
</tr>
<tr>
<td></td>
<td>HGVs</td>
<td>25%</td>
<td>22%</td>
<td>13%</td>
</tr>
<tr>
<td>Trial period</td>
<td>Cars + LGVs</td>
<td>69%</td>
<td>80%</td>
<td>88%</td>
</tr>
<tr>
<td></td>
<td>HGVs</td>
<td>31%</td>
<td>20%</td>
<td>12%</td>
</tr>
</tbody>
</table>

The vehicle composition of Lane 1 at the experimental location remained similar between the baseline and trial periods. A chi-square test showed that the small variation in vehicle composition between the baseline and trial periods at the experimental location was statistically significant ($p < 0.01$) but with a very small effect size of 0.06.

Likewise, the composition of vehicles in Lane 2 remained reasonably constant between the baseline and trial periods. Like Lane 1, a chi-square test showed that there was a significant difference ($p < 0.01$), but with a small effect size of 0.017.

The composition of vehicles in Lane 3 also remained similar between baseline and trial periods. A chi-square test showed that there was a statistically significant difference ($p < 0.05$), but the effect size was very small (0.02).

Taken together these results suggest that the statistical significance can be attributed to the large sample sizes rather than a large difference in vehicle composition between monitoring periods, as outlined earlier in section 2.5.1.8. As such, any changes identified in vehicle speeds and speed compliance are unlikely to have resulted from differences in vehicle composition.

### 3.2.2 Vehicle speed

To ensure that comparisons of vehicle speed were not conflated by the presence of small numbers of high speed vehicles, the one-minute average speed data were weighted by vehicle flow. This ensured that more weight was given to data from periods when the flow was higher, compared to times when there were fewer vehicles (low flow), since averages calculated from small numbers of vehicles may be more greatly biased by high speed outliers.

Comparisons were made between control and experimental locations to account for background factors (aside from the speed restriction change) which may have influenced driver behaviour between the two monitoring periods.

Figure 5 shows the free-flow average speeds at the control and experimental locations across the two monitoring periods.
Report for the on-road trials of 60mph on the M6 J13-15

Figure 5: Free-flow average speed during the monitoring period by location

Free-flow average speed at the control location remained similar throughout the investigation, at around 51mph. At the experimental location, there was an increase in free-flow average speed from around 47mph in the baseline period to around 51mph in the trial period.

A statistical test (ANOVA) confirmed that there was a significant difference in free-flow average speed ($p < 0.01$) between the baseline and trial periods at the experimental location, explaining around 96% of the total variance. There was no significant difference in average speeds between baseline and trial periods at the control location ($p = 0.12$) as such no effect size can be reported.

As the difference in flow between monitoring periods and monitoring locations was not significant, changes in speed are unlikely to have been impacted by differences in flow.

The free-flow average speeds by lane are shown in Table 5.
Table 5: Free-flow average speed (mph) by monitoring period and lane at the experimental location

<table>
<thead>
<tr>
<th>Monitoring period</th>
<th>Lane 1</th>
<th>Lane 2</th>
<th>Lane 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline period</td>
<td>45.2</td>
<td>47.6</td>
<td>49.1</td>
</tr>
<tr>
<td>Trial period</td>
<td>48.6</td>
<td>51.9</td>
<td>53.7</td>
</tr>
</tbody>
</table>

In both periods, speeds were highest in Lane 3, followed by Lane 2 and then Lane 1. Table 5 shows that the free-flow average speed in Lane 1 at the experimental location increased by 3.4mph between the baseline and trial periods and in Lane 2 there was an increase of 4.3mph. Lane 3 had an increase of 4.6mph between the baseline and trial period. Although not shown here, there was little change in the average speeds by lane at the control location.

Figure 6 shows the comparison between the average speed for cars/LGVs and HGVs across the monitoring periods at the experimental location.

![Figure 6: Average speed by vehicle type at the experimental location](image)

The free-flow average speed of HGVs during the baseline period was around 46mph – slightly lower than the free flow average speed of cars and LGVs at 47mph. In the trial period, cars and LGVs were travelling at 51mph while HGVs were travelling at an average speed of 49mph.

To understand the compliance of road users with the posted speed, data were separated into speed bins. These speed bins (0-40, 40-50, 50-57, 57-60, 60-68, 68+mph) allow for vehicles to be identified as travelling: below the speed restriction, above the speed restriction but below the enforcement limit, and above the enforcement limit (10% of speed restriction +2mph).

Figure 7 and Figure 8 show the proportion of vehicles recorded in each speed bin across the two monitoring periods at the experimental location.

The grey bars show the proportion of vehicles travelling below the speed restriction; the orange bars show the proportion of vehicles travelling above the speed restriction but below
the enforcement threshold (10% of speed restriction +2mph); and the red bars show vehicles travelling above the enforcement threshold.

![Bar chart showing the proportion of vehicles in each speed bin during the baseline period at the experimental location.](image)

**Figure 7:** Proportion of vehicles in each speed bin during the baseline period at the experimental location
The proportion of vehicles travelling above the posted speed restriction at the experimental location changed considerably between the baseline and trial periods, dropping from 11% to 2%. The proportion of vehicles travelling above the enforcement limit remained low across both periods at around 0%.

When looking at the differences in the proportion of vehicles in each category (below speed restriction, above speed restriction but below enforcement threshold and above enforcement threshold), two-proportion z-tests showed that, for all three categories, the proportion of vehicles in the category was significantly different ($p < 0.01$) between the baseline and trial periods at the experimental location. Additionally, the three tests showed medium to small effect sizes of 0.42, 0.39 and 0.08, respectively.

Figure 9 and Figure 10 show the proportion of vehicles recorded in each speed bin across the two monitoring periods at the control location.
Figure 9: Proportion of vehicles in each speed bin during the baseline period at the control location.
The proportion of vehicles in each speed bin at the control location remained fairly consistent between the baseline and trial periods. This is expected as the posted speed restriction remained the same during both periods at the control location, and further demonstrates that the changes observed at the experimental location were due to the change in speed restriction. The proportion of vehicles over the speed limit was significantly higher at the control location during both monitoring periods when compared with the proportions at the experimental location. The reasons for this are unknown; potentially, factors unique to the two sites (which were approximately 22km apart) may have contributed to the observed differences.

Even though statistical tests showed that the proportion of vehicles in each of the three speed categories were significantly different \( (p < 0.05) \) between the baseline and trial period, the effect sizes were negligible \( (0.10, 0.06 \text{ and } 0.005, \text{ respectively}) \).

Figure 11 and Figure 12 show the proportion of cars and LGVs (i.e. the figures above repeated but with HGVs excluded) recorded in each speed bin across the two monitoring periods at the experimental location.
Report for the on-road trials of 60mph on the M6 J13-15

Figure 11: Proportion of cars and LGVs in each speed bin during the baseline period at the experimental location

Figure 12: Proportion of cars and LGVs in each speed bin during the trial period at the experimental location
The proportion of cars and LGVs travelling above the posted speed restriction at the experimental location changed considerably between the baseline and trial periods, dropping from 12% to 2%. The proportion of vehicles travelling above the enforcement limit remained very low across the two periods at 0%.

When looking at the differences in the proportion of vehicles in each category (below speed restriction, above speed restriction but below enforcement threshold and above enforcement threshold), two-proportion z-tests showed that, for all three categories, the proportion of vehicles in the category was significantly different ($p < 0.01$) between the baseline and trial periods at the experimental location. Additionally, the three tests showed medium effect sizes of 0.45, 0.42 and 0.22, respectively.

Figure 13 and Figure 14 show the proportion of HGVs recorded in each speed bin across the two monitoring periods at the experimental location.

![Figure 13: Proportion of HGVs in each speed bin during the baseline period at the experimental location](image)
The proportion of HGVs travelling above the posted speed restriction at the experimental location changed considerably between the baseline and trial periods, dropping from 7% to near 0%. The proportion of HGVs travelling above the enforcement limit remained very low across the two periods at near 0%.

When looking at the differences in the proportion of vehicles in each category (below speed restriction, above speed restriction but below enforcement threshold and above enforcement threshold), two-proportion z-tests showed that, for all three categories, the proportion of vehicles in the category was significantly different ($p < 0.01$) between the baseline and trial periods at the experimental location. The effect sizes were around 0.28, 0.42 and 0.06, respectively.

In summary, these data show that compliance rates improved for all vehicles when the speed restriction was 60mph compared with 50mph. The compliance rates at the control location where the speed restriction remained at 50mph was substantially lower in comparison to the experimental location but remained relatively constant across both monitoring periods. As described above, the reasons for this are unknown.

### 3.2.3 Congestion

A check was conducted on the total duration of congestion observed during the investigation. At the experimental location, 2.1% of the total time was classified during the baseline period and 1.2% of the total time was classified as congested during the trial period; defined as any period where the one-minute averaged speed of all vehicles in a lane was less than 40mph.
At the control location, 1.4% of the total time was classified as congested. Figure 15 outlines the average speeds per hour of the day, by monitoring period and location.

This figure shows that, generally, average speed was higher during the night (between 22:00 and 06:00) and lower during the day. Although this was significant, the effect size was relatively small. This pattern appears consistent across the baseline period at both locations and during the trial period at the control location. During the trial period at the experimental location, however, the average speed was higher overall (as discussed in the previous section).

As the hourly average speed did not fall below 40mph it can be concluded that there was minimal routine congestion at the scheme. As such the introduction of a 60mph speed restriction did not appear to have an impact on the amount of congestion seen through the scheme.

Figure 15: Average hourly vehicle speed by location and monitoring period

3.2.4 Close following

A vehicle was defined as engaging in ‘close following’ if there was a headway of less than two seconds to the vehicle in front. This section presents comparisons of close following between monitoring period and location; both for all vehicles and split by vehicle class.

Figure 16 shows the proportion of total vehicles close following across the course of the trial at both the control and experimental locations.
Figure 16: Proportion of vehicles close following by monitoring period and location

During the baseline period the proportion of vehicles close following was 37% at the control location but lower (29%) at the experimental location. During the trial period, the proportion reduced at both locations to 34% and 27% at the control and experimental locations, respectively.

A two-proportion z-test indicated that the small difference in the proportion of vehicles close following at experimental location between the baseline and trial periods was statistically significant ($p < 0.01$), but with a very small effect size of 0.04.

Figure 17 shows the split of HGVs and cars/LGVs close following at the experimental location. HGVs are defined as any vehicle over 25ft long.
A significantly higher proportion of cars/LGVs were close following at the experimental location ($p < 0.05$) than HGVs, although the effect sizes were very small (0.27 during the baseline and 0.28 during the trial period). At the experimental location:

- 32% of cars/LGVs were close following in baseline period
- 30% of cars/LGVs were close following in the trial period
- 20% of HGVs were close following in the baseline period
- 18% of HGVs were close following in the trial period

A two-proportion z-test indicated that these differences were statistically significant ($p < 0.01$) but with a very small effect size of 0.04.

### 3.3 Incidents and breakdowns

In total 170 incidents were reported during the investigation: 75 of which were in the baseline monitoring period, and 95 in the trial monitoring period. A summary of these reported incidents is presented in Figure 18.
The number of reported incidents varied between the baseline and trial period at both the control and experimental locations. At the experimental location, where the speed restriction changed between monitoring periods, the total number of reported incidents was 33 during the baseline period and 53 during the trial period. At the control location, where the speed restriction remained consistent across the investigation, the total number of reported incidents was 50 during the baseline period and 49 during the trial period.

Looking specifically at road traffic collisions (RTCs), the figures showed 4 RTCs during the baseline period and 2 RTCs during the trial period. At the control location the number of reported RTCs was 4 during the baseline period and 5 during the trial period. Given the small sample size, statistical tests were not carried out. The marginal difference in the number of reported RTCs on both the northbound and southbound carriageways cannot be confidently attributed to the change in the speed restriction.

### 3.4 Journey time

Estimates of the average journey time was calculated for the investigation based on the length of the speed restriction and a single aggregated free-flow average speed of vehicles, for each four week monitoring period, from the radar data.

Table 6 shows the estimated average journey time during the baseline and trial periods.

<table>
<thead>
<tr>
<th>Monitoring location</th>
<th>Length (km)</th>
<th>Average vehicle speed (mph)</th>
<th>Journey time (seconds)</th>
<th>Difference (seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Baseline</td>
<td>Trial</td>
<td>Baseline</td>
</tr>
<tr>
<td>Northbound</td>
<td>Experimental</td>
<td>9.3</td>
<td>46.8</td>
<td>50.8</td>
</tr>
<tr>
<td>Southbound</td>
<td>Control</td>
<td>19.4</td>
<td>51.0</td>
<td>51.0</td>
</tr>
</tbody>
</table>
The results suggest that changing the speed restriction from 50mph to 60mph decreased the average journey time by around 35 seconds. Relative to the journey time through the 9.3km scheme, this represents about an 8% reduction in the trial period compared with the baseline period. When considering the approximately 81,000 drivers who travelled through the scheme each day, the time savings are notable. No real change in journey time was observed at the control location, the speed restriction remained consistent throughout both monitoring periods.

3.5 Workforce survey

In total, 59 individuals completed the workforce survey during the investigation; all individuals reported on the 50mph speed restriction and 22 of these individuals also reported on the 60mph speed restriction. A summary of the responses is presented below. Due to the limited number of responses received reporting on the 60mph speed restriction (22), it was not possible to conduct any statistical analyses and caution should be taken when interpreting these results.

Participants from the workforce were asked to rate how they thought the speed restriction affected their safety. Responses are shown in Figure 19.

![Figure 19: Responses to question “How do you think the speed restriction affected your safety? Did it make you feel...?”](image)

Across the investigation:

- 28 out of 59 participants reported the 50mph speed restriction did not affect how safe they felt and 10 out of 22 participants reported the 60mph speed restriction did not affect how safe they felt.
11 out of 59 participants reported the 50mph speed restriction made them feel slightly unsafe and 5 out of 22 participants reported the 60mph speed restriction made them feel either slightly or very unsafe.

20 out of 59 participants reported the 50mph speed restriction made them feel either slightly or very safe and 7 out of 22 participants reported the 60mph speed restriction made them feel either slightly or very safe.

Participants were then asked to rate how appropriate they thought the speed restriction was in terms of their own safety. Responses are shown in Figure 20.

![Figure 20: Responses to question “In terms of your safety, do you think the speed restriction was...?”](image)

Across the investigation:

- 41 out of 59 participants reported the 50mph speed restriction was about right in terms of safety and 15 out of 22 participants reported the 60mph speed restriction was about right in terms of safety.

- 11 out of 59 participants reported the 50mph speed restriction was too slow in terms of safety and no participants reported the 60mph speed restriction was too slow in terms of safety.

- 7 out of 59 participants reported the 50mph speed restriction was too high in terms of safety and 7 out of 22 participants reported the 60mph speed restriction was too high in terms of safety.

Finally, in an open question, participants were asked to provide further comments on how the speed restriction affected their feelings of safety when they last worked on the scheme. Table 7 shows themes that represent general patterns observed in participants’ qualitative responses.
Table 7: Themes from participants’ comments on the effects of the speed restrictions on their feelings of safety when they last worked on the scheme

<table>
<thead>
<tr>
<th>Positive comments</th>
<th>50mph speed restriction</th>
<th>60mph speed restriction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The speed restriction was appropriate in terms of workforce safety.</td>
<td>Compared with a 50mph speed restriction, the 60mph speed restriction:</td>
</tr>
<tr>
<td></td>
<td>The speed restriction was appropriate for exiting the road works safely.</td>
<td>▪ Did not reduce feelings of safety</td>
</tr>
<tr>
<td></td>
<td>The speed restriction worked well in conjunction with the contra-flow system.</td>
<td>▪ Improved traffic flow</td>
</tr>
<tr>
<td></td>
<td>The speed restriction encouraged safe driving behaviours through the road works.</td>
<td>▪ Encouraged safe driving behaviours through the road works</td>
</tr>
<tr>
<td></td>
<td>The speed restriction meant drivers had enough time to react to unforeseen obstructions (for instance, debris in the road).</td>
<td>▪ Discouraged drivers from exceeding the speed restriction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Encouraged HGV drivers to drive on the inside lane so that they are further from the workforce</td>
</tr>
<tr>
<td>Negative comments</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The speed restriction was too high.</td>
<td>The speed restriction was too high.</td>
</tr>
<tr>
<td></td>
<td>It was difficult for works vehicles to reach 50mph before exiting the road works.</td>
<td>Compared with a 50mph speed restriction, it was more difficult for works vehicles to reach 60mph before exiting the road works.</td>
</tr>
<tr>
<td></td>
<td>Drivers (especially HGV drivers) exceeded the speed restriction.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The speed restriction encouraged drivers to tailgate.</td>
<td></td>
</tr>
<tr>
<td>Suggestions to improve safety</td>
<td>Stricter enforcement of the speed restriction.</td>
<td>Reduce the speed restriction to 50mph at sections of road works where road workers are present.</td>
</tr>
<tr>
<td></td>
<td>Reduce the speed restriction to 40mph.</td>
<td>Reduce the speed restriction to 56mph to match the maximum speed of HGVs.</td>
</tr>
<tr>
<td></td>
<td>Do not increase the speed restriction from 50mph through road works.</td>
<td>Ensure works are laid out so that works vehicles can easily slow down sufficiently to enter the road works and reach 60mph before exiting the road works.</td>
</tr>
<tr>
<td></td>
<td>Only increase the speed restriction from 50mph at sections of road works where no road workers are present.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HGVs should be restricted to 40mph.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HGV drivers should be permitted to use only the inside lane.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Keep the workforce as far away from live traffic as possible.</td>
<td></td>
</tr>
</tbody>
</table>

As well as comments about the effects of the speed restriction on feelings of safety, participants who reported on the 50mph speed restriction also provided more general comments about their feelings of safety. These participants mentioned that the pinned barriers and traffic management increased feelings of safety, whereas the narrowed running lanes reduced feelings of safety. One participant suggested implementation of appropriate barriers for future road works schemes.
3.6 Customer satisfaction

In total, 192 participants were identified from the customer satisfaction survey as eligible for inclusion in the investigation. Of those, 147 reported their last journey as being through the scheme during the baseline period when a 50mph speed restriction was in place (76 at the control location and 71 at the experimental). The remaining 45 participants reported their last journey as being through the scheme during the trial period when either a 50mph (in the control location) or 60mph (in the experimental location) speed restriction was in place (29 at the control location and 16 at the experimental). The difference in the number of responses between the baseline and trial period could be due to several reasons, including:

- The baseline period lasting longer than the trial period
- Fewer drivers travelling during the trial period due to UK COVID-19 pandemic restrictions (particularly in March 2020)

Other responses were excluded for the following reasons:

- Participants reported that they did not regularly drive through the experimental location
- Participants reported that their most recent journey through the scheme was neither during the baseline period nor the trial period
- Participants reported that they did not drive through either the experimental location or it was not possible to determine whether they had driven through the experimental location (based on their responses to the survey questions that ask where they joined and exited the motorway)
- Participants reported that they did not clearly remember the journey

To answer the research question, responses only from participants who last drove through the scheme at the experimental location were analysed, resulting in a total sample of 87 responses. A summary of their responses is presented in the following sections.

Due to the smaller number of responses from people who drove through the experimental location during the trial period (16), it was not possible to conduct any statistical analyses and caution should be taken when interpreting the results presented in the following sections.

3.6.1 Feelings of safety

Participants were asked to rate how they thought the speed restriction affected their safety. Responses are shown in Figure 21.
Figure 21: Responses to question: “How do you think the speed restriction affected your safety? Did it make you feel...?”

Across the investigation:

- During the baseline period, 46 out of 71 individuals reported the speed restriction did not affect how safe they felt. During the trial period, 9 out of 16 individuals reported the speed restriction did not affect how safe they felt.

- During the baseline period, 12 out of 71 individuals reported the speed restriction made them feel either slightly or very unsafe. During the trial period, 5 out of 16 individuals reported the speed restriction made them feel either slightly or very unsafe.

- During the baseline period, 13 out of 71 individuals reported the speed restriction made them feel either slightly or very safe. During the trial period, 2 out of 16 individuals reported the speed restriction made them feel slightly safe.

Participants were also asked to rate how appropriate they thought the speed restriction was, in terms of safety. Responses are shown in Figure 22.
Across the investigation:

- During the baseline period, 36 out of 71 individuals reported the speed restriction was about right in terms of safety. During the trial period, 6 out of 16 individuals reported the speed restriction was about right in terms of safety.

- During the baseline period, 31 out of 71 individuals reported the speed restriction was too slow in terms of safety. During the trial period, 10 out of 16 individuals reported the speed restriction was too slow in terms of safety.

- During the baseline and period, 4 out of 71 individuals reported the speed restriction was too high in terms of safety. During the trial period, no individuals reported the speed restriction was too high in terms of safety.

As well as the effect of the speed restriction on perceived safety, participants were asked to comment on how the width of the running lanes within the scheme’s road works affected their feelings of safety. Responses are shown in Figure 23.
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Figure 23: Responses to question: “How do you think the lane widths affected your safety? Did it made you feel...?”

Across the investigation:

- During the baseline period, 31 out of 71 individuals reported the lane widths did not affect how safe they felt. During the trial period, 8 out of 16 individuals reported the lane widths did not affect how safe they felt.

- During the baseline period, 36 out of 71 individuals reported the lane widths made them feel either slightly or very unsafe. During the trial period, 8 out of 16 individuals reported the lane widths made them feel either slightly or very unsafe.

- During the baseline period, 4 out of 71 individuals reported the lane widths made them feel either slightly or very safe. During the trial period, no individuals reported the lane widths made them feel either slightly or very safe.

Participants were also asked to rate how appropriate they thought the lane widths were in terms of safety. Responses are shown in Figure 24.
Across the investigation:

- During the baseline period, 27 out of 71 individuals reported the lane widths were about right in terms of safety. During the trial period, 6 out of 16 individuals reported the lane widths were about right in terms of safety.
- During the baseline period, 44 out of 71 individuals reported the lane widths were too narrow in terms of safety. During the trial period, 10 out of 16 individuals reported the lane widths were too narrow in terms of safety.
- During both the baseline and trial periods, no individuals reported the lane widths were too wide in terms of safety.

Finally, in an open question, participants were asked to provide any further comments on their feelings of safety when they last drove between junctions 13 and 15 of the M6. Table 8 shows themes that represent general patterns observed in participants’ qualitative responses.

**Table 8: Themes from participants’ comments in relation to their feelings of safety**

<table>
<thead>
<tr>
<th>Speed restrictions</th>
<th>Baseline period</th>
<th>Trial period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive comments</td>
<td>The speed restriction was appropriate in terms of safety.</td>
<td>The speed restriction encouraged safer driving behaviours.</td>
</tr>
<tr>
<td>Negative comments</td>
<td>It took too much time to overtake other vehicles. Other drivers (including HGV drivers) exceeded the speed restriction. Other drivers drove well below the speed restriction.</td>
<td>HGV drivers exceeded the speed restriction. Other drivers drove well below the speed restriction. The speed restriction encouraged HGV drivers to tailgate other drivers.</td>
</tr>
</tbody>
</table>
### Baseline period

The speed restriction encouraged other drivers (including HGV drivers) to tailgate other drivers.

The speed restriction encouraged other drivers to hog the middle lane.

### Trial period

The speed restriction encouraged other drivers to hog the middle lane.

<table>
<thead>
<tr>
<th>Suggestions to improve safety</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stricter enforcement of the speed restriction.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Negative comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>The lanes were too narrow.</td>
</tr>
<tr>
<td>Driving alongside other vehicles (especially HGVs) in narrowed lanes did not feel safe.</td>
</tr>
<tr>
<td>The width of the lanes made it difficult to maintain good lane discipline.</td>
</tr>
<tr>
<td>Other drivers (including HGV drivers) had poor lane discipline.</td>
</tr>
</tbody>
</table>

### Suggestions to improve safety

- Implement two wider lanes rather than three narrowed lanes.
- HGV drivers should be permitted to use only the inside lane.
- Stretches of road works should be limited to 5 miles so that drivers are not required to concentrate on maintaining good lane discipline for prolonged periods of time.

### Positive comments

The road works are necessary for improving the carriageway.

### Negative comments

- The carriageway was poorly lit at night.
- The lane markings were difficult to see in wet conditions.
- The lack of hard shoulder reduced feelings of safety.
- Towing a caravan made it difficult to fit into refuge areas.

### Suggestions to improve safety

- HGV drivers should be better taught about the dangers of tailgating.
- Ensure hard shoulders are implemented on all stretches of motorways.

### Other topics

#### Width of lanes

<table>
<thead>
<tr>
<th>Negative comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>The lanes were too narrow.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Suggestions to improve safety</th>
</tr>
</thead>
<tbody>
<tr>
<td>HGV drivers should be better taught about the dangers of tailgating.</td>
</tr>
<tr>
<td>Ensure hard shoulders are implemented on all stretches of motorways.</td>
</tr>
</tbody>
</table>
3.6.2  Journey satisfaction

Participants were asked to rate how they thought the speed restriction affected their journey satisfaction. Responses are shown in Figure 25.

![Figure 25: Responses to question: “How satisfied or dissatisfied were you with the speed restriction?”](image)

Across the investigation:

- During the baseline period, 41 out of 71 individuals reported the speed restriction did not affect their journey satisfaction. During the trial period, 7 out of 16 individuals reported the speed restriction did not affect their journey satisfaction.

- During the baseline period, 24 out of 71 individuals reported the speed restriction made them feel either somewhat or very dissatisfied. During the trial period, 9 out of 16 individuals reported the speed restriction made them feel somewhat or very dissatisfied.

- During the baseline period, 6 out of 71 individuals reported the speed restriction made them feel either somewhat or very satisfied. During the trial period, no individuals reported the speed restriction made them feel either somewhat or very satisfied.

Participants were also asked to rate how appropriate they thought the speed restriction was, in terms of their own journey satisfaction. Responses are shown in Figure 26.
Figure 26: Responses to question: “In terms of journey satisfaction, do you think the speed restriction was...?”

Across the investigation:

- During the baseline period, 36 out of 71 individuals reported the speed restriction was about right in terms of journey satisfaction. During the trial period, 6 out of 16 individuals reported the speed restriction was about right in terms of journey satisfaction.

- During the baseline period, 32 out of 71 individuals reported the speed restriction was too slow in terms of journey satisfaction. During the trial period, 10 out of 16 individuals reported the speed restriction was too slow in terms of journey satisfaction.

- During the baseline period, 3 out of 71 individuals reported the speed restriction was too high in terms of journey satisfaction. During the trial period, no individuals reported the speed restriction was too high in terms of journey satisfaction.

Participants were asked to rate how they thought the lane widths affected their journey satisfaction. Responses are shown in Figure 27.
Figure 27: Responses to question: “How satisfied or dissatisfied were you with the lane widths?”

Across the investigation:

- During the baseline period, 32 out of 71 individuals reported the lane widths did not affect their journey satisfaction. During the trial period, 9 out of 16 individuals reported the lane widths did not affect their journey satisfaction.

- During the baseline period, 38 out of 71 individuals reported the lane widths made them feel either somewhat or very dissatisfied. During the trial period, 6 out of 16 individuals reported the lane widths made them feel either somewhat or very dissatisfied.

- During the baseline period, 1 out of 71 individuals reported the lane widths made them feel very satisfied. During the trial period, 1 out of 16 individuals reported the lane widths made them feel somewhat satisfied.

Participants were also asked to rate how appropriate they thought the lane widths were, in terms of their own journey satisfaction. Responses are shown in Figure 28.
Figure 28: Responses to question: “In terms of journey satisfaction, do you think the lane widths were...?”

Across the investigation:

- During the baseline period, 29 out of 71 individuals reported the lane widths were about right in terms of journey satisfaction. During the trial period, 9 out of 16 individuals reported the lane widths were about right in terms of journey satisfaction.

- During the baseline period, 42 out of 71 individuals reported the lane widths were too narrow in terms of journey satisfaction. During the trial period, 7 out of 16 individuals reported the lane widths were too narrow in terms of journey satisfaction.

- During both the baseline and trial periods, no individuals reported the lane widths were too wide in terms of journey satisfaction.

Finally, in an open question, participants were asked to comment on their journey satisfaction when they last drove between junctions 13 and 15 of the M6. Table 9 shows themes that represent general patterns observed in participants’ qualitative responses.
Table 9: Themes from participants’ comments in relation to their journey satisfaction

<table>
<thead>
<tr>
<th>Speed restrictions</th>
<th>Baseline period</th>
<th>Trial period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive comments</td>
<td>The speed restriction was acceptable.</td>
<td>The 60mph speed restriction was better than a 50mph speed restriction.</td>
</tr>
<tr>
<td>Negative comments</td>
<td>Other drivers (including HGV drivers) exceeded the speed restriction. The speed restriction encouraged HGV drivers to tailgate other drivers. The speed restriction encouraged HGV drivers to overtake other vehicles.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Width of lanes</th>
<th>Baseline period</th>
<th>Trial period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative comments</td>
<td>Driving alongside HGVs in narrowed lanes did not feel comfortable. Some HGV drivers had poor lane discipline.</td>
<td></td>
</tr>
<tr>
<td>Suggestions to improve journey satisfaction</td>
<td>HGV drivers should be permitted to use only the inside lane.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other topics</th>
<th>Baseline period</th>
<th>Trial period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative comments</td>
<td>The stretch of road works was too long. The road works were taking too much time to complete. Other drivers (including HGV drivers) hogged the middle lane. The carriageway was poorly maintained. The lack of hard shoulder reduced levels of journey satisfaction.</td>
<td>The stretch of road works was too long.</td>
</tr>
<tr>
<td>Suggestions to improve journey satisfaction</td>
<td>Increase police presence through road works to discourage drivers from hogging the middle lane.</td>
<td>Improve provision of information regarding road closures.</td>
</tr>
</tbody>
</table>

3.7 Scheme delivery and cost

3.7.1 Delivery

Overall the scheme indicated that delivery of the work activities was not impacted by the 60mph speed restriction. Discussions recorded as part of the lessons learned workshop concluded that the trial and implementation of a 60mph speed restriction had not impacted on the delivery schedule of the specific phase of work in question.
3.7.2 Cost

To safely implement the 60mph speed restriction between junctions 13 and 15, several additional key mitigations and activities were required. These included:

▪ Higher containment vehicle restraint systems and end terminals.
▪ Mobile variable message signs used for incident management.
▪ Additional static signing (speed restriction signs).

Along with the costs of these additional mitigations, an additional cost was incurred by the scheme to implement the trial of a 60mph speed restriction:

▪ Temporary radar installations used for monitoring traffic during the investigation.
4 Conclusions

This section summarises the conclusions from the investigation. These conclusions are based on the findings from a single investigation undertaken at a specific scheme. Both the design and implementation of the scheme’s traffic management and trial mitigations impact greatly on the behaviours identified. As such, caution should be taken when using these conclusions to inform decisions about implementing future 60mph speed restrictions on schemes with different designs.

As part of the final project report, the conclusions from this report will be brought together with those from other participating schemes. This final report has been outlined later in section 6.2.

4.1 Impact of change in speed restriction on driver behaviour

Analysis of driver behaviour during periods of free-flowing traffic showed that, on average, drivers appeared to respond to the increase in speed restriction from 50mph to 60mph by increasing their travelling speed (from about 47mph in the baseline period to 51mph in the trial period, on average). The increase in average vehicle speed was consistent across all three carriageway lanes with the offside lanes seeing the highest speeds. This increase in average vehicle speed resulted in an estimated average journey time reduction of around 35 seconds per driver.

The speed differentials between vehicle classes were also affected by the change in speed restriction. During the trial period, the difference between the observed average vehicle speeds of cars and LGVs compared to HGVs marginally increased by around 2mph.

Whilst average speeds increased, overall compliance with the posted speed restriction was higher in monitoring sections with the 60mph speed restriction than the 50mph speed restriction. About 11% of the drivers observed during the investigation were travelling above 50mph in the baseline period, but a substantially lower proportion chose to travel above 60mph in the trial period (2%).

A similar trend was observed in the behaviours of HGV drivers; overall compliance with the posted speed restriction was higher in the sections with a 60mph speed restriction than the 50mph speed restriction. Around 7% of HGV drivers travelled above 50mph in the baseline period, and a lower proportion (near 0%) travelled above 60mph during the trial period.

The scheme in general experienced relatively consistent levels of close following between vehicles across the investigation. There was, however, a small change due to the change in speed restriction; around a 2% reduction. The proportion of HGVs close following also dropped marginally across the monitoring periods by around 2%. This change was likely related to the difference in average vehicle speeds and compliance after the change of speed restriction.

The number of reported incidents varied marginally during the investigation, but overall numbers of incidents were low and too small to enable statistical analysis. The marginal difference in the number of reported RTCs on both the northbound and southbound carriageways cannot be confidently attributed to the change in the speed restriction.
Overall, in terms of safety, survey respondents from the scheme’s workforce indicated the 50mph speed restriction was about right. The number of survey responses was too small to identify a clear pattern in perceptions of the 60mph speed restriction. There was a broad spread in perceptions of safety across the workforce; some indicated the speed restriction did not affect how safe they felt, for some it made them feel unsafe, and for others it made them feel safe. Due to a small number of responses from the workforce during the trial phase, it was not possible to identify statistically significant changes in perceptions between 50mph and 60mph.

4.2 Impact of change in speed restriction on workforce and customer satisfaction

Overall, participants’ responses for both the workforce survey and customer satisfaction survey were mixed.

Generally, workforce survey participants felt that neither the 50mph nor 60mph speed restriction affected their feelings of safety. Most workforce survey participants also felt that both speed restrictions were ‘about right’ in terms of safety.

Due to the limited number of responses to the customer satisfaction survey during the trial period, no conclusions could be drawn from these data. Responses during the baseline period were mixed but indicated that most participants felt the 50mph speed restriction did not affect their feelings of safety or journey satisfaction, and that the lane widths made them feel unsafe and dissatisfied. Additionally, some participants felt the 50mph speed restriction and lane widths were about right in terms of safety and journey satisfaction, whereas others tended to report that the speed restriction was too low and the lanes were too narrow. Qualitative feedback obtained during the customer satisfaction survey was also mixed and suggests that some participants welcomed the 60mph speed restriction, whereas others were opposed to it.

Due to small sample sizes for both the workforce survey and customer satisfaction survey, it was not possible to test for any statistically significant changes in perceptions between the 50mph and 60mph speed restrictions. Therefore, there is no robust evidence to show either an increase or a decrease in self-reported workforce or customer satisfaction due to the change in speed restriction from 50mph to 60mph.

4.3 Impact of change in speed restriction on scheme cost and delivery

Feedback from the scheme suggested that the introduction and application of a 60mph speed restriction had no negative impact on the schedule and delivery of the works.

Several large fixed costs were also incurred to implement additional risk mitigations, such as higher containment vehicle restraint systems, mobile variable message signs and additional static signing. This information will be used to inform future use of 60mph speed restrictions within road works and will be presented alongside future guidance material.
5 Other investigations

5.1 Highways England customer audits

Separate to this investigation, Highways England’s insight team investigated the impact of the change in speed restriction on customer satisfaction by undertaking customer audits of the scheme. For ease of reference, and with permission from Highways England, a copy of the report can be seen in Appendix C.

For these customer audits, undertaken by Ipsos, ‘Auditors’ (members of the public) who lived in the vicinity of the scheme were recruited. These Auditors were given a full written brief detailing where they needed to go, what they needed to look out for and a preview of the survey questionnaire. Auditors were instructed to drive through the scheme and undertake a survey within 24 hours. The survey sought to identify the impact of the speed restriction change on both customer safety and customer satisfaction. A total of 43 surveys were completed, 20 whilst the scheme was in the baseline trial period and 23 during the trial period.

Survey responses were then filtered via a quality control process by a validation team. This team looked for contradictions and irregularities within the responses of each survey. If completed surveys were deemed to be of inadequate quality, they would not be included in the top line results. No surveys were reported to have failed this quality control process for the investigations on the M6.

The headline findings from these customer audits are summarised below. Some caution is advised in the extrapolation of these results since a small sample of Auditors was used. In addition, no details are provided in the “Top Line Results” report (Ipsos, 2020) with regard to whether statistically significant differences were identified between the 50mph and 60mph phases; therefore, it is not possible to draw robust conclusions from these data regarding the impact of the increased speed restriction.

Key points noted in the ‘Top Line Results’ report (Appendix C) are as follows:

- 20 out of 20 Auditors (100%) felt 50mph was appropriate for the conditions and 22 out of 23 Auditors (96%) felt 60mph was appropriate.
- 20 out of 20 Auditors (100%) reported that the signage was easy to see in the control (50mph) phase and 23 out of 23 (100%) reported it was easy to see in the trial (60mph) phase.
- 19 out of 20 Auditors (95%) indicated that they felt safe traveling at 50mph and 23 out of 23 (100%) said they felt safe traveling at 60mph.
- 20 out of 20 Auditors (100%) were satisfied with the 50mph speed restriction and 23 out of 23 (100%) were satisfied with the 60mph speed restriction.
- 20 out of 20 Auditors (100%) felt the 50mph speed restriction was about right and 23 out of 23 Auditors (100%) felt the 60mph speed restriction was about right.
5.2 Highways England social media listening

Separate to this investigation, Highways England’s insight team investigated the impact of the change in speed restriction on customer satisfaction by monitoring social media postings using a ‘TalkWalker’; a specialist social listening tool. The tool utilised a search query, containing the following key words:

- “50” or “60” or “speed” or “limit” or “mph”; and
- “M6” or “Stafford” or “Stoke” or “before Keele” or “motorway”; and
- “Stafford” or “Keele” or “Stoke” or “A50” or “A500” or “J13” or “J14” or “J15” or “junction 13” or “junction 14” or “junction 15”

During the investigation, a total of seven relevant mentions in relation to the speed restriction were found. Whilst most customer feedback indicated that customers recognised and acknowledged the speed restriction increase to 60mph, the feedback varied. Although two mentions were complimentary and praised the increased speed restriction, two other mentions suggested that drivers were driving well below the 60mph speed restriction, therefore hindering any potential benefits. As with previous speed restriction trials, there was also one mention that the speed restriction remained at 50mph. Additionally, another mention indicated general concern for the safety of road workers, although this feedback was not specifically about the M6 (Highways England, 2020).
6 Next steps

6.1 Continued use of 60mph at the M6 J13-15 scheme

Upon completion of the trial of 60mph, a review and validation exercise was undertaken by the scheme to determine if the 60mph speed restriction could be implemented across the remainder of the works until the scheme’s completion.

In line with the agreed monitoring process, detailed in the scheme-specific risk assessment, available data were reviewed to determine if the safety objectives had been met during the trial. Based on this review the continued use of the 60mph speed restriction was approved, including the inclusion of a new section on the northbound carriageway between junctions 14 and 15.

6.2 Implementation of 60mph at other schemes

This is the seventh investigation of a 60mph speed restriction within road works as part of the wider project. TRL is working closely with Highways England to implement 60mph speed restrictions at other schemes on the Strategic Road Network. Several additional lessons learned were captured as part of this investigation; these have been outlined in Appendix B and should be considered when implementing the 60mph speed restriction on other schemes in the future.

The results from future investigations (each to be presented in their own report) will be collated together (in a toolkit) once the monitoring programme is complete.

The toolkit will enable robust recommendations to be made based on a large and substantial evidence base, with findings being used to inform guidance material into the use of appropriate speed restrictions within road works.
Acknowledgements

The following individuals (or organisations) contributed directly to the investigation of a 60mph speed restriction within the M6 J13-15 scheme:

- Janice Allen, Lee Wise and Benyam Kenbata – Highways England
- Gavin Jones, Richard French, Rees Evans, Rob Doherty and Jill Doyle – Kier
- Richard Younge, Cengiz Guner – Chevron
- Alan Dalley, John-Paul Doherty and Natalie Allen – Atkins

References


Appendix A  PSCRG Members

Principal members:

- A senior Highways England Project Manager and/or Senior Responsible Owner
- Lead consultancy support, with relevant risk assessment knowledge, competence, design understanding and experience with Highways England safety governance procedures
- Network Delivery and Development Senior User
- Customer Operations Senior User
- Competent Designer Safety / Operations Expert
- Project Construction, Design and Management Coordinator
- Contractor representative (when appointed)
- Professional and Technical Solutions Safety Risk and Governance representative

Specialist members:

- Additional technical support (Professional and Technical Solutions specialists or external subject matter experts, as required)
- The Design Team Project Manager
- Asset Support Contract representative
- Maintenance representative, including technology
- Stakeholder representative (e.g. other RCC/Traffic Officer Service representatives)
Appendix B  Lessons learned

To understand the impact of the change in speed restriction on the scheme’s delivery and costs, a lessons-learned online meeting was held after the trial had ended. This session sought to capture details on any impacts to the scheme associated with implementing the change in speed restriction. Attendees included: the scheme’s Highways England Project Manager, Principal Contractor, Traffic Management Supplier and Risk Contractor. This document reports the key points identified during the meeting and may not be reflective of the views from all industry stakeholders. The following questions were posed to attendees.

Question: How do you feel that the trial went on a general level; what worked well, what didn’t and why?

Summary of key points made:

- Having a choice of several locations for the trial made the planning stage easier and minimised risks to the safety of drivers and the workforce. The trial was implemented in an area where road works were complete, so risks to the workforce’s safety was minimised. The location choice was also aimed at maximising the area available for the trial.

- Because the trial was funded using designated funding, some aspects of internal Highways England finance processes were challenging. However, this should not be a recurring issue. In future, additional planning in the development stage should mean that costs are made clearer earlier on.

- Wider issues with the programme beyond these trials caused delays in the implementation of this scheme.

- There were challenges around departures for the setback of barriers, which were difficult to overcome, but an acceptable solution was eventually achieved.

- Contra-flow crossover points at areas with a 50mph speed restriction were not lit because the lighting could not be maintained, which posed a risk to road users and road workers.

- There was anecdotal evidence that speeding was prevalent between junctions 14 and 16. However, the workforce was encouraged to provide feedback on driver compliance and no negative feedback was received.

- Compared with a 50mph speed restriction, Traffic Officers reported a significant reduction in the amount of tailgating by HGVs when the 60mph speed restriction was in place. Anecdotally, this made other drivers feel safer and improved their experience of driving through the scheme.

- The DVSA provided feedback that the 50mph speed restriction made it difficult for them to physically catch up with HGVs for enforcement purposes, as the DVSA are not permitted to exceed the speed restriction but HGVs regularly travel at 50mph or faster. Therefore, the DVSA expect that increasing the speed limit to 60mph would make it easier to conduct their enforcement operations due to HGV speed limiter settings being 56mph.
Question: During early discussions, did you have concerns relating to changing the speed restriction for this scheme? Were any of these concerns realised and, if so, how?

Summary of key points made:

- Initially, a speed restriction ‘step down’ was proposed at junction 14 because the contra-flow traffic management scenario would not encompass the entire scheme length. There were concerns around how to implement this ‘step down’ and how to communicate it to drivers. However, the scheme decided to implement a speed restriction ‘step up’ instead because this was deemed more appropriate for the scheme.

- Initially, a lane width of three metres was proposed for lane two but there were concerns that this width would be too narrow for HGVs. Therefore, 3.25 metre lane widths were implemented with the aim of making drivers feel more comfortable.

- There were initial concerns about agreeing an enforcement strategy. Decisions on enforcement were focused on protecting the workforce and the police did not express any concerns about compliance and were supportive, which helped to progress the early stages of planning.

- During initial workshops, there were concerns that implementing the 60mph speed restriction would endanger the workforce. However, most of these concerns were alleviated once the location of the trial had been decided (away from the workforce) and the 60mph speed restriction had been implemented. Having access to the dashboard data on the speed of traffic also helped to alleviate these concerns.

- There were concerns that increasing the speed restriction to 60mph would increase the number of incidents, increase the consequences of incidents (such as debris traveling further) and endanger those operating in the main carriageway (for example, recovery operatives). However, the number of collisions (two) and breakdowns was similar to those in other areas of the scheme. There may have been more tyre punctures when the road surface was poor, but this was expected.

- The location of the scheme usually has poor weather conditions (such as mist, fog, snow and ice). Associated safety concerns included reduced visibility and tyre grip. Although the location of the scheme was foggy at times, the weather conditions caused no significant safety issues.

Questions: What could have helped you overcome those concerns? What would you have liked to have done?

Summary of key points made:

- In future, it could be beneficial to know what the whole supply chain thinks of the 60mph trials.

- Customer experience could be improved through monitoring incidents more effectively (for instance, by using CCTV).

Question: Was any additional traffic management equipment required to make the scheme suitable for a 60mph speed restriction? If so, what?

Summary of key points made:
Pinned barriers were used for the entire road works section and departure was required for those barriers.

VMS displaying the message ‘New speed limit ahead’ was acquired.

**Question:** Were any additional maintenance activities undertaken during the trial of the 60mph speed restriction? If so, what were they?

No additional maintenance activities were undertaken.

**Question:** Were any modifications to risk assessments and method statements required?

Summary of key points made:

- A scheme-level GG104 risk assessment was required, but shared risk assessments from other schemes helped to create this risk assessment.
- Traffic management and recovery contractors were satisfied with the risk assessments and method statements.

**Question:** Were additional staff required to implement the use of a 60mph speed restriction? If so, what was the impact of this on budget compared to if the scheme has not been running at 60mph?

There were no additional staff required. Extra work was required to complete the risk assessment, but this was not too onerous.

**Question:** In summary, what were your feelings on the impact of using a speed restriction of 60mph, rather than 50mph, within the scheme on: the safety of both road users and road workers, the satisfaction of customers, the cost of the scheme’s road works and the delivery schedule of the scheme?

Summary of key points made:

- Generally, everything went well: costs were minimised, programmes were not affected by the 60mph trial and there were several locations to choose from for the implementation of the trial.
- Only one customer comment was received, indicating appreciation for the 60mph speed restriction and a positive experience of driving through the scheme. No negative customer feedback was received. Anecdotally, other drivers were also appreciative of the 60mph speed restriction.
- Some road workers felt unsafe during the trial because the speed of HGVs remained largely unchanged after implementing the 60mph speed restriction.

Following the lessons learned meeting, all those who were unable to attend were offered the opportunity to provide comments via email.
Appendix C  Ipsos customer audits

Highways England
Customer Audits – Speed Trials – M6 J13-15
Top Line Results
March 2020
## Contents

- Introduction & Methodology
- Results
- Conclusions & Recommendations
Research Methodology

Schemes

Customer Audits conducted across the following schemes:

- M6 J13-15
- Highways England have been trialing a new 60mph speed limits whilst going through the M6 J13-15 scheme.
- Auditors were specifically briefed to undertake the usual customer audit but also look out for/observe the speed limit and provide their perception on the limits.

Measurement

Scheme audits assessing:

- The auditors perception of the 50mph/60mph speed limit that was in place.
- The audits were split evenly to gain an understanding of a customers perception of both speed limits

Sample Base

M6 J13-15
n=43

50mph Tests n=20
60mph Tests n=23

This work was carried out in accordance with the requirements of the international quality standard for market research, ISO 20252 and with the Ipsos MORI Terms and Conditions.
Results
Both speeds were appropriate for the conditions

Did you feel the speed limit in place was appropriate for the conditions?

50 MPH

% Yes

100%

“The speed limit of 50mph is perfect for the road conditions. The motorway has narrow lanes and it is heavily used. This speed limit allows everyone to flow through smoothly.”

Base: n=20

60 MPH

% Yes

96%

“The speed limit was good as it allowed traffic to flow. The speed limit felt natural & I liked it. There was full daylight & it was sunny. The road was clear.”

Base: n=23
In addition, the signage was easy to see

Was the signage displaying the speed limit easy to see?

**50 MPH**

% Yes

100%

“Yes. All signage was clear and often displayed. I estimated every 200 meters there was a speed limit sign of 50mph on either side of the carriageway. Motorists could not miss the speed signs.”

Ipsos

Base: n=20

**60 MPH**

% Yes

100%

“Signage was at frequent intervals. A sign also indicated the change in the speed limit.”

Base: n=23
The higher speed limit felt as safe as the lower limit, but traffic effected the average speed of the 60mph tests

Did you feel safe travelling at the speed limit through the scheme?

**50 MPH**

% Yes

95%

“The motorway was very busy, a number of lorries and are were exceeding the speed between the speed cameras. A number of motorists were seen undertaking.”

**60 MPH**

% Yes

100%

“I felt safe because it was a clear day, low traffic volume and the lanes were wide enough. The solid barriers on either side of the carriageway also added to the feeling of safety.”

Average speed recorded by the auditor = 49 mph

Base: n=20

The average speed was provided by the auditors verbatim based on what they recorded during the journey

Average speed recorded by the auditor = 50 mph

Base: n=23
The auditors felt that both speed limits were suitable – a few auditors noted that the change of speed for the 60mph trials made the drive a little unpredictable.

Did you think the speed limit was too high / too low / just right?

**50 MPH**

% Just Right

100%

“It was a speed that drivers seemed comfortable with and that allowed for free movement.”

Base: n=20

**60 MPH**

% Just Right

100%

“Speed was varied which changed behaviours of other traffic which is unpredictable at times.”

Base: n=23
Traffic didn’t effect the 50mph tests frequently but it did play a part more often in the 60mph audits. None the less, when they were able to travel at the speed limit the 60mph auditors were more satisfied.

How satisfied were they with the speed limit?

<table>
<thead>
<tr>
<th>Speed Limit</th>
<th>Very Satisfied</th>
<th>Satisfied</th>
<th>Neither Satisfied</th>
<th>Dissatisfied</th>
<th>Very Dissatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>50 MPH</strong></td>
<td>90%</td>
<td>10%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td><strong>60 MPH</strong></td>
<td>78%</td>
<td>22%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

“I like the 50 mph speed limit. The main objective is to keep the traffic moving and that was met. Also, the environmental impact is minimized with less pollution.”

“I really enjoy this speed limit. Any higher would be a danger to the workforce on the road and any lower would be a pain to travel through 2 junctions.”

Base: n=20  
Base: n=23
Recommendations & Conclusions
Recommendations & Conclusions

The traffic conditions didn’t greatly effect the perceptions of the speed limits

Unlike some of the previous speed trials the M6 J13-15 results were not effected in scale by the traffic conditions. What was interesting was that despite the rise in speed, the majority of auditors didn’t feel the need to drive to the speed limit and the average speed was only just over 50mph (mainly due to the road either being clear, or very busy). Both speeds were perceived safe and suitable for the conditions.

Signage was clear and well positioned in all cases

All signage was viewed easily and all auditors were aware of the speed limits in place. Even when traffic was heavy the signage was very easy to see.
Monitoring and evaluation of the 60 mph trials

The purpose of this trial was to understand the impact of changing the speed restriction within the M6 J13-15 scheme from 50 mph to 60 mph on driver behaviour, workforce and customer satisfaction, and the scheme’s cost and delivery. The findings from this investigation will be used, along with other investigations, to inform the development of guidance material for future road works design.

The investigation involved monitoring of data from ‘control’ and ‘experimental’ locations positioned within the road works scheme. Several different data sources were used for both locations across a ‘baseline period’ (when both locations were subject to a 50 mph speed restriction) and a ‘trial period’ (when the control location was subject to a 50 mph speed restriction and the experimental location was subject to a 60 mph speed restriction). These data sources included roadside radar data, scheme incident logs, and online surveys from both customers and the scheme workforce. Feedback from the workforce was also gathered during workshops with scheme representatives.

The change in speed restriction resulted in increased average speeds, reduced average journey times, and reductions in the proportion of drivers travelling over the speed restriction. Little impact on the workforce and customers' self-reported levels of satisfaction was identified. Further findings are detailed within the report.