

M4 Junction 3-12 Smart Motorway (TR 010019) – New evidence on M25

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1. Relevance of new evidence

1.1 Relevance

The two new reports referred to in this submission are the 12 month evaluation reports for two sections of the M25 which have, in part or whole, been reconfigured to Smart Motorway - All Lane Running (SM-ALR). For some reason, Highways England has chosen to submit only one of these reports to the M4 Examination, yet we believe that both are relevant as they are the only reports to date on the success or otherwise of this motorway configuration. They highlight some interesting traits such as increasing traffic flow on the motorway, over and above regional and national growth, along with some safety issues too.

1.2 Missing evidence

These reports are deficient in a number of ways, which is surprising if a proper evaluation of the impact of these substantial public investments is to be properly understood. On traffic flows, for example, there is no analysis of the wider impact on the surrounding road network to see whether there has been an increase or decline in traffic levels. Equally, there has been no comparison of the figures measured here with what was predicted when the case for the expenditure was being made.

It is also notable that there are ongoing issues around the reliability of some of the traffic flow figures due to the radar detectors under-reporting by up to 6%, which could mean that the actual traffic increase due to the road expansion is even greater than recorded here.

Equally, we are surprised that air quality has not been seriously addressed with rather spurious reasons given as to why the impact of one of the schemes could not be assessed. For the other scheme it did not even feature as a subject for consideration apparently. Given the seriousness of the issue, we find it somewhat surprising that it was not even mentioned.

2. M25 J5-J7 12 month evaluation study

2.1 Introduction

The reconfiguration of this section of motorway to Smart Motorway with All Lane Running was completed in April 2014 but was largely focussed on Junctions 5-6. Junctions 6-7 largely retained the hard shoulder apart from one small section near Junction 6 clockwise as its capacity appears to have remained the same¹.

2.2 Headlines

The headlines from the study are:

- Traffic increased by 13% for SM-ALR section clockwise (J5-J6)
- Radar based counters under-reporting by up to 6%
- KSI data was worse for SM-ALR section and compared with previously, although overall casualty rates down
- Large number of non-emergency stops in Emergency Refuge Areas (ERAs) (81% of all stops)

2.3 Traffic flow

The biggest increase in traffic was seen over J5-J6 clockwise, the section that had been converted to SM-ALR. A 13% increase in Average Daily Traffic (ADT) was found compared to increases in all roads flow nationally of 3.3% and 2.1% in the South East². This is a significant increase in traffic, potentially some of it induced by the road expansion.

¹ Figure 1-2, page 8, [SM-ALR Monitoring, M25 J5-7 Twelve Month Evaluation Report](#) – Highways England, January 2016

² Executive Summary, page 5, [SM-ALR Monitoring, M25 J5-7 Twelve Month Evaluation Report](#) – Highways England, January 2016

Traffic flows anticlockwise increased by a more modest 3%, while between junctions 6 and 7 where there was no expansion on the number of lanes, the traffic increase was lower at 2%.

This would suggest that the scheme was responsible for increasing traffic flows on the motorway, over and above expected levels.

Notably, this report highlights the severe problems that Highways England is experiencing with radar detectors, to such an extent that it had to abandon their use for Junctions 5 – 6 and calculate the traffic flows over this section using the data for Junctions 6 – 7 and the slip roads, where the more accurate loop monitors were used (or remained in place). It is reckoned that the radar detectors could be under-reporting traffic flows by up to 6%³.

2.4 Traffic safety

It is difficult to draw any conclusions based on 1 year's worth of data and indeed given the small numbers of killed and seriously injured (KSI) both before and after the figures could be difficult to compare even with a longer time period available post opening.

However, having said that, while overall collisions appear to have fallen, in the KSI category, they appear to have risen by 51%⁴ post the opening. In addition, 8 of the 9 KSI collisions post opening took place on the SM-ALR section between Junctions 5 and 6⁵.

This would suggest that it is not possible to claim that SM-ALR is indeed safer than the standard motorway configuration.

Related to this, Highways England have previously stated that a safety benefit of All Lane Running (ALR) is that it removes "the risk of hard shoulder misuse..."⁶, yet this report shows extensive misuse of the Emergency Refuge Areas (ERA), recording 69 unique stops in 220 hours of monitoring, with 81% of the stops being classified as non-emergency. Highways England has acknowledged this, yet its only response is to state that it will consider increasing driver awareness which to date has not been that effective in reducing abuse of the hard shoulder on traditional motorways.

In addition, the use of ERAs could be potentially more dangerous for vehicles manoeuvring into and out of them – there are in effect laybys. Unlike a hard shoulder, where a car or lorry can pull over straight away and then coast or brake to a standstill, given the length of the ERA, vehicles will end up slowing down in the actual traffic lane to be able to safely enter the ERA. Leaving the ERA a vehicle may not be able to get to a particularly high speed before it has to pull out into the general traffic lanes, causing an increase of risk at this point. With a hard shoulder, vehicles can get to a speed closer to the moving traffic before pulling out into the running lanes.

In addition, there has been quite a high level of ignoring of the red cross or lane closure signs. While the average figure might be a 7% non-compliance, this hides substantially higher non-compliance on occasions, up to 16%, with hundreds of vehicles ignoring the signs⁷. This could pose a substantial safety risk.

³ Paragraph 2.1.1, page 11, [SM-ALR Monitoring, M25 J5-7 Twelve Month Evaluation Report](#) – Highways England, January 2016

⁴ Table 4-1, page 22, [SM-ALR Monitoring, M25 J5-7 Twelve Month Evaluation Report](#) – Highways England, January 2016. Note this is before any adjustment for falling casualties nationally over this period, which would result in this figure increasing.

⁵ Paragraph 4.2, page 22, [SM-ALR Monitoring, M25 J5-7 Twelve Month Evaluation Report](#) – Highways England, January 2016

⁶ Paragraph 6.4.2.4, page 17, Highways England Response to Campaign for Better Transport Written Representation – Summary of representations made at special hearings on environment and safety (with additional evidence)

⁷ Appendix C.2 Red X Compliance, page 48, [SM-ALR Monitoring, M25 J5-7 Twelve Month Evaluation Report](#) – Highways England, January 2016

3. M25 J23-J27 12 month evaluation study

3.1 Introduction

The reconfiguration of this section of motorway to SM-ALR was completed in April 2014 for Junctions 23-25 and November 2014 for Junctions 25-27. The whole length of the motorway was converted to SM-ALR apart from through junctions 23, 25 and 27 where the hard shoulder was retained⁸.

3.2 Headlines

The headlines from the study are:

- Traffic increased between 9-11% (but could be even higher – see point below)
- Traffic flow data based on radar detectors which could have under-reported increase (M25 J5-J7 report says there could be under-reporting of flows by up to 6%)
- Large number of non-emergency stops in ERAs (85% of all stops)
- Air quality report is weak and inconclusive

3.3 Traffic flow

Unlike the previous study for M25 J5-7, all the post opening traffic flows have been measured using radar detectors which have proved to be so unreliable that flows for J25-27 generally haven't been assessed⁹. In addition, one of the sectors of the M25 J23-25 provided results at odds with the other three sectors that it has largely been discounted too.

The report says that:

*"It is not possible to determine whether the technology consistently over counts or under counts because a direct comparison with a ground truth detection method is not available"*¹⁰

but then says later on that:

*"Comparison of radar and loop data for M25 J5 to J6 has shown that radars are under-reporting"*¹¹

Clearly, a comparison has been made between the two technologies and there is evidence that radar technology is not only unreliable but also under-reporting the traffic flows. In contrast, there is no evidence provided to show that radar detectors are over-reporting traffic flows as suggested here.

This is important as it means that the increase in traffic experienced on this stretch of motorway is likely to be a minimum increase and could well be higher than stated. This is not acknowledged in the report.

The biggest increase in traffic was for J24-25 anti-clockwise which saw an 11% increase in ADT. J23-24 anticlockwise saw a 9% increase in ADT as did J23-24 clockwise. The anomaly was J24-25 clockwise which saw a 3% increase but this was largely discounted as being erroneous¹².

⁸ Figure 1-2, page 9, [SM-ALR Monitoring, M25 J23-27 Twelve Month Evaluation Report](#) – Highways England, January 2016

⁹ Paragraph 2.1.1, page 12, [SM-ALR Monitoring, M25 J23-27 Twelve Month Evaluation Report](#) – Highways England, January 2016

¹⁰ Paragraph 2.1.1, page 12, [SM-ALR Monitoring, M25 J23-27 Twelve Month Evaluation Report](#) – Highways England, January 2016

¹¹ Paragraph 2.2, page 12, [SM-ALR Monitoring, M25 J23-27 Twelve Month Evaluation Report](#) – Highways England, January 2016

¹² Paragraph 2.2, page 12, [SM-ALR Monitoring, M25 J23-27 Twelve Month Evaluation Report](#) – Highways England, January 2016

3.4 Traffic safety

As with the previous study it is difficult to draw any conclusions based on such short time periods, exacerbated in this instance as only 6 months of data is available for J25-27. Indeed given the small numbers of killed and seriously injured (KSI) both before and after the scheme was constructed, the figures could be difficult to compare even with a longer time period available post opening. This is further complicated by the fact that a number of the fatalities both before and after are suspected to be suicides and one was a stowaway incident¹³.

Overall figures would suggest a slight fall in collisions but not to the extent that it is possible to claim that SM-ALR is indeed safer than the standard motorway configuration, given that the numbers are not statistically significant¹⁴.

As with the study for J5-7 this report shows even more extensive misuse of the ERAs, recording 392 unique stops in 774 hours of monitoring, with 85% of the stops being classified as non-emergency¹⁵. 96% of HGV stops were classified as non-emergency, which given their slower acceleration and significant mass could mean that they pose an increased risk when they use the ERAs as they will have to slow down in the general traffic lane to enter them and have to pull out into the running lanes, before they have reached their cruising speed.

It should be noted that no misuse of the hard shoulder was observed at J23 and J25¹⁶.

As with the J5-7 report, there has been quite a high level of ignoring of the red cross or lane closure signs. While the average might be a 7% non-compliance, this hides substantially higher non-compliance on occasions, up to 19%, with hundreds of vehicles ignoring the signs¹⁷. This could pose a substantial safety risk.

3.5 Air pollution

The results for nitrogen dioxide (NO₂) are, like safety, generally inconclusive with some measurements appearing to rise and others to fall¹⁸. Some sites also have had less data post the scheme opening, particularly between J25-27 where the scheme did not open until November 2014, with the January to April 2015 figures unadjusted and therefore difficult to compare.

It is premature for Highways England to claim that:

“...the results for the M25 J23-27 Scheme demonstrate that air quality is generally better in the post-Scheme opening air quality monitoring results compared to the concentrations of NO₂ monitored pre-Scheme.”¹⁹

However, while it does acknowledge that the improvements are not being attributed to the scheme, it nevertheless makes these claims and states that therefore that it is likely that there is little to worry about for the M4.

¹³ Paragraph 4.1, page 22, [SM-ALR Monitoring, M25 J23-27 Twelve Month Evaluation Report](#) – Highways England, January 2016

¹⁴ Paragraph 4.2, page 24, [SM-ALR Monitoring, M25 J23-27 Twelve Month Evaluation Report](#) – Highways England, January 2016

¹⁵ Paragraph 4.4.4, page 29, [SM-ALR Monitoring, M25 J23-27 Twelve Month Evaluation Report](#) – Highways England, January 2016

¹⁶ Paragraph 4.5, page 30, [SM-ALR Monitoring, M25 J23-27 Twelve Month Evaluation Report](#) – Highways England, January 2016

¹⁷ Appendix C.2 Red X Compliance, page 48, [SM-ALR Monitoring, M25 J5-7 Twelve Month Evaluation Report](#) – Highways England, January 2016

¹⁸ Table 5-1, pages 32-33, [SM-ALR Monitoring, M25 J23-27 Twelve Month Evaluation Report](#) – Highways England, January 2016

¹⁹ Paragraph 3.6, page 3, [Explanatory Note to the M25 J23-27 Twelve Month Evaluation Report](#) – Highways England

The evaluation report itself states:

“Although NO₂ concentrations exceeded the NO₂ annual mean criterion in both the Before and After periods, they appear to be lower following the opening of the scheme, which is a positive finding. However, it is not possible to directly attribute the reduction in measured concentrations to the scheme itself, as there are many other factors which can cause variation in air quality monitoring data (including changes in fleet composition and contribution from secondary NO₂ (i.e. NO₂ not directly emitted from vehicle exhausts)).”²⁰ [italics by Highways England]

Apart from the optimistic statement that levels appear to be lower when this is not universal, it is clear that it is not able to state what impact the road has had on the levels. In itself, this is both an odd statement and slightly worrying, given the impact that air pollution has on human health and the fact that the UK is still non-compliant some 6 years past the original (legal) deadline to reduce NO₂ pollution to below 40µg/m³. We would have expected there to be more robust monitoring in place and greater priority given to assessing the impact of the road expansion.

The last part of the statement about not being able to tell what impact the scheme might have had because of other influences is also slightly strange given that unless there is some heavy industry in the area, most NO₂ emissions will be from traffic. Changes in fleet composition are also modelled or tracked and could be accounted for, although they are unlikely to have altered dramatically in any case. A gradual improvement is likely to be seen over time, but that generally has been much slower than anticipated.

4. Overall conclusions

These two studies both show a significant increase in traffic levels post scheme completion for those sections of road where capacity was increased. These figures might even be understated in the case of the J23-27 study because of its reliance on radar detectors which were found to underreport by up to 6% in the J5-7 study.

While there is no wider context for these traffic figures, it would suggest that there is the distinct likelihood that the expansion in road capacity has helped to generate new traffic. It has certainly led to more traffic on the M25 corridor, with all the additional impacts that will create. It is interesting that Highways England did not mention these traffic increases in its explanatory note²¹ as if the same impact is seen on the M4 it could significantly increase pollution levels alongside the M4.

On safety, since the results are inconclusive, it is not possible to say that:

“The results show that the overall safety performance over the initial 12 month period has not worsened...”²²

Indeed, given the KSI collision rate on J5-7 which has seen a 51% increase before any adjustment upwards for falling rates over that time period, Highways England should be decidedly cautious in what it claims on safety.

Allied to the high incidence of the misuse of ERAs and non-compliance with Red X signals, it is far from clear that the new SM-ALR configuration is any safer than a standard motorway.

²⁰ Paragraph 7.4.1, page 43, [SM-ALR Monitoring, M25 J23-27 Twelve Month Evaluation Report](#) – Highways England, January 2016

²¹ [Explanatory Note to the M25 J23-27 Twelve Month Evaluation Report](#) – Highways England

²² Paragraph 3.1, page 2, [Explanatory Note to the M25 J23-27 Twelve Month Evaluation Report](#) – Highways England

Air pollution is in a similar situation with inadequate data and analysis to be able to draw any meaningful conclusions. If anything, this highlights the need for robust monitoring both prior to scheme construction and post the scheme opening, with instruments that can flag up immediately, or in fairly short notice, that there is a pollution problem. Waiting 6 months or a year for diffusion tube results and validation is not desirable or appropriate.

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Campaign for Better Transport

Campaign for Better Transport's vision is a country where communities have affordable transport that improves quality of life and protects the environment. Achieving our vision requires substantial changes to UK transport policy which we aim to achieve by providing well-researched, practical solutions that gain support from both decision-makers and the public.

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