



Road Safety
Camera
Commissioner

REPORT OF THE ROAD SAFETY CAMERA COMMISSIONER TO THE MINISTER FOR POLICE AND EMERGENCY SERVICES

Investigation into 991 infringements issued on 30 June 2013 from the Keilor
Park Drive Bridge, Western Ring Road

Release date: 8 August 2013



PURPOSE

- 1 This report documents the findings of the circumstances surrounding the issuing of 991 infringements detected by the road safety camera system operating at the Keilor Park Drive Bridge on the Western Ring Road on 30 June 2013 between 12:09 pm and 1:22 pm.

BACKGROUND

- 2 On Friday 26 July 2013, Mr Tim Hansen spoke to Mr Neil Mitchell on Radio 3AW regarding his alleged speeding infringement, which was detected by a road safety camera at the Keilor Park Drive Bridge on the Western Ring Road on 30 June 2013.
- 3 Later that morning, Superintendent McWhirter of the Victoria Police Traffic Camera Office spoke to Mr Mitchell and confirmed that a lowered speed limit of 40 km/h was implemented on 30 June 2013 between 12:09 pm and 1:22 pm, due to roadworks in the area. He also confirmed that in that 73 minute period, 991 infringement notices were issued.
- 4 Due to the media attention, I spoke to Mr Mitchell and asked motorists who had received infringement notices for exceeding the speed limit at that time, date and place to write to me. I received an initial 26 complaints. As a result of those complaints, I commenced an investigation into the circumstances surrounding the issuing of the 991 infringement notices, pursuant to section 10(e) of the *Road Safety Camera Commissioner Act 2011*. At the time of publication of this report, I had received 50 individual complaints.
- 5 I have been provided with information by Victoria Police about the nature and type of these infringement notices. Of the 991 infringements issued, 987 were issued for exceeding the speed limit and four were issued for driving an unregistered vehicle. A more detailed breakdown is as follows:
 - a. 269 infringements were issued in relation to vehicles travelling 25 km/h or more over the speed limit. These are classified as excessive speed infringements and the penalties include a conviction and suspension of licence
 - b. 718 infringements were issued in relation to vehicles exceeding the speed limit by up to 24 km/h, including 20 heavy vehicles, and
 - c. 4 infringements were issued to owners of unregistered vehicles.

ROAD SAFETY CAMERAS AT THE KEILOR PARK DRIVE BRIDGE

- 6 The road safety camera system at the Keilor Park Drive Bridge consists of two major components: the camera unit, also known as the primary speed calculation unit and a set of in-road sensors, also known as the secondary speed calculation unit.
- 7 The type of camera unit, or primary device, is the Gatsometer Digital Radar Camera System-Parabolic (DRCS-P), which is prescribed for use in Victoria by the Road Safety (General) Regulations 2009. This type of device uses radar signals to detect the presence and speed of a vehicle using the Doppler Effect. **Appendix A** contains a detailed explanation of how the Doppler Effect works.

- 8** All fixed road safety camera systems in Victoria are equipped with an independently operating and calibrated secondary speed calculation unit or secondary device. The secondary devices at the Keilor Park Drive Bridge are inductive loop sensors installed where the radar signals hit the road. Inductive loop sensors measure a change in magnetism corresponding to the metallic content of vehicles when they travel over them.

VARIABLE SPEED SIGNAGE

- 9** The approach to the Keilor Park Drive Bridge and beyond is an area where roadworks commonly occur. VicRoads can vary the speed limit between 40 km/h and the normal speed limit of 100 km/h at any time to suit traffic volume or roadworks. Changes to the speed limit are displayed on electronic variable speed limit signs on both sides of the carriageway. These signs are remotely controlled and they are illuminated.
- 10** When the speed limit is changed by VicRoads, the road safety cameras will adjust to enforce the new speed limit. However, any images of vehicles detected speeding five minutes before and five minutes after a change in speed limit will not result in an infringement being issued. This is to ensure motorists have a fair chance to comply with new speed limits.
- 11** For all vehicles detected speeding at the Keilor Park Drive Bridge, the road safety camera system records images of the speed limit displayed on the nearest bank of electronic variable speed limit signs approaching the camera location. These images show the speed limit before the detection of a speeding vehicle and at the time of the detection. This is done in order to ensure continuity of the speed limit has occurred. These images, in addition to the image of the vehicle that was detected speeding, are sent for manual processing.

LAYOUT OF THE ROAD SAFETY CAMERA LOCATION

- 12** The road safety camera system at the Keilor Park Drive Bridge is located within a variable speed zone. The speed limits are controlled by VicRoads and the road safety camera will automatically adjust to a change in the speed limit.
- 13** Changes to the speed limit are displayed on electronic variable speed limit signs approximately 250 metres before the road safety camera. There are two electronic variable speed limit signs, one on each side of the carriageway. They are monitored by cameras to ensure that the speed limits being displayed are correct and consistent.
- 14** There is one camera per lane for a total of two cameras. The cameras are mounted to the underside of the Keilor Park Drive Bridge, facing north east.
- 15** During the period in question, only the road safety camera monitoring the left-hand lane was active. The road safety camera for the right-hand lane was undergoing maintenance at the relevant time and had been deactivated since 14 April 2013. Hence, all drivers detected speeding were travelling in the left-hand lane.

TRAFFIC MANAGEMENT

- 16** Before roadworks are authorised, VicRoads requires that a traffic management plan be submitted for approval from a VicRoads accredited organisation. Traffic management plans are required in order to ensure a safe environment for workers, as well as minimising (as much as possible) the impact on traffic flow during roadworks. Upon approval of the traffic management plan, VicRoads will authorise the roadworks to be carried out within the period defined in the application.

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- 17** During the roadworks, VicRoads staff may inspect the site to ensure that traffic management is being carried out in accordance with the approved plan and VicRoads guidelines. These inspections are recorded in written reports and stored by VicRoads.
- 18** I have been advised by VicRoads, which has been most helpful, that the traffic management plan it provided relating to the roadworks conducted on 30 June 2013 between 12:09 pm and 1:22 pm showed the following signage and speed limit changes:
- a. Approximately one kilometre before the Keilor Park Drive Bridge, a temporary static sign showed that the speed limit was reduced to 80 km/h, with a warning that roadworks were ahead.
 - b. Approximately 800 metres before the Keilor Park Drive Bridge, a temporary static sign was displayed showing that there was a 40 km/h speed limit ahead.
 - c. Approximately 600 metres before the Keilor Park Drive Bridge, a temporary static sign showed that the 40 km/h speed limit zone began.
 - d. Approximately 450 metres before the Keilor Park Drive Bridge, a temporary static sign advised motorists to merge right from three lanes into one lane ahead.
 - e. Approximately 300 metres before the Keilor Park Drive Bridge, the merging of the lanes began.
 - f. Approximately 250 metres before the Keilor Park Drive Bridge, the variable electronic speed limit signs are installed. These signs displayed a 40 km/h speed limit. The roadworks were located a short distance after these signs.
 - g. In the roadworks zone, temporary bollards were placed to ensure vehicles travelled only in the right hand lane of the carriageway.
 - h. At the end of the roadworks zone, a short distance before the Keilor Park Drive Bridge, both lanes were opened again for traffic.
 - i. The end of roadworks signage which raised the speed limit to 100 km/h was installed 200 metres past the Keilor Park Drive Bridge.

SCOPE OF INVESTIGATION

- 19** The scope of this investigation was to:
- a. Determine whether the road safety camera system on the Keilor Park Drive Bridge was functioning reliably and accurately during the period in question by examining the camera log files recorded on 30 June 2013 and the test and maintenance reports relevant to that period
 - b. Determine whether the electronic variable speed limit signs were correctly displaying a 40 km/h speed limit during the period in question. To do this, I viewed all images of the electronic variable speed limit signs in relation to each of those infringements referred to me by the public, and

- c. Determine the nature and extent of the traffic management relating to roadworks near the Keilor Park Drive Bridge on the Western Ring Road on 30 June 2013 by examining information provided by VicRoads.

RESULTS OF INVESTIGATION

- 20** I am satisfied that the active camera system at the Keilor Park Drive Bridge was functioning reliably and accurately on 30 June 2013 between 12:09 pm and 1:22 pm. After examining the camera log data and the maintenance and test reports for the camera system, it was clear the camera system ensured that all images of vehicles detected speeding sent for further processing, had a corroborating secondary speed measurement and associated variable speed limit sign imagery.
- 21** I am satisfied that in respect of all the infringement notices referred to me by motorists, the variable speed limit signs were functioning correctly on 30 June 2013 between 12:09 pm and 1:22 pm. I have viewed all the images of the electronic variable speed limit signs in relation to each infringement. I can confirm that all of the images of the electronic variable speed limit signs correctly displayed a speed limit of 40 km/h before and at the time of each infringement.
- 22** As a result, I am satisfied that the reduced 40 km/h speed limit was displayed appropriately on a temporary static speed limit sign in addition to the electronic variable speed limit signs. I am also satisfied that all 991 infringements issued from the active road safety camera installed at the Keilor Park Drive Bridge on 30 June 2013 between 12:09 pm and 1:22 pm were issued correctly and are valid.
- 23** Upon examination of the traffic management plan used for the roadworks, I found that the abrupt end of traffic management, a short distance before the road safety cameras installed under the Keilor Park Drive Bridge, was the predominant cause of the large number of infringement notices being issued during this time. After passing the roadworks, both lanes were open with no further roadworks ahead and no further signage before the bridge to indicate that the 40 km/h speed limit was still in force.
- 24** I consider this led to the mistaken assumption by some motorists that the speed limit restriction to 40 km/h was then over and they began to accelerate to what they believed was the correct speed limit. It would seem that a herd mentality set in and many others followed their example.
- 25** Road rules 21(1) and 21(3) of the Road Safety Rules 2009 (see **Appendix B**) state that motorists should adhere to any speed limit until it is contradicted by a different speed limit sign. However, in my view the absence of clear direction relating to the 40 km/h speed limit between the end of the roadworks and the road safety camera system was unfair. This could have been avoided if a further set of temporary 40 km/h signs had been positioned before motorists reached the bridge. If this had been the case, I am confident this investigation would have been unnecessary.
- 26** I do not accept that the signage was sufficient. The "proof of the pudding", in respect of the adequacy of the signage, is surely "in the eating". In my view, some discretion is called for in the face of the startling number of motorists detected speeding and the magnitude of that speeding, during this short period of time.

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- 27** To understand the scale of motorists' misunderstanding in the situation they faced, the Department of Justice also provided figures for the number of vehicles detected speeding on Friday 28 June 2013 and Saturday 29 June 2013 at the Keilor Park Drive Bridge. The speed limit enforced was 100 km/h for the entire day on each of those days. The number of vehicles detected speeding did not exceed three on either of those days. Further, examination of the data for 30 June 2013 showed that outside the period of roadworks, only four other vehicles were detected speeding.
- 28** A possible explanation for motorists who claimed they did not see any 40 km/h signs was because the variable electronic speed limit signs are installed where traffic began to merge from three lanes to one. This may have led to some motorists being distracted by the task of ensuring they completed the merging manoeuvre safely, thus failing to notice the speed limit signs.
- 29** I note advice from VicRoads that in respect of these roadworks, because of their short duration, no physical surveillance was undertaken of the implementation of the traffic management plan. If a physical inspection had been carried out in this case, it might have alerted VicRoads to the potential for confusion due to the absence of a further 40 km/h speed limit sign between the end of the roadworks and the Keilor Park Drive Bridge.

CONCLUSIONS

- 30** From the data presented to me, I am confident that the road safety camera system installed at the Keilor Park Drive Bridge on the Western Ring Road, which was operative on 30 June 2013 between 12:09 pm and 1:22 pm, was functioning reliably and accurately.
- 31** From the infringement images provided to me by the Department of Justice, it is clear that the electronic variable speed limit signs installed at the Keilor Park Drive Bridge on the Western Ring Road were functioning correctly on 30 June 2013 between 12:09 pm and 1:22 pm.
- 32** It follows that I am satisfied that all 991 infringement notices issued from the road safety camera at the Keilor Park Drive Bridge on 30 June 2013 between 12:09 pm and 1:22 pm are valid and were issued correctly.
- 33** It is my opinion that the reason that 987 motorists were detected speeding at the Keilor Park Drive Bridge on the Western Ring Road on 30 June 2013 between 12:09 pm and 1:22 pm was predominantly due to confusion regarding the applicable speed limit once they had driven past the roadworks. This was due to a lack of clear signage in the area between the end of the roadworks and road safety camera system. This led drivers to assume they were in the clear and could revert to a higher speed limit.
- 34** As I have already observed, I believe the presence of an additional 40 km/h sign between the end of the roadworks and the Keilor Park Drive Bridge would have obviated the need for this investigation.
- 35** Unfortunately, the stakes here were higher than usual, because that incorrect assumption involved a belief that the speed limit was 100 km/h, 60 km/h more than the actual speed limit of 40 km/h. This has clearly resulted in the potential of serious sanctions for some motorists involved, including convictions and suspension of licences.

RECOMMENDATIONS

36 As a result of this investigation, I recommend that:

- a. I recognise the 987 Traffic Infringement Notices issued for speeding offences detected on 30 June 2013 between 12:09 pm and 1:22 pm at the Keilor Park Drive Bridge were issued correctly and that each of the motorists did commit an offence. However, in the interests of fairness, I recommend that Victoria Police withdraw those Traffic Infringement Notices and issue Official Warnings in their place. Any infringement penalty paid in relation to these offences should be refunded and any demerit points reversed
- b. In relation to the four infringement notices issued for the offence of driving an unregistered vehicle, these Traffic Infringement Notices remain valid and should not be withdrawn
- c. VicRoads review the traffic management plans of future roadworks located at or near installations of fixed road safety cameras to ensure that there is clarity regarding the applicable speed limit along that length of road
- d. VicRoads ensure that future roadworks conducted at or near installations of fixed road safety camera systems should have conspicuous signage to remind motorists of their obligations to stay within the temporary speed limit applicable to that length of road until advised otherwise
- e. VicRoads ensure that surveillance of roadworks and associated signage always be carried out, irrespective of the duration of those roadworks, and
- f. VicRoads undertake a public campaign to promulgate the obligation of motorists to remain within any temporary speed limits applicable to roadworks zones until they pass signage that defines the end of the roadworks site and the beginning of the next posted speed limit.

CONSULTATION

37 This report was prepared with the cooperation of VicRoads, Victoria Police and the Department of Justice.

APPENDIX A

THE DOPPLER EFFECT

The Doppler Effect is an everyday phenomenon and affects all types of waves, including sound and electromagnetic radiation, such as light or radar. The effect relates to changing frequencies of emitted or reflected sound or light by moving objects from the point of view of an observer. The road safety camera measures the speed of a vehicle by utilising the Doppler Effect to measure the change of frequency of the reflected radar signal from a passing vehicle.

For example, when an ambulance is travelling towards an observer, the pitch or the frequency of the siren's sound is higher. When it begins to move away from the observer, the pitch of the siren becomes lower. By measuring the change in pitch of the sound, it is possible to work out the speed of the ambulance using the Doppler Effect equation.

The general Doppler Effect equation is shown below:

$$f_{received} = \left(\frac{c + v_{observer}}{c + v_{source}} \right) f_{emitted}$$

Doppler Effect variables

Variable	Definition
$f_{received}$	Frequency of returned signal
$f_{emitted}$	Frequency of the emitted signal
$v_{observer}$	The speed of the observer – in this case, it is zero metres per second as the camera is fixed
v_{source}	The speed of the vehicle being measured
c	The speed of light - 299,792,458 metres per second

APPENDIX B

ROAD SAFETY RULES 2009

Sections 21(1) and 21(3) of the Road Safety Rules 2009 define how to follow speed limits in Victoria.

Road rule 21(1) of the Road Safety Rules 2009

The speed-limit applying to a driver for a length of road to which a *speed-limit sign* applies is the number of kilometres per hour indicated by the number on the sign.

Road rule 21(3) of the Road Safety Rules 2009

A *speed-limit sign* on a road applies to the length of road beginning at the sign and ending at the nearest of the following –

- (a) a *speed-limit sign* on the road with a different number on the sign;
- (b) an *end speed-limit sign* or speed derestriction sign on the road;
- (c) if the road ends at a T-intersection or dead end – the end of the road.