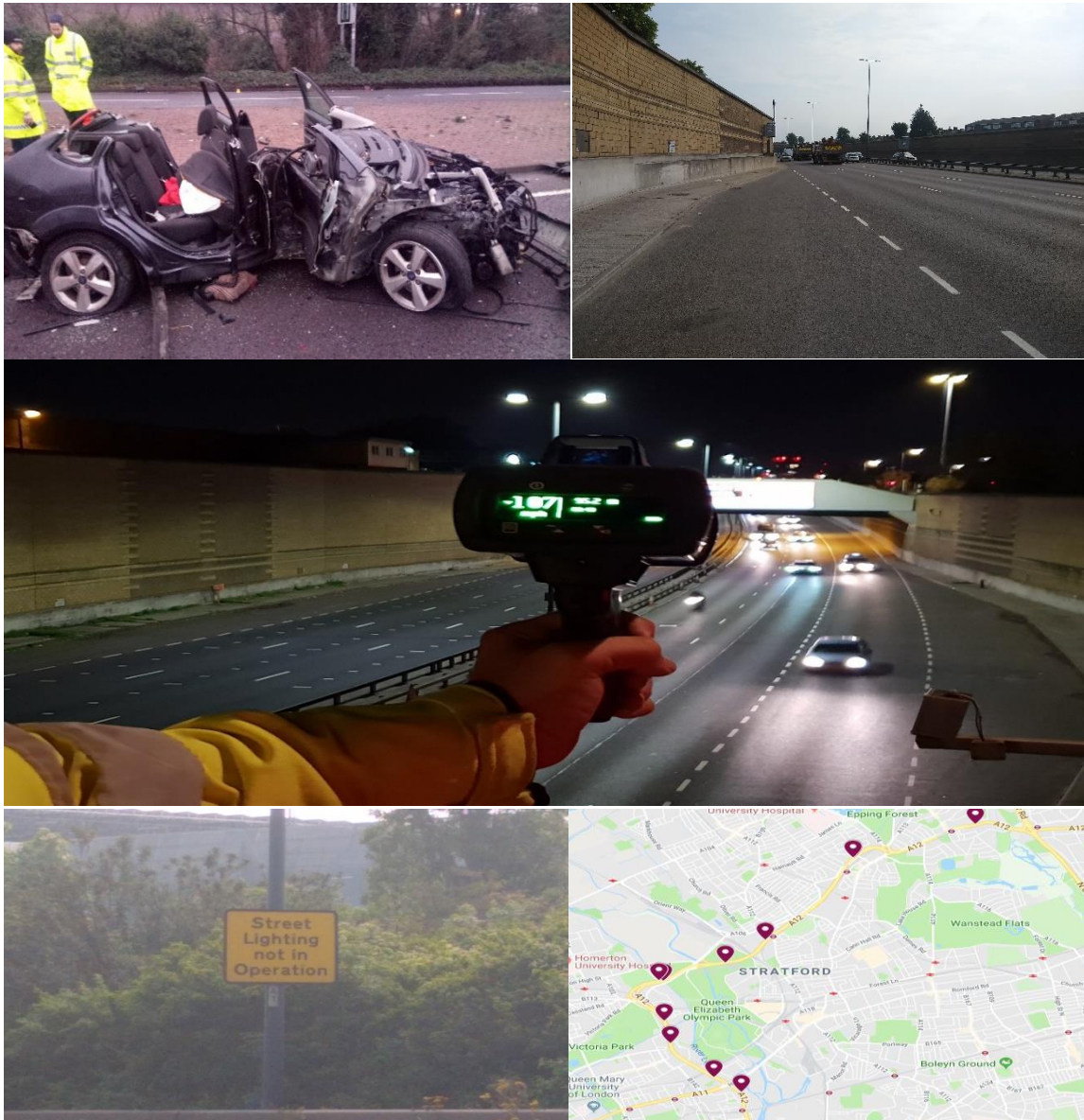


Reducing Road Deaths and Serious Injuries

Operation NESO

Location: A12, North East London, United Kingdom



Cover images left to right from top:

1. Vehicle involved in serious injury collision, January 2018
2. High walls lining the road
3. Pro-Laser speedgun reading of a vehicle in a 50mph limit, January 25th 2019
4. Streetlighting information sign
5. Map showing former speed camera locations

Summary

Scanning

- 5 fatal road traffic collisions on a short stretch of the A12 dual carriageway in a 9 month period
- 3 further serious injury collisions in the same period
- 1 fatality in the previous 10 years on this same section
- All 8 of the recent collisions suggest inappropriate speed as one of the factors
- The last fatality also suggests poor lighting as a factor
- All fatalities occurred during the hours of darkness

Analysis

- All of the parties involved in the 8 serious collisions were male
- The 5 fatalities were aged between 21 and 38
- This section of road had originally had 11 speed/safety cameras in operation. All were now either removed or no longer working
- Streetlighting had been removed across a third of the section in recent years
- Some signage was either inadequate or missing
- The road was never previously a policing priority and there was little data in relation to any previous enforcement activity
- With no adjoining houses or buildings large sections of the stretch, only brick walls, there is very little sensation of speed for drivers

- Very low adherence to the speed limit, especially at night

Response

- Recognition that the solution to the problem was beyond purely an enforcement approach by the Police
- Taken to a joint forum of the newly formed Danger Roads Tactical Tasking and Co-ordinating Group for the development of a joint plan with partners
- Tactical plan (Operation NESO) encompassing Enforcement, Engineering and Education implemented in February 2019
- Initial increased speed enforcement activity aimed at the hours of darkness
- All officers instructed to inform detected offenders of the reason for the enforcement
- Low cost engineering solutions had to be sought due to the very limited budget available to Transport for London as a result of spending commitments in other areas
- Identified a low-cost long-term solution through an average speed camera system supplied by Jenoptiks UK Ltd
- Education approach to later include media releases after there was 'good' news to pass on

Assessment

- Zero fatalities and zero serious injury collisions to date from the start of the operation
- Pro-rata cost saving of £3-4m
- Average speed of offenders reduced from 65mph to 63mph, with the median speed reduced from 77mph to 69mph, in daylight.
- Identified almost immediately that the speeding problem was across most of the day and the operation had to be extended to include the daylight hours

WORD COUNT: 392

Scanning

The A12 road has its origins back in Roman times and in the passing years has had some re-routing leaving it in its current route from the Blackwall Tunnel in east London all the way to Great Yarmouth on the east coast of England. On its route across London it passes through 5 of the 32 boroughs in the capital (Tower Hamlets, Hackney, Waltham Forest, Redbridge and Havering).

In the 1960's the government first proposed improving the section between Hackney and the M11 motorway (freeway). This would mean a dual carriageway road that would make journeys from the East Midlands all the way to the most eastern crossing of the Thames in London at the Blackwall tunnel significantly faster. It would be a great improvement on the existing, congested single carriageway roads through residential areas. This project became known as the M11 Link Road and became the focus of attention for large, organised protests that went on for some years.

These protests were eventually ended in 1994 with the road opening entirely by 1999. This stretch is roughly 6 miles long with 3 lanes in each direction. There are no traffic lights with junctions controlled by on and off slip roads at (from east to west) Redbridge, Wanstead, The Green Man, The Lea Interchange, Old Ford and Bow and there are three tunnels named George Green, Green Man and Eastway/Wick. The speed limits set at that time are still in force today with the section between The Green Man and The Lea Interchange set at 50mph and the rest is at 40mph.

With the way the road was built there are no houses directly adjoining the road and very few businesses. Most of the route is bordered by either high brick walls or the open expanse of the London 2012 Olympics site for which this road served as the main access route.

During the design and build stages the road was under the authority of the, now defunct, London Regional Transport (LRT) body. In conjunction with what is now the Metropolitan Police Road Safety Engineering Unit (RSEU) it was decided that the nature of the road would give rise to drivers travelling at speeds higher than the posted limits as the road 'felt' like a motorway where the speed

limit is 70mph¹. To prevent this, several sites for static speed enforcement cameras were identified and in total 11 cameras were placed along the 6 mile stretch of road. This caused some negative press attention as they were reasonably new and unpopular with the public. The general rule governing the siting of them was that they were put into collision hotspots where it could be shown that speed was a factor². As the road was brand new how could the cameras be justified? The Police and LRT successfully argued their case and the cameras were put in.

Shortly after the road fully opening there were political changes in London and a Mayor post introduced. In turn this created a single body to deal with all transport across London, Transport for London (TfL), and they became responsible for the maintenance and governance of the road. It quickly became an integral part of London's arterial road network and still is today.

Reliable statistics in relation to fatalities on this road only go back to 2003. These show that between 2003 and 2018 there were 3 fatalities with the last one occurring in August 2008. Between April 2018 and January 1st 2019 there were 5 fatalities. Added to these there were 3 further collisions involving serious injury in 2018. In 2017 there were just 3 serious injury collisions on this stretch of road (no fatalities) making the 2018 total Killed or Seriously Injured (KSI) figures a 266% increase year on year. In the same period, across London, road traffic fatalities dropped from 152 in 2017 to 122 in 2018 a decrease of 19.7%.³

Looking closer at the collisions; all parties involved were male and all of the deceased were aged between 21 and 38. All fatalities occurred during the hours of darkness and initial indications were that inappropriate speed was a factor in all 5 with lack of street lighting a factor in the latest.

The streetlighting in question was between Bow and the Lea Interchange, covering roughly a third of the stretch. This had been removed due to its age and condition and not replaced due to lack of available funds. The 11 speed cameras that had been in place for many years had been removed or not replaced when an upgrade was due⁴. In addition, there was some signage and road markings that were inaccurate or missing altogether.

The Department for Transport is the UK government department who lead on all things transport related. Their latest figures that estimate the cost of KSI collisions state each fatality costs the country £2.1m (\$2.7m) and each serious injury £243k (\$314k). In total these 6 miles of road cost the country £11.2m (\$14.5m) in a single year⁵.

In terms of the length of time the road has been in use this issue has appeared almost overnight and with the collisions spread over the year there was no indication that it would stop without intervention. In the same year events across the rest of London had the main Police focus on knife crime and reducing youth murders. It was subject to worldwide media and national government attention. Specialist Traffic officers based within the Roads Policing Teams (RPT) were being abstracted to deal with this problem⁶. In addition, TfL had seen a significant fall in their funding due to a combination of commitments to large scale infrastructure projects and a reduction in revenues⁷.

There was real concern that, left alone, the collisions would continue and more lives would be lost.

WORD COUNT: 969

Analysis

Before analysing the problem, we must consider that:

- Prior to the issue being identified the road was not well policed. It presented no known problems, there are no business or residential premises present that required any police activity.
- The road itself is classed as a “fast road” meaning only a small number of trained officers working within the RPT can stop motorists or deal with incidents on it⁸.
- Although there was some statistical data available it was only accurate for fatalities but not for injury collisions.
- The data recording improved with an interim collision reporting system (COPA) introduced in early 2017, but again it was found not to be totally accurate for locations⁹.

Looking at the serious collisions over the period in question:

- January 21st 2018 Serious Injury, London Borough of Waltham Forest
A single vehicle exits the Green Man Tunnel eastbound at speed and loses control on the bend. Also suspected to have been intoxicated.
- April 9th 2018 0328hrs Fatality, London Borough of Hackney
Driver of a high-performance convertible vehicle enters the Wick Underpass at high speed and loses control on the bend. Rear seat passenger is ejected into the road.
- May 14th 2018 0010hrs Fatality, Waltham Forest
Intoxicated scooter rider driving erratically and at speed loses control.
- May 21st 2018 Serious Injury, Hackney
Suspected intoxicated scooter rider travelling at high speed collides with the rear of another vehicle.
- August 9th 2018 0015hrs Fatality, Waltham Forest
Motorcycle rider travelling at high speed loses control on a bend entering the Green Man tunnel eastbound.
- September 6th 2018 0225hrs Fatality, Waltham Forest
Range Rover enters the Green Man tunnel eastbound in excess of 100mph and collides with the rear of another car, killing the driver of that car.
- September 20th 2018 Serious Injury, Waltham Forest
Motorcycle rider travelling at speed loses control under heavy braking.
- January 1st 2019 0300hrs Fatality, London Borough of Tower Hamlets
Intoxicated pedestrian attempts to cross the unlit carriageway by Old Ford and is hit by a van travelling at speed.

The RSEU would normally identify and highlight any problem roads. Due to a reduction in numbers there was no-one in place in the north east area and their work was divided between those spread

across the rest of the city. They only look to report on fatal collisions and not those resulting in injury. This meant that the only potential pattern was in Waltham Forest where 3 of the 5 fatalities occurred but, through a procedural error, the RSEU were not requested to assist.

The SCIU's are based in geographical quadrants and the north east team led the investigations into 4 of the 5 fatalities. The May 14th scooter rider was dealt with by another team due to the heavy workload at the time in the north east.

TfL Road Safety Engineering have an individual responsible for each borough supported by other units within TfL. These include analysts keeping track of collision data, but they rely on the information supplied to them from the police via the COPA system, which was not designed for collision recording and did not give accurate mapping detail. Consequently, there was no one person taking overall responsibility for the road and no-one highlighted any emerging pattern.

The analysis started in late September 2018 following two very high speed collisions in the Green Man tunnel. Those investigating the various collisions were consulted and all gave the same 2 underlying causes – speed combined with driver/rider error.

A closer look at the infrastructure showed that over time the 11, fixed site, speed cameras had not been maintained nor replaced during the upgrade from wet film to digital. 6 were removed and 5 were no longer operational. They were removed due to their efficacy as the criteria for installing or upgrading the cameras relied on evidence the road in question was a collision hotspot. For 3 previous fatalities in 15 years how could 11 cameras be justified? With budget cuts, money was spent elsewhere where there was evidence of KSIs.

Budget restraints also prevented any formal speed survey from taking place. The only way of collecting any data was by officers carrying out enforcement checks with handheld devices. This took place over 12 nights and the results of this were stark. There was almost zero compliance with the speed limit in the central 50mph section and the 40mph section to the west was little better. Speeds

of over 100mph were common place with some vehicles travelling so quickly Police cars could not catch up. The general standard of driving was quite poor and there was also some evidence of street racing. Working for 2 hours on each of the nights 51 people were stopped and reported for offences. All of them had been exceeding the limit by +50% or more.

Looking at the speed limits. This road is classed as an 'urban motorway'¹⁰ and there are several examples across London's arterial network. The 40mph sections at the eastern and western ends were in place as these both included multiple junctions, underpasses, sharp bends and were prone to traffic build up. The 50mph central third was reasonably straight but with some undulations and only prone to stationary traffic during the evening rush hour. These limits had been set back when the road was first opened with speed cameras in place. They were also in line with the other urban motorways in London that sit inside the inner ring roads. The only difference being the 50mph section was almost entirely lined with high brick walls giving very little sensation of speed.

During this initial analysis period that the 5th fatality occurred and new problems were highlighted. The driver involved had a dashcam fitted and viewing this it showed the marked difference in vision levels between the lit sections in the centre and east and the western section where the streetlighting had been removed. The limit is 40mph and the driver had been travelling at 64mph when he struck a pedestrian in lane 3. This road is not one where pedestrians are ever expected to be. With the lack of lighting the driver was reliant on his headlights alone and as an "unexpected event" the accepted reaction time for such an occurrence is applied¹¹. It was found that even if he had been travelling at the limit he would not have had enough time to react and avoid the collision.

The pedestrian was intoxicated having just left a nearby nightclub. As well as the nightclub the area is being heavily developed with new housing. For access it is serviced by surface streets to the north and east, but to the south and west the A12 and a river form the borders. There is a single road crossing the A12 but it has not been developed at the speed of the other projects with no pedestrian

facilities in place. It is believed the pedestrian was heading to a fast food outlet on the opposite side of the A12 and took the direct route as opposed to the, less obvious, safe route.

Pedestrians have the right of way across all public roads unless specifically prevented from doing so. These preventions take the form of Traffic Management Orders (TMO) and are granted, on application, to the body responsible for the road. There were no signs in place at the point¹² where the pedestrian entered the A12 and on investigation it was discovered that no TMO was in place.

The road as a whole was then looked at with greater scrutiny. It was apparent that the driver in the first fatality had driven along a long, mainly straight carriageway, passing 2 decommissioned speed cameras, over a blind crest and into a sharp right hand bend where he lost control. However, the approach to the double hazard were not very well signed. Although there was a single sign warning of the bend there were no additional warning markings on the carriageway.

When looking at the lack of lighting; it is not unusual to have unlit roads in the UK, although inner London does not have any comparable roads to this section of the A12. It formed part of the existing network that the M11 Link Road connected to and the light columns were 50 years old. They had been removed for safety reasons and in November 2017 TfL began a 2 year trial of no lighting. In the years prior a number of large, digital advertising screens had appeared along the whole length of the A12, with 3 within the unlit section. At night these screens provided the only source of light outside of the vehicle headlights. One of these was within a few feet of the initial impact point of the vehicle involved in the first fatality. It was at the start of a 90 degree right hand bend and came into view just as drivers crest the unlit hill prior to the bend. A second screen was mounted on the side of a bridge that traffic dipped to pass underneath and was directly in the drivers' eye line. Upon passing it the drivers were then immediately back into the unlit area. The effect on night vision was quite pronounced¹³.

There were other signage issues on the carriageway most notably around the eastbound approach to the Green Man tunnel. In common with the Wick Underpass it was a 90 degree bend at the end of

a long, mainly straight approach and the hazard was indicated with a sign but nothing in addition to this.

Examining the participants in the 5 fatalities revealed that other than them all being male there was no other link between them. The 5 deceased were all aged between 21 and 38, but they were not all offending drivers. This possible link was further diluted with the data from those detected in the initial enforcement stage. Officers involved in this all reported that “everybody” was speeding.

WORD COUNT: 1652

Response

Over the years of TfL’s existence the working relationship with the police has grown, operating well at a strategic and management level and there are close inter-actions between RSEUs. At the operational level though there had never previously been a need for a close working relationship.

In 2018 London adopted a Swedish approach to road safety entitled Vision Zero¹⁴. The aim being to reduce road deaths in London to zero by 2041. To tackle some of the anticipated challenges in a more focused fashion a sub group of practitioners from both bodies was created – The Danger Roads Tactical Tasking and Co-Ordinating Group (DRTTCG) and it was to this forum that the issue was taken.

To demonstrate, a movie was made of the road and Operation NESO was then launched.

The aim is the same as for Vision Zero – no road deaths and to do this it takes a three pronged approach.

- Enforcement
- Engineering
- Education

Enforcement- the initial work had shown that speeding, although greater at night, still existed through most of the day. Only officers from the RPT were trained to carry out speed enforcement on the road. Although it would have been beneficial to use officers based within the boroughs the road passes through it was too dangerous.

The main focus remained at night, but officers were tasked to the road at all times of day. To establish a baseline, the mobile speed camera van was used as its enforcement levels are set by the safety camera partnership agreement and have to begin at 47 in the 40 and 59 in the 50.

As expected, the numbers were very high with a total of 697 drivers detected in the first 14 weeks of the operation.

Engineering- Simply enforcing the speed limits through police using handheld detectors was neither sustainable nor adequate. Reducing the speed limits was not an option as there was nothing in place to enforce this and there was no reason to drop them. Raising the limits was dismissed as well, believing that the level of non-compliance would continue but at higher speeds.

The only long term solution lay with cameras. Recommissioning the 11 static cameras was one option. However, these encourage drivers to “surge” between them making their driving erratic as well as fast. An average speed camera system prevents this and are shown to result in better compliance¹⁵. The problematic 50mph section would only require only 2 sets of cameras. With this effectively controlled the opportunity to travel at very high speed would be eliminated.

The lack of lighting presents a larger problem. TfL simply do not have the funding within their current budget to replace the columns. Pedestrian activity continues here so action is ongoing to remove their desire or need to take this route. The nightclub closes very late at night when public transport is limited. They have increased their parking area for Uber cars and encourage their patrons to use these at the same time they warn against crossing the A12. The signage along the whole route is to be refreshed and a TMO sought to prevent pedestrians from entering the

carriageway. In the medium term a pedestrian crossing is planned along the surface street that connects with the A12 directing pedestrians along the safe road with deterrent paving on the footway that leads in the other direction. The fast food retailer have been invited to place a sign at the junction indicating for potential customers to follow the surface road.

Of the advertising screens it was found that the large one on the side of the bridge was in fact owned by TfL. The brightness has been reduced to the lowest setting and greatly reduced the dazzling effect. The other 2 problematic screens are erected on privately owned land and are subject to an ongoing discussion with the owners to take some remedial action.

Education- The desire from the outset was to get the message out to users of the road.

Unfortunately, at the same time there was heavy media coverage of murders in London and more specifically youth knife crime. It wasn't felt beneficial to anyone to go to the media to highlight a second issue involving high fatalities. All officers involved in the enforcement were instructed to tell those stopped why they were there. Like most countries, speed enforcement is seen negatively by those stopped and with all of the murders in the media officers were often asked why they weren't concentrating in that area.

The home post codes of all of the offenders were recorded to determine where any media should be targeted when the time came to go to the press. From this data it was found that two of the boroughs with a large number of offenders do not fully participate in all education programmes aimed at young drivers¹⁶. This is to be addressed.

Those drivers detected by the camera van at the lower end of the scale were offered speed awareness courses as opposed to fines and penalty points¹⁷.

After the first 10 weeks of the operation a statement was released to the media highlighting the work that had already taken place and why¹⁸.

WORD COUNT: 864

Assessment

The clearest evaluation of Operation NESO can be shown by the complete absence of any further fatalities or serious injuries. The cost to the country now £0 as opposed to £11.2m (\$14.5m) for the previous year.

There has been a change in driver behaviour that becomes more obvious when analysing the enforcement. Of the 697 drivers detected in 14 weeks 407 were in the first half and 290 in the second – a reduction of 29%.

The camera van baseline figures were also telling. They attended at the same time of day in week 1 and in week 9, but had to return for a second day in week 9 in order to detect the same number of offenders for comparison. In week 1 there were 5 offenders over 80mph with a top speed of 95mph the median speed being 77mph. In week 9 the highest speed was 79mph and the median now 69mph.

All officers now report that it is taking much longer to detect speeders exceeding the +50% threshold. Previously, speeding drivers did not appear to respond to the presence of a police vehicle either when seen personally or highlighted to them on the various satellite navigation systems that show police activity. It is now apparent that they do.

As the situation continues to evolve while permanent solutions are put in place the role of capable guardian was looked into. The RPT are always going to take the primary responsibility, but they are not the only option. Their enforcement activity has been scaled back down and will continue to focus on small periods of time at night unless that need changes. Other considerations to assist include

- Police Community Support Officers¹⁹. They are to be deployed along the road parked in a marked vehicle. They will then ‘announce’ themselves on the satellite navigation apps²⁰. This has been shown to slow the approaching traffic down.

- Uber drivers. They have an app on their PDA's that can be accessed by TfL. Messages reinforcing the speed limit on the road are to be sent. They make up a high percentage of drivers on the road late at night.
- Mobile road signs. These are to be sited at the roadside at the approaches to the two sharp bends where 3 of the 5 fatalities occurred and display additional warnings²¹.
- Drones. There are plans to experiment with the use of drones for other traffic related purposes and would draw media attention to any such use that should help deter potential speeders²².
- Average speed camera system. The only way the main problem of excess speed is going to be brought to an end is with one of these in place.

The DRTTCG continues to monitor the progress in their monthly meetings. The final solutions to the problems lie with TfL spending money on the infrastructure of the road and these are well into the planning stages with a timetable for works to be released in summer 2019.

The blueprint provided by Operation NESO is to be used for dealing with all danger roads identified in the future.

WORD COUNT: 515

TOTAL WORD COUNT: 4000

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Key Project Team Members

- Danger Roads Tactical Tasking and Co-ordinating Group (Chair- Superintendent Andy Cox)
- Safety Camera Partnership
- Transport for London, Road Danger Reduction
- Transport for London, Road Policing Compliance
- Transport for London, Asset Operations
- Transport for London, Road Safety Engineering
- Transport for London, Analysis and Tasking
- Metropolitan Police, Road Safety Engineering
- Metropolitan Police, Roads Policing Team East
- Metropolitan Police, North East Serious Collision Investigation Unit
- Metropolitan Police, Forensic Collision Investigation Team
- Metropolitan Police, Media and Communications
- Jenoptik Traffic Solutions UK Ltd

Endnotes

¹ In the UK the speed limit in built up areas is 30mph unless otherwise indicated. On other roads it is 60mph unless indicated with the exception of motorways where it is 70mph.

² 2004 Parliamentary advice document regard siting of speed cameras
<https://www.parliament.uk/documents/post/postpn218.pdf>

³ In the period from 2003-2018 road fatalities have significantly reduced across London as shown on this graph. The 3 previous deaths on the A12 occurred in 2003 (1) where there were 272 fatalities across London and in 2008 (2) when there were 221. For 5 to happen when there was an all-time low of 122 in total in London highlights the significance of the problem.



⁴ The sites of the 11 cameras that were removed (2 are in the same place on opposite carriageways, second from the right, and shown as 1 marker).



⁵ Link to latest Department for Transport figures evaluating the cost of road casualties
<https://www.gov.uk/government/publications/reported-road-casualties-great-britain-annual-report-2017>

⁶ Link to Mayor of London announcement of 122 officers from RPTs moving to assist with violent crime reduction
<https://www.london.gov.uk/press-releases/mayoral/strengthening-londons-violent-crime-taskforce>

⁷ Link to BBC news article regarding TfL's finances
<https://www.bbc.co.uk/news/uk-england-london-47640994>

⁸ A "fast road" is any road that has a permanent speed limit above 40mph or is designated as a fast road due to its complex nature or history of collisions. In the past 20 years 6 Metropolitan police officers have been killed on duty as a result of a road traffic collision. In that same period only 1 officer has been killed as a result of violent crime, highlighting the need for the fast road policy.

⁹ The sites of the fatal (in red) and serious injury (green) collisions from January 2017 to January 2019. Note the proximity to the speed camera locations above.



¹⁰ An urban motorway is a motorway constructed in a built-up urban area. These differ from other motorways in a number of respects. Because they serve local as well as inter-city traffic, junctions and access points are generally much closer together.

¹¹ Link to article about reaction times to unexpected events
<https://copradar.com/redlight/factors/>

¹² Typical sign at entry points to all urban motorways that can only be put in place with the authority of a TMO.



¹³ There are studies into the safety of advertising on the road network and also for digital media, but there has not been any study into the effect of going in and out of brightly lit areas caused by these advertising boards. It is to form part of a safety review into all unlit sections of urban motorways.

¹⁴ Link to TfL website explaining Vision Zero
<https://tfl.gov.uk/corporate/safety-and-security/road-safety/vision-zero-for-london>

¹⁵ Link to RAC (Royal Automobile Club) Foundation report into the effectiveness of average speed cameras
<https://www.racfoundation.org/research/safety/effectiveness-average-speed-cameras-great-britain>

¹⁶ More than half of London boroughs participate in an education programme entitled Safe Drive Stay Alive where the emergency services and people affected by road death speak to large groups of teenagers who are about to be old enough to get a driving licence. Hackney and Tower Hamlets don't currently participate.

¹⁷ In the UK drivers are allowed a maximum of 12 points on their licences before they are disqualified from driving. Points are awarded based on the severity of the offence, with the minimum being 3 for speeding and the maximum being an instant disqualification and even prison.

¹⁸ Link to the press release regarding Operation Neso results after 10 weeks
<http://news.met.police.uk/news/over-500-drivers-fined-for-excess-speeding-on-a12-366138>

¹⁹ Police Community Support Officers (PCSO's) have been in UK policing since 2003. They have very limited powers and are not able to do speed enforcement amongst other tasks. There are a number attached to the RPT's and they are sufficiently trained to provide a visible presence on the A12.

²⁰ The main satellite navigation apps allow users to highlight things of note for other drivers, including the presence of Police activity. If enough users highlight the same thing then an icon appears on every driver's screen. This has a noticeable effect on driving behaviour with drivers becoming very speed aware once the image of a police officer appears. By logging into these apps we can announce ourselves and affect driving behaviour without having to do any enforcement. Example below from the app "Waze".



²¹ An example of a mobile road sign. These are not a common sight on roads and are normally used to highlight something out of the ordinary of a temporary nature.



²² Currently in the UK we do not use any aircraft to enforce speed and have only recently started experimenting with drones for other areas of policing. Once we have sufficient capacity for expanding into using these for traffic enforcement the A12 presents an ideal place for a trial. Link below to a study into the use of drones for speed enforcement
<https://www.sciencedirect.com/science/article/pii/S0001457518308121>