

# **ACT Auditor-General's Office**

## **Performance Audit Report**

### **Speed Cameras in the ACT**

**Justice and Community Safety Directorate**

**March 2014**



PA13/10

Mrs Vicki Dunne MLA  
The Speaker  
ACT Legislative Assembly  
Civic Square, London Circuit  
CANBERRA ACT 2601

Dear Madam Speaker

I am pleased to forward to you a Performance Audit Report titled '**Speed Cameras in the ACT**' for tabling in the Legislative Assembly pursuant to Section 17(4) of the *Auditor-General Act 1996*.

Yours sincerely

Dr Maxine Cooper  
Auditor-General  
20 March 2014



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# 1. SUMMARY AND CONCLUSIONS

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## INTRODUCTION

- 1.1 Commonwealth data on road fatalities indicates that ACT roads are the safest of any jurisdiction in Australia<sup>1</sup>, and that ACT roads have become safer<sup>2</sup> over the ten-year period to 2010. Unlike in other jurisdictions, in the ACT most roads are urban, and much of the yearly travel of ACT residents is beyond the ACT's borders. Rural roads in Australia are frequently the location of fatalities and serious injuries.
- 1.2 Ten-year national road safety strategies focus on safety improvements to the road network of each Australian jurisdiction. The ACT Government was a signatory to the 2001-2010 national strategy and to the current 2011-2020 strategy. In addition the ACT Government has published an *ACT road safety strategy 2011-2020* which sets an overall target to:
- ... contribute to a national reduction in the annual number of fatalities and serious injuries of at least 30 per cent by 2020, by achieving a similar improvement in ACT fatalities and serious injuries.
- 1.3 In October 1999 the ACT Government bought second hand camera equipment and implemented its first mobile speed camera system. Prior to this, the ACT was the only jurisdiction in Australia not using any speed cameras, fixed or mobile, for the enforcement of its speed limits.
- 1.4 In 2010 the ACT Government agreed to implement fixed point-to-point speed cameras in an urban environment. The first point-to-point installation commenced operation in February 2012. The ACT was the first jurisdiction in Australia to apply this relatively new technology in an urban environment.
- 1.5 All jurisdictions in Australia use fixed or mobile camera systems for detecting speeding as part of a range of measures to achieve safer speeds and reduce road casualties. Complementary measures include establishing appropriate speed limits, enforcement tolerances and sanctions such as fines and demerits, and encouraging community acceptance as to the legitimacy of Government activity to manage road speeds.
- 1.6 Speed cameras work by acting as a deterrent to driving above the speed limit. Road users comply to avoid the possibility of a speeding fine and other sanctions.

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<sup>1</sup> Productivity Commission, *Report on Government Services*, 2013, para 6.48 road fatalities per 100,000

<sup>2</sup> Australian Transport Council, *National road safety strategy 2011-2020*, p. 11 identifies a 17.6 per cent reduction in road fatalities over the previous ten-year period

- 1.7 Research<sup>3</sup> shows that as travel speed increases, so does the risk of crash involvement and also the risk of serious injury in the crash. According to the *National road safety strategy 2001-2010*, 'on urban main roads with 60 km/h speed limits, the risk of involvement in a serious injury crash has been found to double with each increase of 5 km/h above the speed limit'. National road crash data indicates that speeding is the main behavioural factor in 34 per cent of fatal road crashes<sup>4</sup>.
- 1.8 Since 1999 the ACT Government has issued more than 721 802 camera infringement notices, and collected \$106 million in fines from its speed camera operations. The number of speed cameras on ACT roads has expanded from 2 mobile cameras to 39 fixed and mobile cameras.
- 1.9 In the ACT, as in other jurisdictions in Australia, there are public concerns that the primary purpose of Government speed cameras is to raise revenue<sup>5</sup> rather than save lives. The ACT Government, in its response to the *National road safety strategy 2011-2020*, emphasised its commitment to reducing deaths and injuries, and stated<sup>6</sup>:
- ... the economic cost to the community of ACT road crashes has been conservatively estimated at \$224 million per annum.
- 1.10 In the ACT all fixed cameras are operated by the ACT Government, as are some mobile cameras. ACT Policing is also responsible for speeding enforcement. It conducts operations using a range of mobile speed detection devices. These operations account for around ten per cent of all speeding infringements on ACT roads per year, and include campaigns aimed at high risk road users, and high risk locations such as 40 km/h school zones.
- 1.11 Several jurisdictions in Australia have taken a strategic approach to the use of speed cameras, so that camera investment is supported by a coherent, road network-wide assessment of risks, which informs the selection of camera system types and mode of their operation.

### AUDIT OBJECTIVE

- 1.12 The objective of this performance audit is to provide an independent opinion to the Legislative Assembly on whether:
- there are the right number of speed cameras in the right places;
  - speed cameras are effective in reducing speed; and
  - speed cameras are reliable.

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<sup>3</sup> G Nilsson, *Traffic safety dimensions and the power model to describe the effect of speed on safety*, 2004, and C Kloeden et al, *Travelling speed and the rate of crash involvement*, 1997, 2001, 2002

<sup>4</sup> *National road safety strategy 2011-2020*, p. 25

<sup>5</sup> T Petroulias, *Community attitudes to road safety 2011 survey report*, p. 46

<sup>6</sup> *ACT road safety strategy 2011-2020*, p. 8



- 1.13 In examining the objective, consideration is given to:
- cameras and related speed detection equipment operated by the ACT Government. The audit did not consider speeding enforcement activities conducted by ACT Policing;
  - the evolution of speed camera systems across the ACT road network over the fourteen years they have been in operation; and
  - the planning for speed camera deployment in the future.
- 1.14 Professor Max Cameron of Monash University Accident Research Centre was engaged to provide technical advice, particularly on the effectiveness of different speed camera systems, and on how these have been introduced in other jurisdictions.

## CONCLUSIONS

- 1.15 Audit conclusions drawn against the audit objective are set out below.

### OVERALL CONCLUSION

**The ACT is unlikely to have the right number of speed cameras in the right places. The effectiveness of speed cameras in the ACT has not been established. Speed camera reliability is poor. However, this has no effect on the validity of infringements issued.**

### Siting of speed cameras conclusions (Chapter 2)

There is no strategic basis for making decisions for integrating the use of the ACT's speed camera systems as the ACT Government does not have a speed camera strategy and its draft *ACT road safety camera strategy* (September 2013) is 'not a strategy'. Over the last fourteen years, the use of speed cameras in the ACT has grown incrementally without a strategy that covers the whole road network, or the contribution each camera system makes towards long-term road safety goals.

Problems and uncertainties exist with each of the four speed camera systems in use in the ACT:

- Mobile speed camera coverage is limited compared with that envisaged by the ACT Government in 2005, and mobile camera operations are overt which means it is unlikely that the ACT Government is achieving its desired 'anytime, anywhere' approach.
- Speed and red light cameras may not be located at the highest priority sites as their effectiveness and relative priority, compared with intersections with traffic lights where there are no cameras, has not recently been evaluated. The last evaluation occurred in 2003 and it was for three sites only.
- There are too few mid-block speed cameras to achieve the Government's aim of having a general effect on speeding across the road network, and the siting of these cameras does not take account of crash data as is the practice in other Australian jurisdictions. Mid-block cameras are unlikely to be sited to achieve the

best road safety results.

- The siting of point-to-point speed cameras in the ACT is experimental as there is little or no evidence from elsewhere to support their use in an urban environment, for such short sections of road, or for the purpose of reducing speeding beyond the sections of road between the pairs of cameras. There is no evaluation plan to determine the effectiveness of the ACT's point-to-point speed cameras.

### **Effectiveness of speed cameras conclusions (Chapter 3)**

There is a persistent speeding problem in the ACT, according to survey and infringement data, which calls into question the effectiveness of the ACT Government's speed camera systems.

Evaluations of speed camera systems, particularly the mid-block speed cameras and the recently implemented point-to-point cameras have not been undertaken. Furthermore the value for money of the two point-to-point camera installations is questionable. It is likely there has been a three-fold increase in the cost per km of road treated from the initial design stage through to implementation.

While the speeding problem in the ACT is persistent, its extent is unknown. Residents report high levels of speeding, but this cannot be confirmed with any accuracy. The use of infringement data from camera sites is an unreliable indicator of speeding behaviour across the road network and speed surveys have not been designed to be representative. As a result there is limited information on whether the problem of speeding is increasing or diminishing on the road network.

Limitations in data used in the development of the ACT's speed camera systems are not identified to decision makers. The planning and coordination of data collection is not effective. Information on camera effectiveness has not been routinely made public. The administration of requests for the disclosure of vehicle images is inadequate.

### **Speed camera reliability and operations administration conclusions (Chapter 4)**

Reliability problems, particularly with mobile cameras, have led to escalating maintenance costs, limited camera availability, and a greater number of rejected infringements when checked by adjudicators prior to issuing. This compromises the effectiveness of the Government's speed enforcement activities as fewer speeding motorists receive a Camera Infringement Notice, despite speeding occurring at camera sites. In 2013-14 the Government funded (\$1.55 million) the replacement of most of its speed camera equipment that is more than ten years old.

The Government's administration of Camera Infringement Notices with respect to the verification of infringements is robust thereby reducing the risk of issuing invalid infringements. However, the relatively high rejection rate of potential infringements indicates inefficiencies. The Traffic Camera Office is aware of the limitations of its adjudication system which will be the subject of an options evaluation in 2013-14.

All fixed speed cameras receive routine checks with planned maintenance currently meeting requirements. While this is the case, the current maintenance cycle for these cameras may be too frequent in some instances. This needs to be investigated as savings may be able to be realised if cameras are being over serviced.

Although the Government has provided funding in 2013-14 for existing equipment replacement and maintenance, there is no documented strategy to guide how best to program and integrate these activities.

The planning and review of the sites scheduled for mobile speed van operations is inadequate. This makes strategic forward planning difficult and presents the risk that these cameras are not being used effectively.

## KEY FINDINGS

1.16 The audit conclusions are supported by the following findings relating to the audit criteria (refer to Appendix A - Audit criteria, approach and method):

### Siting of speed cameras (Chapter 2)

#### *The development of speed camera systems in the ACT*

- Since speed cameras were introduced in 1999 the ACT Government has not developed a speed camera strategy that: supports its road safety strategies and road safety action plans; adopts a network-wide approach; identifies a target contribution from speed cameras to the overall reduction in fatalities and injuries; and integrates systems and actions. (paragraph 2.23)
- Budget proposals have been the basis for expanding speed camera systems in the ACT. Many have had a focus on adopting a new technology. Budget proposals have been inadequate as there has been no explanation for the scale of funding requested, proposals do not state what the funding requested will achieve in terms of road safety results and what the relationship is between the level of funding sought and the long-term expansion of camera systems. (paragraph 2.33)
- At no time in the fourteen years of the development of speed camera systems in the ACT has there been a Government commitment to, or policy position for, the extent of the camera coverage in a timescale beyond the budget round at the time. Expansion has been a stated aim but it has not been defined. (paragraph 2.31)
- The ACT Government in 2011 recognised the need for an overarching speed camera strategy in its *Road safety action plan 2011-2013* in stating that an 'overall strategy and guidelines for gradual expansion will be prepared'. A draft *ACT road safety camera strategy* (September 2013) has been prepared. (paragraph 2.34)

- Professor Max Cameron, the road safety subject matter expert engaged to assist in this audit, advised that 'The ACT road safety camera strategy (draft) is not a strategy. No goal is stated and its specific objectives for achieving a reduction in road trauma in the ACT are not given. The four types of camera system represent the elements of the system, but it is unclear what principles for the deterrence of speeding are their basis. No estimates of the speeding and crash reductions likely to be achieved by the camera systems, alone and in aggregate, appear to have been made in developing the strategy. Hence the ACT Government will have no idea whether its road safety camera program will contribute substantially to achieving the ACT and National strategic goals of 30 per cent reduction in serious road casualties by 2020, or not at all'. (paragraph 2.39)
- The lack of an adequate speed camera strategy presents the risk that the ACT's speed camera systems, collectively and individually, will not achieve desired road safety objectives, funding will not be targeted, and decisions to invest in specific speed camera systems will result in poor value for money. (paragraph 2.40)
- The ACT Government has agreed to adopt the *National road safety strategy 2011-2020* which seeks to have jurisdictions consider the issue of hypothecation by the end of 2013. According to an Austroads report (2013) there has been a partial or full hypothecation of revenue from speed enforcement activities directly back to road safety in Victoria, Queensland, Tasmania and Western Australia. The ACT Government's position on this matter has not been stated. (paragraph 2.41)

### **Mobile speed cameras**

- Mobile speed camera sites were initially selected based on, amongst other things, data relating to speed-related crash history and speed surveys. In 2005, the Government committed to assessing all 649 arterial and collector roads in the ACT with a view to expanding the number of sites for its mobile speed camera operations, and achieving a greater compliance with speed limits across the whole ACT road network. (paragraphs 2.45 and 2.48)
- The expansion of mobile speed camera operations is taking considerable time to achieve as after nine years, mobile speed camera vans are only able to be used on 147 roads, which is 23 per cent of the ACT's 649 arterial and collector roads. This is because not all of the 649 roads have been assessed and therefore cannot be added to Schedule 1 of the *Road Transport (Safety and Traffic Management) Regulation 2000* to facilitate the use of mobile speed cameras. (paragraph 2.52)
- Furthermore, since 2005, at least 77 per cent of sites added to Schedule 1 were initially identified from public complaints. In most cases, during the site assessment process, there was limited consideration of other site selection criteria, such as accident history and traffic density. Therefore Schedule 1 may not reflect the most appropriate sites according to a balanced consideration of all site selection criteria. (paragraph 2.53)
- The ACT Government mobile camera operations are overt as the vans used in the ACT are white with a sign on the van roof stating 'your speed has been checked'.

This makes the vans identifiable to road users on their approach to the mobile speed cameras. While an overt approach is used, there is no evidence to suggest that a covert or a combined overt and covert approach, as happens in some other jurisdictions, was considered in the decision-making process. (paragraph 2.55)

- Given the relatively limited number of sites where mobile camera vans may operate, and that operations are undertaken in an overt manner, the ACT Government is unlikely to achieve its desired 'anytime, anywhere' approach. (paragraph 2.58)

### *Speed and red light cameras*

- At the time of the introduction of speed and red light cameras in 2001, twenty intersections had been identified and prioritised from the analysis of crash data from the previous four years. The circumstances surrounding each crash at the twenty intersections were considered. As with mobile camera sites, each intersection was required to be added to Schedule 1 of the Regulation. (paragraph 2.61)
- The ACT Government's road safety strategy action plans (2003-04, 2005-06) identified the need for the 'review of current intersection crash data to ensure most efficient allocation of red light cameras'. No such review has taken place since 2003, and the 2003 review related to the first three sites selected for speed and red light cameras. (paragraph 2.63)

### *Mid-block speed cameras*

- Between the time at which the budget proposal was agreed in 2006 through to April 2008, there was a change in the Government's stated purpose for the mid-block cameras: from one of achieving a local effect at 'dangerous locations' to that of achieving a general effect to improve speed compliance across the whole road network. (paragraph 2.73)
- Professor Max Cameron advised that:
  - ... a signed, conspicuous fixed-spot speed camera system cannot achieve [a general deterrent or general effect], unless there is a high density of cameras e.g. at least 1 per 4 km. (paragraph 2.74)
- There was no evidence that the ACT Government had planned a mid-block speed camera system with sufficient camera sites to potentially achieve a general effect across the whole arterial road network. The arterial network in the ACT extends to around 290 km on which there are only nine locations with thirteen mid-block speed cameras. (paragraph 2.75)
- Furthermore, crash data was not included in the criteria for determining the siting of the mid-block cameras. The ACT is the only jurisdiction where crash data has not been used to prioritise mid-block camera sites. (paragraphs 2.72 and 2.78)

### *Point-to-point speed cameras*

- The ACT Government has implemented two point-to-point installations, one on Hindmarsh Drive and one on Athllon Drive. The Territory and Municipal Services Directorate has indicated that the purpose of the ACT Government's point-to-point camera system is twofold: to have a general effect across the network, that is, an effect beyond the length of road between the pairs of speed cameras, and to have a local effect. (paragraphs 2.87 and 2.89)
- Professor Max Cameron advised that:
  - ... there is no research to support the aspiration that the system will have an effect beyond the section covered by the pair of cameras, that is, a local effect over the treated length.....beyond that it is unclear and ambitious. (paragraph 2.90).
- In relation to the use of point-to-point in an urban setting, Professor Max Cameron advised that it is:
  - ... unprecedented outside the ACT ... [and that there are] doubts about its suitability in urban areas except for long lengths of urban freeway ... (paragraph 2.92)
- The cost effectiveness of the installations on the two sections of road (Hindmarsh Drive, 2.8 km and Athllon Drive, 3.7 km) covered by the point-to-point cameras in the ACT is compromised since each section is shorter than:
  - the minimum length of sections in the two other jurisdictions (Victoria 7 km, and Queensland 14 km) that have installed point-to-point cameras for speed enforcement of all vehicles;
  - the minimum length initially proposed (5 km) by the ACT Government's advisors in the *Forward Design Study: Introduction of Point to Point Speed Cameras in the ACT* (July 2010) in order to be the most cost effective option; and
  - the minimum length recommended by advisors (10 km) to two other jurisdictions considering the introduction of point-to-point systems. (paragraph 2.93)
- While there are currently two point-to-point installations in the ACT, the initial forward design study (2010) identified ten or potentially more being implemented in a phased approach following a pilot. However, there is no evidence that advice has been sought or received as to the extent to which the current two installations or the initially proposed ten installations, as part of the phased approach, would provide a general effect across the network, or a local effect on the road lengths between the pairs of cameras. (paragraph 2.100)
- The pilot of the point-to-point speed camera system in the ACT does not have a supporting evaluation plan that would ensure learnings from this experiment are maximised. Evaluating the pilot is important in order to determine if this type of system is providing value for money and should be further deployed in urban areas. (paragraph 2.102)

## Effectiveness of speed cameras (Chapter 3)

### *Infringements*

- Infringement rates for fixed speed cameras in the ACT are around 0.06 to 0.12 per cent over the long term, i.e. approximately one vehicle in one thousand is issued an infringement notice for speeding at camera sites. Infringement rates are of limited use in determining the extent of speeding. These rates are likely to grossly understate the level of speeding above the speed limits across the whole ACT road network as:
  - camera detected infringements are only issued for speeding offences that are significantly above the speed limit; and
  - the overt nature of fixed speed cameras and signs in the ACT provides road users with ample warning to slow down approaching camera sites. (paragraphs 3.9 and 3.10)
- The *National road safety strategy action plan 2007-08* outlines measures for best practice including adopting 'tight enforcement tolerances'. The ACT Government agreed to review the discretionary speed enforcement tolerance in the ACT in 2007-08. However, there is no a documented rationale for the ACT's enforcement tolerance. (paragraphs 3.11 and 3.12)

### *Community attitudes*

- The *National Survey of Community Satisfaction with Policing* surveys shows that the ACT has a speeding problem as over 60 per cent of drivers surveyed each year from 2009-10 to 2011-12 stated that they had driven 10 km/h or more above the speed limit. This is higher than the Australian average and other jurisdictions in Australia, except for New South Wales in 2011-12 and Western Australia in 2010-11 where reported speeding was similar to that in the ACT. (paragraph 3.13)
- Public perceptions of crime problems are also considered in the *National Survey of Community Satisfaction with Policing* surveys. Survey data suggests that ACT residents had the second highest level of concern for speeding as nuisance behaviour in residential neighbourhoods compared to residents in other Australian jurisdictions in 2011-12. (paragraph 3.14)
- Attitudes of ACT residents, as identified in surveys, are difficult to reconcile. When compared to residents of other jurisdictions, ACT residents:
  - are more likely to see poor driving skills as a contributory factor in crashes;
  - are less likely to link speeding with the incidence of crashes;
  - have the strongest support for more speed enforcement activity;
  - feel they are less likely to get caught speeding; and



- are more likely to agree with the speed limits.

It is not clear in the draft *ACT road safety camera strategy* how community attitudes are influencing speed camera systems in the ACT. (paragraph 3.17)

### Speed surveys

- The ACT Government conducts and annually publishes the results of a large number of roadside speed surveys. In the last fourteen years there have been 3 644 surveys which show that free-flow traffic speed is greater than 5 km/h over the speed limit for approximately 50 per cent of the survey sites and ranges from 41 and 65 per cent. (paragraph 3.18)
- While this identifies the extent of the speeding problem at specific locations this data does not provide an accurate indicator of speeding across the network. This is because the selection of survey sites is not a representative sample of road types and conditions of the ACT road network. Sites are generally identified for surveying as a result of perceived problems. (paragraph 3.19)
- Speeding infringement rates, community surveys and roadside speed surveys indicate there is persistent speeding in the ACT. Since there is no network representative roadside speed survey or any other speed monitoring system, it is not possible to determine whether this problem is increasing or diminishing across the whole road network. (paragraph 3.22)

### Evaluation

- Over the past fourteen years, the Government has planned but not undertaken evaluations for many aspects of its speed camera operations. Two camera systems (mobile, and speed and red light cameras) were evaluated but this was over ten years ago, and neither was conclusive. There is no overarching evaluation framework to gauge the effectiveness of speed camera activity across the whole ACT network despite the adoption and siting of camera systems in the ACT that is either contrary to prevailing research or where there is an absence of accepted practice. (paragraphs 3.28 and 3.32)
- The draft *ACT road safety camera strategy* recognises that formal evaluations of the effect of ACT road safety cameras have been limited and proposes options for the evaluation of effectiveness of the Government's speed cameras. However, there is no commitment in the strategy to a forward program of evaluations. In November 2013 the Government committed to undertaking an evaluation of the ACT's speed cameras in the first half of 2014. (paragraphs 3.33 and 3.36)
- No evaluation plan has been developed to guide the assessment of the pilot of the point-to-point system in the ACT. Such a plan is important to determine if this type of system is providing value for money and should be further deployed in urban areas. (paragraph 3.38)



- The value for money of the point-to-point system pilot is likely to have been compromised by changes to the lengths of road covered by the two installations. The reduction in the length of the road between the pairs of point-to-point cameras, combined with the increase in actual costs (compared to the estimated cost) of installing this system, has led to a three-fold increase in the cost per km of road treated. (paragraphs 3.39 and 3.40)

#### **Data collection**

- National road safety strategy action plans advise that the collection of speed data should be done independently of the data generated by enforcement activity at speed cameras sites. This is achieved in the ACT since the Traffic Data Unit in the Territory and Municipal Services Directorate provides such data to Legislation, Policy and Programs in the Justice and Community Safety Directorate, that is, the Directorate that leads on road safety policy and enforcement. However, the planning and coordination of activities between these sections is not fully effective. (paragraph 3.44)
- The siting criteria for speed camera systems currently used in the ACT have relied on data which is primarily sourced from surveys of road speeds and traffic conditions, management information from camera operations such as infringement rates, and information on crashes. File records identify that many data sources used in the siting methodologies are imperfect as they are often incomplete or imprecise. There is a risk that decision makers are asked to make decisions on recommendations without knowing the robustness of the data. (paragraphs 3.45 and 3.46)
- Data utility is improving as the Territory and Municipal Services Directorate has been able to plot crash sites more accurately since 2011, using precise coordinates rather than attributing crashes to long sections of roads. Also a larger number of traffic light-controlled intersections can now be monitored for red light running, which can be a very useful predictor of potentially dangerous intersections. (paragraph 3.47)

#### **Camera operations data**

- The draft *ACT road safety camera strategy* identifies the need to improve the public availability of camera siting information, but the strategy does not identify a need to improve the availability of camera effectiveness information. Information on camera effectiveness has not been routinely made public. Other jurisdictions are considering publishing or have already published information on the effectiveness of camera operations. (paragraphs 3.49 and 3.50)

#### **Protecting and disclosing images of vehicles**

- Disclosure of images from speed camera operations is permitted if it is 'reasonably necessary for the enforcement of criminal law'. The point-to-point installation on Hindmarsh Drive takes images of an estimated 900 000 vehicle

movements a month. ACT Policing has made 22 requests for images since January 2012. No other agencies have made requests. (paragraphs 3.58, 3.59 and 3.60)

- The Traffic Camera Office's administration of these requests is an area where procedures, practice and record keeping should be improved in order to provide assurance that camera image disclosure is 'reasonably necessary'. (paragraphs 3.59 and 3.60)

### **Speed camera reliability and operations administration (Chapter 4)**

#### ***Speed camera reliability***

- Annual reports show that the Government's target level of fixed speed cameras being 'in use' for 95 per cent of the time has been achieved in six of the last seven years. (paragraph 4.6)
- The Justice and Community Safety Directorate target of 43 shifts per week for mobile speed camera operations was not achieved in the last three years. Operational availability fell markedly in 2012-13 with fewer than 40 per cent of 43 shifts per week being possible in three of the four quarters of the year. This was due to equipment failure, which has resulted, at times, in only two of the five camera vans being available. (paragraph 4.8)
- The number of reactive maintenance work requests has increased in the last three years by 109 per cent, from 114 in 2010-11, to 174 in 2011-12, and to 238 in 2012-13. An estimated two per cent of mobile camera detected potential infringements had to be rejected during adjudication due to camera errors in the two-year period to June 2012. (paragraphs 4.27 and 4.30)

#### ***Maintenance of speed camera equipment***

- The current and previous maintenance contracts covering the period August 2009 to date have a requirement for fortnightly planned maintenance for fixed speed cameras. This was not achieved in 2011 or 2012 but was met in 2013. While this is the case, it may not be problematic as in Victoria planned maintenance for fixed camera devices is specified to be undertaken on a monthly basis. It was not evident why fortnightly maintenance inspections are necessary in the ACT, rather than monthly. The estimated additional cost to the ACT of requiring fortnightly rather than monthly planned maintenance is \$120 000 a year. (paragraph 4.13)
- For the management of reactive maintenance, the Traffic Camera Office has improved its ability to track and confirm the responsiveness of its contractor. However, there remain areas for further improvement. (paragraph 4.26)
- The Government agreed on 4 June 2013 to fund the replacement of six of its eight speed and red light cameras that are over ten years old and all its mobile

cameras, costing \$1.55 million. Once implemented, this will ensure all except two cameras in use on ACT roads are less than ten years old. (paragraph 4.29)

- While the Government is funding the replacement of older speed cameras in 2013-14, there is no documented strategy that sets out the rationale and the program for speed camera maintenance and replacement. (paragraph 4.31)

#### *Speed camera accuracy*

- In considering the accuracy of speed measuring devices for the period 2010 to 2013, the Audit Office identified a lack of a master inventory of devices. In addition there is no readily accessible record system that identifies whether speed measuring devices are either in or out of use, or their location or certification dates. Justice and Community Service Directorate officers acknowledge the desirability of such a system, and advised that the use of an electronic diary for annual certification reminders, introduced after the February 2010 audit, was a stand-in measure until a new adjudication system was introduced that would incorporate the means to monitor annual certification. This system has not been designed or implemented. (paragraph 4.38)
- There is no verification process for when test certificates are received by the Traffic Camera Office to check that their key content is correct, such as device details, test and signatory dates. (paragraph 4.41)

#### *Mobile speed camera operations*

- Based on a walk-through of systems and procedures by an audit officer on 24 September 2013, the assessment of records and a review of other documentation, it is considered that operational practices are aligned with legislative requirements and internal standard operating procedures regarding initial mobile camera operator training, and associated operator approval. (paragraph 4.62)
- Auditing mobile camera operators, once approved, is an area where the record keeping, and potentially practice, is not in accordance with the internal standard operating procedures. The internal standard operating procedure for this indicates this should comprise one, two and three-month audits, as well as a number of unannounced audits and the evaluation of traffic camera operator effectiveness. There was no documented evidence of this audit process occurring. (paragraph 4.64)
- In planning the shift schedule for mobile camera operations, the Traffic Camera Office takes limited account of site by site infringement history, that is, whether previous camera van shifts at the same site identified a high number of infringements and therefore evidence of a continuing speeding problem. (paragraph 4.69)

- There was no evidence that demonstrated that the Traffic Camera Office periodically assesses road accident statistics to ensure that sites that are statistically significant are allocated mobile speed camera coverage, as the *ACT Traffic Camera Office Mobile camera unit site selection criteria* states should happen. There is no routine analysis of the results of mobile speed camera operations. (paragraphs 4.70 and 4.71)

### **Infringement validity**

- The ACT Traffic Camera Office has a relatively high rejection rate of potential infringements due to adjudication. Between 18 and 43 per cent of all potential infringements per year over the last fourteen years have been rejected during adjudication. Rejected infringements are deemed to have not met evidentiary requirements. Professor Max Cameron advised that other Australian states typically achieve a lower than 20 per cent rejection rate as a result of adjudication, with one state managing an improvement from 25 down to 10 per cent over a fifteen-year period. He further advised that the percentage that is rejected is something that can be reduced, given effective systems. (paragraphs 4.81 and 4.82)
- Officers in the Traffic Camera Office identified that the existing adjudication database introduced in 2000 has many monitoring and reporting limitations due to its age and design. This makes it difficult to systematically focus on process improvements that may lead to reducing the infringement rejection rate. For example, officers advised that it is not possible to identify trends in the reasons for rejecting cases, the identity of previous adjudicators or the reasons for changes. As a result of a 2013-14 budget proposal from the Justice and Community Safety Directorate being supported by the Government, funding of \$50 000 has been allocated to evaluate adjudication system replacement options. This is currently being undertaken. (paragraphs 4.83 and 4.89)
- In the 60 infringement cases reviewed by an audit officer, there was sufficient evidence to re-adjudicate the case and the same conclusion could be derived as that made in the original adjudication. (paragraph 4.87)
- An analysis of the supervisory control sheets showed that there was disagreement between the first adjudicator and the cross checker in 0.3 per cent of all cases adjudicated for the most recent twelve-month period. This indicates that adjudicators, for a very high percentage of infringements, are consistent in their decision making regarding an infringement's validity. (paragraph 4.91)
- Training and development is effective in enabling new staff members to develop the skills and knowledge necessary to undertake the adjudication role and to be approved as competent. However, there is no independent training provided to the adjudicators, and there is no documented procedure for the adjudication training process. The Office is heavily reliant on the corporate knowledge of a few key members of staff with learning occurring through the sharing of experience. (paragraph 4.95)

### **Infringement administration**

- Thirty case studies were assessed by an audit officer with respect to the three matters of: extension of time to pay 'out of time' applications, withdrawal of Camera Infringement Notices, and unknown drivers. The assessment identified inadequacies in procedures and their implementation, and in record keeping, since:
  - internal standard operating procedures were not up to date;
  - while there were internal standard operating procedures, at least in part, for each of these three matters, these were not always followed;
  - there was insufficient evidence in rego.act of the actions taken to understand why some decisions were made; and
  - the identity of the administrator approved to take a particular action was not available in every case. (paragraph 4.120)
- The ACT Government has issued around 60 000 Camera Infringement Notices a year in the past three years, and collected around \$10 million a year in fines. At any time over this period there is around \$2 million to \$3 million in uncollected fines. The value of uncollected speeding fines has grown from \$448 528 as at 1 July 2001 to \$2 939 455 as at 1 July 2013. (paragraphs 4.121 and 4.122)
- In June 2013 the Government legislated and implemented arrangements to enable people in receipt of infringement notices, who are having difficulties, to seek an extension of time, and to pay off fines according to an agreed plan. Long-term or high-level debtors are being encouraged to use the new arrangements. A priority group of road users with \$4.8 million in debt have been contacted. Plans have been agreed for over 1 700 road users which account for \$2.5 million in debt. (paragraphs 4.124 and 4.125)
- Limited management information is routinely drawn from the rego.act system to provide assurance as to the effectiveness of the system, for example, in terms of the transparency, consistency and fairness of administration of Camera Infringement Notices. (paragraph 4.128)

### **RECOMMENDATIONS**

- 1.17 The audit has made 16 recommendations to address the audit findings.
- 1.18 In accordance with section 18 of the *Auditor-General Act 1996*, a final draft of this report was provided to the Director-General of the Justice and Community Safety Directorate for consideration and comment. The Director-General's responses are as follows.

### Justice and Community Safety Directorate response

*The Justice and Community Safety (JACS) Directorate has reviewed the proposed report and has no comments to provide, apart from to confirm that there are no factual errors to bring to your [the Auditor-General's] attention.*

*The JACS Directorate consulted the Territory and Municipal Services (TAMS) Directorate and invited TAMS to confirm that it had no comments on the report. TAMS has confirmed that it has no comments on the proposed report.*

1.19 The audit recommendations are shown below.

#### **Recommendation 1 (Chapter 2)**

The ACT Government should develop and implement a speed camera strategy that:

- a) includes a goal and measurable objectives for achieving a reduction in road trauma on ACT roads through the use of speed cameras and related speed management actions;
- b) takes a long-term perspective (to 2020 or beyond) and addresses speeding and speed related crashes across the whole of the ACT road network;
- c) establishes, using leading practice from elsewhere, options for the development and integration of speed camera systems that will collectively achieve the targeted reductions in road trauma; and
- d) includes a sensitivity analysis, to support future budget proposals, which shows how varying levels of investment and the phasing of implementation will affect short, medium and long-term road safety.

#### **Recommendation 2 (Chapter 2)**

The ACT Government should develop and implement a mobile speed camera plan which:

- a) specifies the extent of the ACT road network where mobile speed cameras may operate, and the time by which this is to occur; and
- b) identifies the effect of different levels of operational intensity (i.e. the number of vans and shifts, and siting priorities), and mode of operation (i.e. overt, covert) on road safety goals as coverage of the road network is expanded.

#### **Recommendation 3 (Chapter 2)**

The ACT Government should review the purpose and siting of its existing thirteen mid-block speed cameras to determine if they need to be removed, relocated or expanded.

**Recommendation 4 (Chapter 2 & 3) Multi-part recommendation**

The ACT Government, for its two existing point-to-point speed camera installations, should:

- a) review and state the purpose of the system;
- b) develop and implement an evaluation plan to assess their effectiveness in reducing speeding and road trauma; and
- c) determine their value for money compared with other speed management treatments to inform future decisions.

**Recommendation 5 (Chapter 3)**

The ACT Government should develop and implement a ‘relatively large, network-representative, speed monitoring system’ in order to determine changes in the extent of speeding on ACT roads.

**Recommendation 6 (Chapter 3)**

The ACT Government should develop and implement an ACT speed camera evaluation and data collection plan.

**Recommendation 7 (Chapter 3)**

The ACT Government should routinely publish information on the effectiveness of all its speed camera systems according to the stated purpose of each system.

**Recommendation 8 (Chapter 3)**

The Justice and Community Safety Directorate should document its procedures, and maintain comprehensive records, for its administration of requests for the disclosure of camera images.

### **Recommendation 9 (Chapter 4)**

The Justice and Community Safety Directorate should align its speed camera maintenance practices, internal standard operating procedures and contractual requirements.

### **Recommendation 10 (Chapter 4)**

The ACT Government should develop and implement a speed camera maintenance and replacement strategy (This could be part of the speed camera strategy which is the subject of Recommendation 1).

### **Recommendation 11 (Chapter 4)**

The Justice and Community Safety Directorate should develop and maintain a master inventory of speed camera devices and use this to verify the key content of new certification against primary and / or secondary sources.

### **Recommendation 12 (Chapter 4)**

The Justice and Community Safety Directorate should undertake and document audits of approved mobile speed camera operators in accordance with its internal standard operating procedures.

### **Recommendation 13 (Chapter 4)**

The Justice and Community Safety Directorate should strategically plan its mobile speed camera operations by fully applying the principles in the *Mobile camera unit site selection criteria* guide and as set out on its speed camera web-pages.

### **Recommendation 14 (Chapter 4)**

The Justice and Community Safety Directorate should improve its recording of adjudication information so that this can be used to target improvements for reducing the infringement rejection rate.



**Recommendation 15 (Chapter 4)**

The Justice and Community Safety Directorate, in its administration of infringements in the rego.act system, should:

- a) update its internal standard operating procedures;
- b) align practice with procedure; and
- c) maintain comprehensive records for all manual interventions.

**Recommendation 16 (Chapter 4)**

The Justice and Community Safety Directorate should monitor the transparency, consistency and fairness of the administration of Camera Infringement Notices in the rego.act system by conducting qualitative and / or quantitative reviews.



## 2. SITING OF SPEED CAMERAS

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2.1 This chapter examines the development and siting of the ACT's speed camera systems.

### Conclusion

**The ACT is unlikely to have the right number of speed cameras in the right places.**

There is no strategic basis for making decisions for integrating the use of the ACT's speed camera systems as the ACT Government does not have a speed camera strategy and its draft *ACT road safety camera strategy* (September 2013) is 'not a strategy'. Over the last fourteen years, the use of speed cameras in the ACT has grown incrementally without a strategy that covers the whole road network, or the contribution each camera system makes towards long-term road safety goals.

Problems and uncertainties exist with each of the four speed camera systems in use in the ACT:

- Mobile speed camera coverage is limited compared with that envisaged by the ACT Government in 2005, and mobile camera operations are overt which means it is unlikely that the ACT Government is achieving its desired 'anytime, anywhere' approach.
- Speed and red light cameras may not be located at the highest priority sites as their effectiveness and relative priority, compared with intersections with traffic lights where there are no cameras, has not recently been evaluated. The last evaluation occurred in 2003 and it was for three sites only.
- There are too few mid-block speed cameras to achieve the Government's aim of having a general effect on speeding across the road network, and the siting of these cameras does not take account of crash data as is the practice in other Australian jurisdictions. Mid-block cameras are unlikely to be sited to achieve the best road safety results.
- The siting of point-to-point speed cameras in the ACT is experimental as there is little or no evidence from elsewhere to support their use in an urban environment, for such short sections of road, or for the purpose of reducing speeding beyond the sections of road between the pairs of cameras. There is no evaluation plan to determine the effectiveness of the ACT's point-to-point speed cameras.

### Key findings

#### *The development of speed camera systems in the ACT*

- Since speed cameras were introduced in 1999 the ACT Government has not developed a speed camera strategy that: supports its road safety strategies and road safety action plans; adopts a network-wide approach; identifies a target

contribution from speed cameras to the overall reduction in fatalities and injuries; and integrates systems and actions. (paragraph 2.23)

- Budget proposals have been the basis for expanding speed camera systems in the ACT. Many have had a focus on adopting a new technology. Budget proposals have been inadequate as there has been no explanation for the scale of funding requested, proposals do not state what the funding requested will achieve in terms of road safety results and what the relationship is between the level of funding sought and the long-term expansion of camera systems. (paragraph 2.33)
- At no time in the fourteen years of the development of speed camera systems in the ACT has there been a Government commitment to, or policy position for, the extent of the camera coverage in a timescale beyond the budget round at the time. Expansion has been a stated aim but it has not been defined. (paragraph 2.31)
- The ACT Government in 2011 recognised the need for an overarching speed camera strategy in its *Road safety action plan 2011-2013* in stating that an 'overall strategy and guidelines for gradual expansion will be prepared'. A draft *ACT road safety camera strategy* (September 2013) has been prepared. (paragraph 2.34)
- Professor Max Cameron, the road safety subject matter expert engaged to assist in this audit, advised that 'The ACT road safety camera strategy (draft) is not a strategy. No goal is stated and its specific objectives for achieving a reduction in road trauma in the ACT are not given. The four types of camera system represent the elements of the system, but it is unclear what principles for the deterrence of speeding are their basis. No estimates of the speeding and crash reductions likely to be achieved by the camera systems, alone and in aggregate, appear to have been made in developing the strategy. Hence the ACT Government will have no idea whether its road safety camera program will contribute substantially to achieving the ACT and National strategic goals of 30 per cent reduction in serious road casualties by 2020, or not at all'. (paragraph 2.39)
- The lack of an adequate speed camera strategy presents the risk that the ACT's speed camera systems, collectively and individually, will not achieve desired road safety objectives, funding will not be targeted, and decisions to invest in specific speed camera systems will result in poor value for money. (paragraph 2.40)
- The ACT Government has agreed to adopt the *National road safety strategy 2011-2020* which seeks to have jurisdictions consider the issue of hypothecation by the end of 2013. According to an Austroads report (2013) there has been a partial or full hypothecation of revenue from speed enforcement activities directly back to road safety in Victoria, Queensland, Tasmania and Western Australia. The ACT Government's position on this matter has not been stated. (paragraph 2.41)

### **Mobile speed cameras**

- Mobile speed camera sites were initially selected based on, amongst other things, data relating to speed-related crash history and speed surveys. In 2005, the Government committed to assessing all 649 arterial and collector roads in the ACT with a view to expanding the number of sites for its mobile speed camera operations, and achieving a greater compliance with speed limits across the whole ACT road network. (paragraphs 2.45 and 2.48)
- The expansion of mobile speed camera operations is taking considerable time to achieve as after nine years, mobile speed camera vans are only able to be used on 147 roads, which is 23 per cent of the ACT's 649 arterial and collector roads. This is because not all of the 649 roads have been assessed and therefore cannot be added to Schedule 1 of the *Road Transport (Safety and Traffic Management) Regulation 2000* to facilitate the use of mobile speed cameras. (paragraph 2.52)
- Furthermore, since 2005, at least 77 per cent of sites added to Schedule 1 were initially identified from public complaints. In most cases, during the site assessment process, there was limited consideration of other site selection criteria, such as accident history and traffic density. Therefore Schedule 1 may not reflect the most appropriate sites according to a balanced consideration of all site selection criteria. (paragraph 2.53)
- The ACT Government mobile camera operations are overt as the vans used in the ACT are white with a sign on the van roof stating 'your speed has been checked'. This makes the vans identifiable to road users on their approach to the mobile speed cameras. While an overt approach is used, there is no evidence to suggest that a covert or a combined overt and covert approach, as happens in some other jurisdictions, was considered in the decision-making process. (paragraph 2.55)
- Given the relatively limited number of sites where mobile camera vans may operate, and that operations are undertaken in an overt manner, the ACT Government is unlikely to achieve its desired 'anytime, anywhere' approach. (paragraph 2.58)

### **Speed and red light cameras**

- At the time of the introduction of speed and red light cameras in 2001, twenty intersections had been identified and prioritised from the analysis of crash data from the previous four years. The circumstances surrounding each crash at the twenty intersections were considered. As with mobile camera sites, each intersection was required to be added to Schedule 1 of the Regulation. (paragraph 2.61)
- The ACT Government's road safety strategy action plans (2003-04, 2005-06) identified the need for the 'review of current intersection crash data to ensure most efficient allocation of red light cameras'. No such review has taken place since 2003, and the 2003 review related to the first three sites selected for

speed and red light cameras. (paragraph 2.63)

### **Mid-block speed cameras**

- Between the time at which the budget proposal was agreed in 2006 through to April 2008, there was a change in the Government's stated purpose for the mid-block cameras: from one of achieving a local effect at 'dangerous locations' to that of achieving a general effect to improve speed compliance across the whole road network. (paragraph 2.73)
- Professor Max Cameron advised that:
  - ... a signed, conspicuous fixed-spot speed camera system cannot achieve [a general deterrent or general effect], unless there is a high density of cameras e.g. at least 1 per 4 km. (paragraph 2.74)
- There was no evidence that the ACT Government had planned a mid-block speed camera system with sufficient camera sites to potentially achieve a general effect across the whole arterial road network. The arterial network in the ACT extends to around 290 km on which there are only nine locations with thirteen mid-block speed cameras. (paragraph 2.75)
- Furthermore, crash data was not included in the criteria for determining the siting of the mid-block cameras. The ACT is the only jurisdiction where crash data has not been used to prioritise mid-block camera sites. (paragraph 2.72 and 2.78)

### **Point-to-point speed cameras**

- The ACT Government has implemented two point-to-point installations, one on Hindmarsh Drive and one on Athllon Drive. The Territory and Municipal Services Directorate has indicated that the purpose of the ACT Government's point-to-point camera system is twofold: to have a general effect across the network, that is, an effect beyond the length of road between the pairs of speed cameras, and to have a local effect. (paragraphs 2.87 and 2.89)
- Professor Max Cameron advised that:
  - ... there is no research to support the aspiration that the system will have an effect beyond the section covered by the pair of cameras, that is, a local effect over the treated length ... beyond that it is unclear and ambitious. (paragraph 2.90)
- In relation to the use of point-to-point in an urban setting, Professor Max Cameron advised that it is:
  - ... unprecedented outside the ACT ... [and that there are] doubts about its suitability in urban areas except for long lengths of urban freeway ... (paragraph 2.92)
- The cost effectiveness of the installations on the two sections of road (Hindmarsh Drive, 2.8 km and Athllon Drive, 3.7 km) covered by the point-to-point cameras in the ACT is compromised since each section is shorter than:
  - the minimum length of sections in the two other jurisdictions (Victoria 7 km, and Queensland 14 km) that have installed point-to-point cameras

- for speed enforcement of all vehicles;
  - the minimum length initially proposed (5 km) by the ACT Government's advisors in the *Forward Design Study: Introduction of Point to Point Speed Cameras in the ACT* (July 2010) in order to be the most cost effective option; and
  - the minimum length recommended by advisors (10 km) to two other jurisdictions considering the introduction of point-to-point systems. (paragraph 2.93)
- While there are currently two point-to-point installations in the ACT, the initial forward design study (2010) identified ten or potentially more being implemented in a phased approach following a pilot. However, there is no evidence that advice has been sought or received as to the extent to which the current two installations or the initially proposed ten installations, as part of the phased approach, would provide a general effect across the network, or a local effect on the road lengths between the pairs of cameras. (paragraph 2.100)
- The pilot of the point-to-point speed camera system in the ACT does not have a supporting evaluation plan that would ensure learnings from this experiment are maximised. Evaluating the pilot is important in order to determine if this type of system is providing value for money and should be further deployed in urban areas. (paragraph 2.102)

## THE DEVELOPMENT OF SPEED CAMERA SYSTEMS IN THE ACT

- 2.2 Speed cameras are used by governments to achieve road safety objectives by fostering safer speeds and reducing the incidence and severity of crashes. However, other measures are also used to achieve road safety objectives, for example, defining appropriate speed limits, specifying enforcement tolerances and sanctions such as fines and demerits, and encouraging community acceptance of government activity to manage road speeds.
- 2.3 Since 1999 the ACT Government has issued more than 721 802 camera infringement notices, and collected \$106 million in fines from its speed enforcement camera operations. The number of speed cameras on ACT roads has expanded from 2 mobile cameras to 39 fixed and mobile cameras in operation at any one time with the commencement of the second point-to-point installation in September 2013.
- 2.4 In the ACT, as in other jurisdictions in Australia, there are public concerns that the primary purpose of Government speed cameras is to raise revenue rather than save lives. The ACT Government, in its response to the *National road safety strategy 2011-2020*, emphasised its commitment to reducing deaths and injuries, and stated<sup>7</sup>:

<sup>7</sup> ACT Road safety strategy 2011-2020, p. 8

... the economic cost to the community of ACT road crashes has been conservatively estimated at \$224 million per annum.

- 2.5 In the ACT all fixed and some mobile cameras are operated by the ACT Government. ACT Policing is also responsible for speeding enforcement. It conducts operations using a range of mobile speed detection devices. Police operations account for around ten per cent of all speeding infringements on ACT roads per year and include campaigns aimed at high risk road users and high risk locations such as school 40 km/h zones.
- 2.6 Speed cameras work by acting as a deterrent<sup>8</sup> to driving above the speed limit. Road users comply to avoid the possibility of a speeding fine and other sanctions.
- 2.7 Research<sup>9</sup> shows that as travel speed increases, so does the risk of crash involvement and also the risk of serious injury in the crash. According to the *National road safety strategy 2001-2010* 'on urban main roads with 60 km/h speed limits, the risk of involvement in a serious injury crash has been found to double with each increase of 5 km/h above the speed limit'. ACT Policing reports that speeding was identified as a contributing factor in 16 of the 59 (27 per cent) fatal crashes which occurred between 2008 and 2012 in the ACT. This is similar to experience in other Australian jurisdictions, with national road crash data showing that speed is a significant contributing factor in around 30 per cent of fatal crashes.
- 2.8 Road safety research<sup>10</sup> identifies key characteristics (refer to the Glossary for fuller explanation) in designing speed camera systems:
- principles of deterrence, such as *specific deterrence* and *general deterrence*, as two distinct behavioural effects on road users, depending on the camera system employed and its operation;
  - sphere of influence, that is, *local effect* within the immediate vicinity of the speed camera, and *general effect* that can be identified more widely across the whole road network;
  - mode of operation of the system, that is, whether it is operated *overtly* or *covertly*, including the influence of signage; and
  - the *intensity* of the systems combined, and *optimal scheduling* of mobile operations.
- 2.9 The use of cameras for speed enforcement first began in Australia in Victoria in 1985. The first speed cameras were mobile cameras.

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<sup>8</sup> R Tay, *Speed cameras: Improving safety or raising revenue?* Journal of Transport Economics and Policy 44(2), 2010, Deterrence theory discussed pp. 247-257

<sup>9</sup> G Nilsson, *Traffic safety dimensions and the power model to describe the effect of speed on safety*, 2004

<sup>10</sup> M Cameron and A Delaney, *Speed enforcement – effects, mechanisms, intensity and economic benefits of each mode of operation*, Monash University, 2008



2.10 In October 1999, the ACT Government purchased and began using two second hand mobile cameras. These were the first speed cameras to be used in the ACT. Prior to this the ACT was the only jurisdiction in Australia not using speed cameras for enforcing speed limits.

**Figure 2.1: Mobile, mid-block, point-to-point, speed and red light cameras (clock-wise)**



Source: Justice and Community Safety Directorate

2.11 Four speed camera systems (refer to Figure 2.1) are operated on ACT roads by the ACT Government:

- mobile speed cameras. These are operated from within vans. There is a maximum of five vans in operation at any one time;
- speed and red light cameras. These are located at thirteen traffic light controlled intersections and detect speeding and red light offences;
- mid-block cameras. These are speed cameras located away from intersections of which there are thirteen cameras at nine sites; and
- point-to-point cameras. These are located in pairs on main roads. There are four pairs of cameras (eight camera sites).

There is therefore a maximum of 39 speed camera sites in the ACT; 34 with fixed speed cameras and 5 sites where mobile camera vans may be operating at any one time.

2.12 Since 1991 the Department of Urban Services, and then its replacement agency the Territory and Municipal Services Directorate, were primarily responsible for

road safety policy and implementation. In May 2011, the responsibility for road safety policy and camera operations was transferred to the Justice and Community Safety Directorate. In this Directorate, the Legislation, Policy and Planning Branch has responsibility for road safety policy and the Traffic Camera Office has responsibility for operations. The Territory and Municipal Services Directorate remains an important partner in the development of speed camera systems in the ACT as it continues:

- to collect and provide road safety data which is used for the siting and evaluation of cameras; and
- to manage capital programs for installing new or replacing fixed speed cameras.

### Road safety strategies

2.13 Road safety strategies are overarching frameworks which can guide speed camera strategies and the use of speed cameras. The ACT Government is a signatory to the national road safety strategies which are supported by specific ACT strategies.

### *National and ACT road safety strategies*

2.14 National road safety strategies are established for ten-year periods<sup>11</sup>. Shorter-period action plans, usually covering a two-year period guide how these long-term plans are to be achieved. While these strategies and action plans have a broad focus which includes fostering the development of safer roads, safer vehicles, and safer people and safer speeds, they can be used to guide the use of speed cameras.

2.15 The ACT Government has developed its own road safety strategies and action plans to align with the national road safety strategies and action plans. Most road safety strategies focus on reducing the frequency and severity of crashes.

2.16 National and ACT road safety strategies set targets for reducing fatalities on the roads. The current target in the *National road safety strategy 2011-2020* is to reduce the annual numbers of deaths and serious injuries on Australian roads by at least 30 per cent by 2020. In its *ACT road safety strategy 2011-2020*, the ACT Government aims to:

... contribute to a national reduction in the annual number of fatalities and serious injuries of at least 30 per cent by 2020, by achieving a similar improvement in ACT fatalities and serious injuries.

2.17 The national and ACT road safety strategy target for the previous ten-year period, to 2010, was a 40 per cent reduction in fatalities. Nationally a reduction

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<sup>11</sup> Australian Transport Council national road safety strategies 1992-2001, 2001-2010 and 2011-2020

of 34 per cent was achieved over this period, and in the ACT the reduction was 17.6 per cent.

### *The role of speed cameras in road safety strategies*

- 2.18 Some, but not all, of the 34 per cent reduction nationally has been credited to the effect of speed enforcement through the use of speed cameras. Safer vehicles and safer roads also make a significant contribution. The *National road safety strategy 2001-2010* identified a 9 per cent reduction in fatalities potentially achievable from changes in road user behaviour, which includes speed enforcement.
- 2.19 Research used in developing national (2011) and state (2008) road safety strategies identifies that a 12 per cent contribution can be achieved over a ten-year period through camera-based speed enforcement<sup>12</sup>. In Western Australia, a speed enforcement strategy, largely based on the use of speed cameras, aimed at a 25 per cent reduction in fatal crashes, and a lesser reduction in serious injuries.
- 2.20 Professor Max Cameron, the road safety subject matter expert engaged to assist in this audit, advised that it is only by setting a target contribution from speed cameras towards the overall reduction in fatalities and casualties that a camera program can be designed meaningfully as a component of a road safety strategy.
- 2.21 The ACT Government's *Road safety action plan 2009-10* supports this:
- It is proposed to have tighter "targets" for the next ACT road safety strategy covering the period after 2010. International research<sup>13</sup> indicates that countries with quantitative road safety targets perform better than countries without targets. Some countries use empirically derived targets, based on quantitative modelling of intervention options. This approach will be explored and developed in the lead up to preparing the next ACT road safety strategy (page 23).
- 2.22 The development of a camera strategy as part of a broader road safety strategy provides the opportunity for a government to develop a coherent rationale for a mix of enforcement options, including the number and siting of speed cameras and the intensity and mode of operations. These can be tailored to address related strategic targets. In addition to setting goals and measurable objectives, it is good practice to adopt a network-wide approach to reduce speeding at high risk locations and more broadly across the network, through complementary systems and actions. Professor Max Cameron advised that at least four Australian states (Western Australia, Queensland, Victoria and New South Wales) have taken or are taking this approach.

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<sup>12</sup> Advice provided by the subject matter expert based upon modelling for a state level strategy (2008) and the *National road safety strategy 2011-2020*

<sup>13</sup> OECD/International Transport Forum, *Towards Zero – Ambitious Road Safety Targets and the Safe System Approach* 2008, pp. 14-17

- 2.23 Since speed cameras were introduced in 1999 the ACT Government has not developed a speed camera strategy that:
- supports its road safety strategies and road safety action plans;
  - adopts a network-wide approach;
  - identifies a target contribution from speed cameras to the overall reduction in fatalities and injuries; and
  - integrates systems and actions.

### ACT approach

- 2.24 Since 1999 the ACT Government has approved at least six budget proposals from the then Department of Urban Services, and the Territory and Municipal Services and Justice and Community Safety Directorates for camera system developments as part of the annual budget process. In this audit all recent proposals from when mid-block cameras were first proposed were considered:
- \$1.72 million for mobile, speed and red light, and mid-block cameras (2006-07, Territory and Municipal Services)
  - \$1.35 million for point-to-point cameras (2009-10, and again in 2010-11, Territory and Municipal Services)
  - \$500 000 for upgrade of existing cameras (systems and numbers of cameras not specified, 2011-12, Territory and Municipal Services)
  - \$1.55 million for mobile, and speed and red light cameras (2013-14, Justice and Community Safety)
- 2.25 In each proposal the supporting working papers, plans, policies and briefings have focused on a particular technology, such as new or replacement mobile cameras, new mid-block cameras or the point-to-point system. The budget proposals do not have a network-wide strategic context.
- 2.26 The stated purpose of speed camera enforcement in the ACT has been consistent in budget proposals, plans, policies and briefings: to achieve safer speeds and reduce road user casualties. Similar to other jurisdictions, the ACT Government has not included in its rationale for its speed cameras consideration of environmental factors, such as noise, pollution or fuel efficiency.
- 2.27 Budget proposals, plans, policies and briefings, do not specify how the goal of safer speeds and reduced casualties is to be achieved through the use of speed cameras. As stated in paragraph 2.8 road safety research identifies key characteristics of speed camera programs related to principles of deterrence, sphere of influence, mode of operation of the system, the intensity of the systems combined and optimised scheduling of mobile operations.
- 2.28 Budget proposals for ACT camera system developments in general do not sufficiently identify consideration of the prevailing research at the time about

the effectiveness of the camera solution being proposed, and the characteristics that may influence its effectiveness.

- 2.29 The adoption of a new technology seems to be a key imperative in ACT budget proposals. While adoption of new technologies may be appropriate, the proposals have not outlined alternatives, such as different ways or alternative existing technologies for achieving the desired road safety results. No options have been presented that indicate the impact of different levels of investment on the achievement of the desired results. The only options presented relate to the timing of the investment, for example, to implement now, later or never.
- 2.30 The ACT Government has consistently referred to a 'gradual expansion' of speed camera systems in its road safety strategies and action plans over the past seven years. Action plans state:
- Continue to expand the number of fixed red light and speed cameras and mobile camera van sites and introduce fixed speed-only cameras on mid-blocks (2007-08).
- The ACT safety camera program has been gradually expanded over the last 10 years .....Continue the expansion of the camera enforcement program, to be agreed with the ACT Government (2009-10).
- During the period of this Action Plan, an overall strategy and guidelines for the gradual expansion of the ACT safety camera program, including the replacement of older camera equipment as required, will be prepared (2011-13).
- 2.31 Initial planning for a wider deployment of some systems has been undertaken. For example, in 2001, the sites of twenty traffic light controlled intersections were identified as potential sites for speed and red light cameras, of which three were implemented that year. In 2005 the Government agreed to extend the coverage of mobile speed camera operations to potentially all 649 of the main roads in the ACT. The two point-to-point installations were approved as a part of a Territory and Municipal Services Directorate pilot that proposed a further three stages of implementation including ten or more sites. However, at no time in the fourteen years of the development of speed camera systems in the ACT has there been a Government commitment to, or policy position for, the extent of the coverage within a timescale beyond the budget round at the time. Expansion has been a stated aim but it has not been defined.
- 2.32 In budget proposals for replacing ageing equipment or for increasing the number of cameras or systems, there is limited information on the outcomes the investment intends to achieve. However, there is much coverage, particularly in older proposals, on the revenue consequences of investment in cameras. One proposal refers to 'maximising revenue from traffic infringement notices', and achieving a '4:1 cost benefit', where the benefit is fine income. More recent budget proposals, for example, for the point-to-point system in 2010, exclude fines revenue from the analysis.

- 2.33 Budget proposals have been the basis for expanding speed camera systems in the ACT. Many proposals have had a focus on adopting a new technology. Budget proposals have been inadequate as there has been no explanation for the scale of funding requested, proposals do not state what the funding requested will achieve in terms of road safety results and what the relationship is between the level of funding sought and the long-term expansion of camera systems. For example, in the budget proposal in 2006-07, which included the introduction of the new mid-block cameras, no indication was given of the level of impact the cameras would have at the targeted 'dangerous locations' referred to in the proposal, and how many cameras were required for this system to be effective.

### Development of the draft *ACT road safety camera strategy* (September 2013)

- 2.34 The ACT Government in 2011 recognised the need for an overarching speed camera strategy in its *Road safety action plan 2011-2013* in stating that an 'overall strategy and guidelines for gradual expansion will be prepared'. A draft *ACT road safety camera strategy* (September 2013) has been prepared.
- 2.35 The draft *ACT road safety camera strategy* identifies speed cameras as a key component in achieving greater compliance with ACT speed limits, which are part of a speed management approach that aims to reduce road casualties on ACT roads. However the draft *ACT road safety camera strategy* does not specify a long-term goal, that is, the contribution speed cameras will make to the targeted 30 per cent reduction in serious road casualties by 2020 that is set out in the *ACT road safety strategy 2011-2020*.
- 2.36 The draft *ACT road safety camera strategy* therefore does not address the Government's stated aim to have 'tighter targets' based on 'quantitative modelling of intervention options', as set out in the Government's *Road safety action plan 2009-10*. As mentioned in paragraph 2.20, such specification is fundamental for it is only by doing this that a camera program can be designed as a meaningfully component of a road safety strategy.
- 2.37 Provision for the potential expansion in the use of speed cameras and the need to develop an expansion methodology is recognised in the draft *ACT road safety camera strategy*:
- ... [the strategy] outlines how the effectiveness of cameras could be measured to inform future decisions about their use, including the expansion of the existing road safety camera network ... (page 1)
- ... it is important that [a] methodology is developed to clearly identify the circumstances where the use of a road safety camera would be an appropriate and effective option in achieving improved road safety outcomes ... (pages 27 and 33)
- 2.38 However there is no indication in the draft *ACT road safety camera strategy* as to whether the camera program should be maintained, reduced, expanded or restructured over the medium to long term. The strategy identifies that existing

arrangements are to continue until a program-wide evaluation indicates otherwise. This is contrary to the *ACT Road safety action plan 2011-2013* which specifically states the Government will:

... develop a strategy and guidelines for the gradual expansion of the ACT safety camera program.

2.39 Professor Max Cameron reviewed the draft *ACT road safety camera strategy*, and advised:

The ACT road safety camera strategy (draft) is not a strategy. No goal is stated and its specific objectives for achieving a reduction in road trauma in the ACT are not given. The four types of camera system represent the elements of the system, but it is unclear what principles for the deterrence of speeding are their basis. No estimates of the speeding and crash reductions likely to be achieved by the camera systems, alone and in aggregate, appear to have been made in developing the strategy. Hence the ACT Government will have no idea whether its road safety camera program will contribute substantially to achieving the ACT and National strategic goals of 30 per cent reduction in serious road casualties by 2020, or not at all.

2.40 As the ACT Government does not have a speed camera strategy and its draft *ACT road safety camera strategy* is 'not a strategy' there is no strategic basis for making decisions about integrating the scale and operation of the ACT's speed camera systems. The lack of an adequate speed camera strategy presents the risk that:

- the ACT's speed camera systems, collectively and individually, will not achieve desired road safety objectives;
- funding will not be targeted; and
- decisions to invest in specific speed camera systems will result in poor value for money.

2.41 The ACT Government has agreed to adopt the *National road safety strategy 2011-2020* which seeks to have jurisdictions consider the issue of hypothecation by the end of 2013<sup>14</sup>. According to an Austroads<sup>15</sup> report (2013) there has been a partial or full hypothecation of revenue from speed enforcement activities directly back to road safety in Victoria, Queensland, Tasmania and Western Australia. The ACT Government's position on this matter has not been stated.

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<sup>14</sup> *National road safety strategy 2011-2020*, p. 101 identifies 'First steps – within three years...explore the allocation of monies'

<sup>15</sup> Austroads 2013, *Driver Attitudes to Speed Enforcement* AP-R433-13, p. 32



### Recommendation 1 (Chapter 2)

The ACT Government should develop and implement a speed camera strategy that:

- a) includes a goal and measurable objectives for achieving a reduction in road trauma on ACT roads through the use of speed cameras and related speed management actions;
- b) takes a long-term perspective (to 2020 or beyond) and addresses speeding and speed related crashes across the whole of the ACT road network;
- c) establishes, using leading practice from elsewhere, options for the development and integration of speed camera systems that will collectively achieve the targeted reductions in road trauma; and
- d) includes a sensitivity analysis, to support future budget proposals, which shows how varying levels of investment and the phasing of implementation will affect short, medium and long-term road safety.

### SITTING OF SPEED CAMERAS

2.42 An analysis was undertaken to determine whether in the decision-making processes for adopting each of the four speed camera systems (refer to paragraph 2.11), the following was considered:

- accepted practices in other jurisdictions using each system;
- research findings relating to ‘what works’;
- the intended effect of the system;
- siting criteria; and
- appropriate data to analyse options.

2.43 In undertaking the abovementioned analysis ACT Government media releases and web-pages, and Directorate policies and supporting papers were considered. Professor Max Cameron also reviewed ACT camera system siting criteria information as presented in the ACT Government’s road safety web-pages and the draft *ACT road safety camera strategy*, and advised on practices in other jurisdictions and available research on speed cameras.

### MOBILE SPEED CAMERAS

2.44 In October 1999 mobile speed cameras were introduced into the ACT. Their use was defined in the *Motor Traffic Act 1936*<sup>16</sup> and subsequently the *Road Transport (Safety and Traffic Management) Act 1999*, both of which require the location of offences captured by the camera devices to be identified through a location coding system.

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<sup>16</sup> *Motor Traffic Act 1936* (A1936-45) republication no. 8, effective 6 October 1999 to 22 December 1999, part 11C



- 2.45 Mobile camera operations were initially limited to 27 locations, prioritised according to speed-related crash history and speed surveys as well as the physical characteristics of sites and occupational health and safety implications for camera operators. In February 2000 the *Road Transport (Safety and Traffic Management) Regulation 2000* specified the first 27 locations and codes in Schedule 1 of this Regulation.
- 2.46 By August 2000 site selection and operating criteria for mobile speed cameras had been prepared and agreed by a Camera Enforcement Safety Management Committee, comprising road safety experts from the then Department of Urban Services, ACT Policing and NRMA. In September 2001 there were 67 locations and codes published in Schedule 1 of the *Road Transport (Safety and Traffic Management) Regulation 2000*.
- 2.47 In 2004 the August 2000 site selection criteria were revised to include community complaint history, advice from the Police, traffic density, and history of compliance with the speed limit, as well as accident history, physical characteristics of sites and occupational health and safety implications for camera operators. The 2004 site selection criteria align with those used in other jurisdictions.
- 2.48 In 2005, the Government committed to assessing all 649 arterial and collector roads in the ACT roads with a view to expanding the number of sites for its mobile speed camera operations, and achieving greater compliance with speed limits across the whole ACT road network. This was to be undertaken in stages with Schedule 1 of the *Road Transport (Safety and Traffic Management) Regulation 2000* being amended as required. A staged approach was considered necessary to 'allow for sufficient time to assess over 600 new roads'.
- 2.49 This new approach was intended to support the promotion of compliance with speed limits across the whole ACT road network, rather than limit the use of mobile speed cameras to major roads with a particular crash history or identified speed compliance problem. Advice provided at the time by the Department of Urban Services to the Government stated:
- ... a policy change that would result in a cultural change is therefore required for motorists to drive at or below the speed limit for the whole of the ACT, not just at selected sites.
- 2.50 The change in Government policy in the use of mobile speed cameras in 2005 reflects practice in other Australian jurisdictions such as Queensland, Western Australia and Victoria. This "anywhere and at anytime" approach in the use of mobile cameras is referred to as 'anytime, anywhere'.
- 2.51 This 'anytime, anywhere' approach is reflected in the draft *ACT road safety camera strategy* which states:
- ... to improve compliance with speed limits by conducting speed enforcement "anywhere and at anytime" (page 28 and 29).

- 2.52 The expansion of mobile speed camera operations is taking considerable time to achieve as after nine years, mobile speed camera vans are only able to be used on 147 roads, which is 23 per cent of the ACT's 649 arterial and collector roads. This is because not all of the 649 roads have been assessed and therefore cannot be added to Schedule 1 of the *Road Transport (Safety and Traffic Management) Regulation 2000* to facilitate the use of mobile speed cameras.
- 2.53 Furthermore, since 2005, at least 77 per cent of sites added to Schedule 1 of the Regulation were initially identified from public complaints. In most cases, during the site assessment process, there was limited consideration of other site selection criteria, such as accident history and traffic density. The sites listed in Schedule 1 of the Regulation identifying the locations where mobile camera operations take place may therefore not reflect the most appropriate sites according to a balanced consideration of all site selection criteria.
- 2.54 Research indicates that an 'anytime, anywhere' approach based on the ability to deploy mobile speed cameras widely across the road network, using a pattern of shifts and locations that cannot be predicted by road users, potentially has a high general effect across the whole road network<sup>17</sup>. This effect increases as the mode of camera operation becomes more covert<sup>18</sup>, and as the intensity of operations increases<sup>19</sup>.
- 2.55 The ACT Government mobile camera operations are overt as the vans used in the ACT are white with a sign on the van roof stating 'your speed has been checked'. This makes the vans identifiable to road users on their approach to the mobile speed cameras. While an overt approach is used, there is no evidence to suggest that a covert or a combined overt and covert approach, as happens in some other jurisdictions, was considered in the decision-making process. For example, the options paper prepared by the then Department of Urban Services for the development of the mobile speed camera system proposed in 2005 did not state the potential effectiveness of mobile speed cameras according to whether they were operated overtly or covertly.
- 2.56 This inadequacy remains. In reviewing the draft *ACT Road safety cameras strategy*, Professor Max Cameron advised that some of the wording in the draft strategy is problematic in this respect, as it:
- ... glosses over key distinctions relating to the balance of covert and overt mobile camera operations. This should prompt further consideration of what aspects of camera operations it is helpful to make more open.
- 2.57 Furthermore the 2005 options paper prepared by the Department of Urban Services for the Government's consideration did not set out:

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<sup>17</sup> M Cameron & A Delaney, *Speed enforcement – Effects, mechanisms, intensity and economic benefits of each mode of operation*, 2008

<sup>18</sup> M Cameron & A Delaney, *Development of strategies for best practice in speed enforcement in Western Australia*, 2006

<sup>19</sup> R Elvik, *Cost-benefit analysis of Police enforcement*, 2001

- the required intensity of operations to achieve a desired level of general effect on road user behaviour across the network;
- the rate at which the staged assessment of sites should take place, or what the impact would be of deploying a fixed number of mobile camera vans, at the time numbering five, across an ever growing number of locations; or
- plans for developing the intensity of mobile operations, that is the number of camera vans and their frequency of deployment to sites, according to their desired or actual impact on speeding.

2.58 Given the relatively limited number of sites where mobile camera vans may operate, and that operations are undertaken in an overt manner, the ACT Government is unlikely to achieve its desired 'anytime, anywhere' approach. The extent of any effect from the use of mobile cameras can only be determined by an evaluation and this has not been undertaken since the change in policy in 2005.

### Recommendation 2 (Chapter 2)

The ACT Government should develop and implement a mobile speed camera plan which:

- a) specifies the extent of the ACT road network where mobile speed cameras may operate, and the time by which this is to occur; and
- b) identifies the effect of different levels of operational intensity (i.e. the number of vans and shifts, and siting priorities), and mode of operation (i.e. overt, covert) on road safety goals as coverage of the road network is expanded.

### SPEED AND RED LIGHT CAMERAS

2.59 Approximately fifteen per cent of road casualties in the ACT occur at traffic lights. Some of these casualties result from motorists running red lights. The *ACT road safety strategy 2011-2020* identifies that right angle collisions which are a possible consequence of running red lights, are the most frequent category of crashes that result in severe injuries.

2.60 There are thirteen traffic light controlled intersections where there are combined speed and red light cameras. In January 2001 cameras were first installed at three intersections in Canberra. Others were installed in 2002 (six more) and 2007 (four more).

2.61 At the time of the introduction of speed and red light cameras in 2001, twenty intersections had been identified and prioritised from the analysis of crash data from the previous four years. The circumstances surrounding each crash at the twenty intersections were considered. As with mobile camera sites, each intersection was added to Schedule 1 in the *Road Transport (Safety and Traffic Management) Regulation 2000*.

- 2.62 The purpose and the resulting siting criteria for the ACT's speed and red light camera system aligns with practices in other jurisdictions in Australia. In addition, it is the practice in the ACT to review dangerous intersections for alternative solutions to the installation of speed and red light cameras. Such alternatives include re-engineering lanes of the intersection, or the re-phasing of signals. This is considered good practice<sup>20</sup>.
- 2.63 The ACT Government's road safety strategy action plans (2003-04, 2005-06) identified the need for the 'review of current intersection crash data to ensure most efficient allocation of red light cameras'. No such review has taken place since 2003, and the 2003 review related to the first three sites selected for speed and red light cameras (refer to Chapter Three, paragraph 3.27). No monitoring and evaluation has been undertaken to determine the ongoing effectiveness of all thirteen speed and red light cameras. While the ACT's speed and red light camera sites were initially strategically positioned according to a sound rationale and siting criteria it is not possible to determine if they continue to be at the most appropriate sites. Recommendation 6 should address this.

### MID-BLOCK SPEED CAMERAS

- 2.64 Planning for the introduction of mid-block cameras into the ACT began in 2005. Mid-block cameras are sited along sections of main, arterial roads between intersections.
- 2.65 Thirteen mid-block cameras were installed on ACT roads between August 2007 and June 2008. These are sited at nine locations on the Barton, Federal and Monaro Highways and Tuggeranong Parkway. Some locations have cameras on carriageways in both directions.
- 2.66 These cameras are located in grey boxes on poles by the side of the road. The camera device is likely to be visible to road users, and camera sites and their location codes have been publicised through listing in Schedule 1 of *Road Transport (Safety and Traffic Management) Regulation 2000*, and were announced in media releases at the time of the cameras' introduction.
- 2.67 Sites are also clearly sign-posted. The draft *ACT road safety camera strategy* states that:
- Three signs are used on the approach to the road safety camera site which show "Speed Camera 24 hours" at a 300 to 500 metres distance to the camera, "Speed Camera Ahead" at 150 to 250 metres, and "Heavy Fines Loss of Licence" at 50 to 100 metres to the camera (page 32).
- 2.68 The initial budget proposal for mid-block speed cameras, which was supported by the Government in 2006, identified the need for the mid-block speed cameras:

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<sup>20</sup> Professor Max Cameron referred to this as good practice.

... to be located at mid-block sections of arterial road which have a history of crashes or high speeding offences.....providing a static camera operating on continuous basis at known dangerous locations.

2.69 The supported budget proposal also cites the findings of research into fixed, mid-block speed cameras in New South Wales<sup>21</sup>. The findings cited in the budget proposal identify that vehicles slow down at camera sites. The research cited makes no reference to a general effect, that is, an effect on road user speeding behaviour more broadly across the road network.

2.70 Between November 2006 and the time when mid-block camera sites were made public through a media release in May 2007, a decision was taken at officer level in the Territory and Municipal Services Directorate that the purpose of the mid-block cameras would be to achieve a general effect across the road network and not their original intent of preventing crashes at specific sites. Although the Directorate briefing in August 2007 to the Minister did not make reference to the sphere of influence for the mid-block cameras in terms of achieving either a local or general effect, the position was set out publically in Government media briefings in April 2008 in which it was stated:

The fixed-speed cameras have been introduced as a general deterrent measure to improve compliance with speed limits across the whole network. They have not been placed at sites where multiple decisions are required by motorists and are not specifically targeted toward crash “black spots”.

2.71 The purpose of the mid-block speed cameras is further confirmed in the draft *ACT road safety camera strategy* which identifies:

- the main purpose of mid-block speed cameras as providing a ‘general network deterrence’ (page 9); and
- that mid-block cameras operate 24 hours a day, 7 days a week which provides a constant enforcement presence across the network (page 17).

2.72 Furthermore, an officer level decision was also made that crash data would not be part of the criteria for determining the siting of the mid-block cameras. The Minister was briefed on site selection criteria in August 2007, after the sites had been announced (May 2007). The criteria were:

- Traffic volume;
- Higher speed roads;
- Vehicle speed, according to available speed surveys (2005, and 2006);
- Visibility of cameras at potential camera sites; and
- Technical suitability, such as the availability of power.

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<sup>21</sup> ARRB Group, *Evaluation of the fixed digital speed camera program in NSW, 2005*

- 2.73 Between the time at which the budget proposal was agreed in 2006 through to April 2008, there was a change in the Government's stated purpose for the mid-block cameras: from one of achieving a local effect at 'dangerous locations' to that of achieving a general effect to improve speed compliance across the whole road network.
- 2.74 Professor Max Cameron provided advice on this stated change of purpose. He advised that the effect the Government intended from the mid-block cameras as implemented is problematic. The Government has stated that the system will provide 'general network deterrence'. This conflates two concepts; general deterrence and general effect. He further advised that:
- ... a signed, conspicuous fixed-spot speed camera system cannot achieve either [a general deterrent or general effect], unless there is a high density of cameras e.g. at least 1 per 4 km<sup>22</sup>.
- 2.75 There was no evidence that the ACT Government had planned a mid-block speed camera system with sufficient camera sites to potentially achieve a general effect across the whole arterial road network. The arterial network in the ACT extends to around 290 km on which there are only nine locations with thirteen mid-block speed cameras. For there to be a network of sufficient density to achieve at least one camera site every four kilometres, 73 speed camera sites would be needed which is significantly more than the existing number. In the absence of significantly more mid-block speed camera sites, it is unreasonable to anticipate a measurable general effect across the arterial road network.
- 2.76 The number of the mid-block cameras purchased and installed was determined by the available budget of \$980 000 for mid-block speed cameras (refer to paragraph 2.24) in the agreed budget proposal (2006-07), and not by an assessment of the number of cameras and sites necessary to achieve a general effect on road user behaviour that would result in greater compliance with speed limits across the whole arterial road network.
- 2.77 Research at the time<sup>23</sup> supported the use of mid-point speed cameras, a type of fixed spot-speed camera, to achieve a local effect at dangerous sites, where there is incidence or risk of serious crashes and injury. Professor Max Cameron further confirmed:

Fixed spot-speed cameras in the UK and New South Wales have been extensively evaluated. Strong crash reduction effects have been found within the immediate vicinity of camera sites (no more than 1 km) and rapidly diminishing effects up to 2-3 km. In all cases, the camera sites have been chosen on the basis of a (serious) casualty crash history during the previous 3 to 5 years..... However, once in place, with their extensive signage and visibility (as practised in the ACT), it is not

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<sup>22</sup> London Accident Analysis Unit, *West London speed camera demonstration project*, London Research Centre, 1997

<sup>23</sup> T Brinson, *Spot Speed*, 2002, A Gains, M Nordstron, M Heydecker & J Shrewsbury, *National safety camera programme: Four-year evaluation report*, 2005, and ARRB *Evaluation of the Fixed Digital Speed Camera Program in NSW*, 2005

expected that a fixed spot-speed camera has anything other than a local effect, no matter what volume of traffic passes each visible camera site. From this evaluation experience elsewhere, it is unreasonable to expect that fixed spot-speed cameras in the ACT achieve a general network effect.

- 2.78 The initial rationale for the mid-block speed cameras in the budget proposal (2006-07) aligned with the research findings at the time. However, the ACT Government's current rationale for its mid-block speed cameras does not accord with these findings as cameras were installed at locations on the basis they would achieve a general effect across the network. The ACT is the only jurisdiction<sup>24</sup> where crash data has not been used to prioritise mid-block camera sites.
- 2.79 The effectiveness of the ACT's mid-block cameras in achieving a general or local affect has not been evaluated.
- 2.80 The siting of the ACT's thirteen mid-block speed cameras is problematic as they are:
- not of sufficient density to potentially achieve a general effect across the arterial road network or the whole road network; and
  - unlikely to be optimally sited to achieve a local effect as crash data has not guided their location.

### **Recommendation 3 (Chapter 2)**

The ACT Government should review the purpose and siting of its existing thirteen mid-block speed cameras to determine if they need to be removed, relocated or expanded.

### **POINT-TO-POINT SPEED CAMERAS**

- 2.81 The national road safety strategy encourages all jurisdictions through the strategy's 'highest-impact actions' to:
- ... implement targeted, automated speed enforcement, including point-to-point automatic speed detection, where appropriate (page 28 of the action plan 2007-08).
- 2.82 Point-to-point speed cameras have speed detection cameras at either end of a section of road, and detect offences based on the average speed of vehicles between the two cameras. There are two roads in the ACT with point-to-point speed cameras: one began operating in February 2012 on Hindmarsh Drive covering 2.8 km, and the other in August 2013 on Athllon Drive covering 3.7 km in length. These cost \$1.63 million, and comprise pairs of cameras on carriageways in both directions. There are therefore eight camera sites.

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<sup>24</sup> Comparison between ACT and NSW, QLD, WA, VIC and the UK

2.83 The two installations are described in Territory and Municipal Services Directorate commissioned reports as being part of a 'system pilot' ahead of a potential 'phased approach'.

2.84 Of the four different types of speed camera systems used in the ACT, the point-to-point camera system is not widely adopted in Australian jurisdictions. As at December 2013, there were four jurisdictions with point-to-point camera systems; Victoria (commenced 2007), New South Wales (2010, for heavy vehicle speed enforcement), Queensland (commenced 2011) and the ACT (2012). It has been trialled in South Australia, and reviewed for its potential introduction in Western Australia. A literature review in March 2009 undertaken prior to the Queensland Government's trial of point-to-point stated:

..... perhaps due to the relatively limited and recent application of point-to-point speed enforcement in Australia, the evaluation literature in this country is scarce.

2.85 In the ACT the Government's commitment to implementing point-to-point speed cameras emerged in January 2009. A meeting took place between Territory and Municipal Services Directorate road safety officers and the Minister on 23 January 2009. Verbal advice was provided to the Minister. There is no written record of the advice given on point-to-point systems, and it remains unclear how costs, benefits and risks were considered by officers prior to the advice being given. On 24 January 2009 the ACT Government announcement was made that:

Point-to-point speed cameras, which can determine whether a driver has been speeding at any point along a stretch of road, will be installed in the ACT.

This was the first time the Government made a public commitment to implementing point-to-point speed cameras in the ACT.

2.86 At the time of this announcement Victoria was the only jurisdiction with point-to-point cameras in operation for speed enforcement. Approximately 54 km of the Hume Highway is covered by four consecutive point-to-point zones in each direction, ranging from approximately 7 km to 25 km. On 21 December 2011 a point-to-point installation commenced operation over a 14 km length of the Bruce Highway in Queensland.

2.87 The Territory and Municipal Services Directorate has indicated that the purpose of the ACT Government's point-to-point camera system is twofold: to have a general effect across the network, that is, an effect beyond the length of road between the pairs of speed cameras, and to have a local effect. Reports commissioned by the Directorate to provide advice on the implementation of point-to-point in the ACT state:

... the objective of [the ACT's point-to-point system] is to achieve a change in driver behaviour and greater speed compliance across the network (July 2010)<sup>25</sup>.

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<sup>25</sup> Territory and Municipal Services Directorate, *Forward design study: Introduction of point to point speed cameras in the ACT*, July 2010, p.44



... [single fixed] speed enforcement systems, such as those installed in the ACT, are acknowledged to be effective at reducing speeds at the camera site but not within a wider area surrounding the camera. .... Point-to-point speed enforcement systems have been developed to manage average speeds between two points that can be several kilometres apart (July 2010).

... [analysis and ranking was undertaken] to promote active speed enforcement by exposure to high traffic levels and gain speed compliance across the whole of the ACT as well as address sites with high crash rates (September 2011)<sup>26</sup>.

2.88 The draft *ACT road safety camera strategy* prepared by the Justice and Community Safety Directorate confirms this dual purpose, with the desired impact of the point-to-point system being to:

- improve compliance with speed limits, across the network (page 35 i.e. a general effect); and
- reduce crashes and casualties within the enforcement corridor (page 35 i.e. a local effect).

2.89 The ACT Government has implemented two point-to-point installations, one on Hindmarsh Drive and one on Athllon Drive, based on advice provided initially by the Territory and Municipal services Directorate (up to May 2011) and the Justice and Community Safety Directorate (from May 2011), with the intent of influencing road users' behaviour beyond and on the routes covered by the pairs of cameras.

2.90 Professor Max Cameron advised that:

... there is no research to support the aspiration that the system will have an effect beyond the section covered by the pair of cameras, that is, a local effect over the treated length ... beyond that it is unclear and ambitious.

#### **Recommendation 4 (Chapter 2) Multi-part recommendation**

The ACT Government, for its two existing point-to-point speed camera installations, should:

- a) review and state the purpose of the system

2.91 Furthermore, advice received by the two Directorates highlights the significant difficulties in implementing point-to-point speed cameras in an urban environment. The *Forward Design Study: Introduction of Point to Point Speed Cameras in the ACT* (July 2010) identified that site selection is:

... potentially the greatest challenge facing the implementation of [point-to-point] in the ACT because of the urban nature of the ACT road network.

The study goes on to identify that:

<sup>26</sup> Territory and Municipal Services Directorate, *P2P Data Analysis and Ranking*, September 2011, p. 4

... [point-to-point] systems should be installed initially on road sections with a minimum length of around 5 km. It is probable that shorter road lengths would be more cost effectively served by a fixed point enforcement camera.

2.92 In relation to the use of point-to-point in an urban setting, Professor Max Cameron advised that it is:

... unprecedented outside the ACT ... [and that there are] doubts about its suitability in urban areas except for long lengths of urban freeway.

And that:

... point-to-point would be more cost effective [than a single fixed speed camera] for longer sections ... the use of a 10 km minimum length would further increase the likelihood that point-to-point is the most cost effective solution ... and that recommended sites [in two other jurisdictions where point-to-point systems have been considered] were all links greater than 10 km ...

2.93 The cost effectiveness of the installations on the two sections of road covered by the point-to-point cameras in the ACT is compromised as in both cases the road length covered by the cameras is shorter than:

- the minimum length of sections in the two other jurisdictions (Victoria, 7 km and Queensland, 14 km) that have installed point-to-point cameras for speed enforcement of all vehicles;
- the minimum length initially proposed (5 km) by the ACT Government’s advisors in the *Forward Design Study: Introduction of Point to Point Speed Cameras in the ACT* (July 2010) in order to be the most cost effective option; and
- the minimum length recommended by advisors (10 km) to two other jurisdictions considering the introduction of point-to-point systems.

2.94 The *Forward Design Study: Introduction of Point to Point Speed Cameras in the ACT* (July 2010) identified a range of potential site selection issues; power, communication, length of road section, avoiding intersections, discrete speed zones, and free-flow speeds. From the consideration of these, an initial set of ten sites was proposed for detailed analysis using specific safety and traffic factors (refer to Table 2.1).

**Table 2.1: Factors contributing to site selection**

Safety factors	Traffic factors
Casualty crashes per kilometre per year	Non free-flow intersections per kilometre
Crashes per kilometre per year	Total traffic volumes
Number of existing fixed and mobile sites	Ratio of 85 <sup>th</sup> percentile speed to speed limit
NetRisk <sup>27</sup> ranked sites per kilometre	

Source: *Forward design study: Introduction of point to point speed cameras in the ACT*, p 49, July 2010

<sup>27</sup> NetRisk is a tool that is used to assess the safety condition of the road network

- 2.95 Following the initial forward design study (July 2010) over a fourteen month period the Justice and Community Safety and Territory and Municipal Services Directorates and the Minister gave further consideration to siting criteria, and other potential sites. This was supported by two further reports, one in November 2010<sup>28</sup> and one in September 2011<sup>29</sup> with revised lists of priority sites. The location of the first site on Hindmarsh Drive was publicly announced on 21 September 2010. The second site on Athllon Drive was announced on 9 May 2012.
- 2.96 One major factor that influenced the priority order of proposed sites was the decision to re-analyse possible sites based on shorter sections of road, reduced from 5 km to 2 km since:
- ... the point-to-point steering committee agreed that the minimum length of 2 km should be adopted. Without such a reduction in the minimum corridor length there were insufficient sites available for consideration.<sup>30</sup>
- 2.97 The need to review possible sites using a different method occurred due to the lack of available sites meeting the original minimum road length of 5 km, that is, the length that would have ensured point-to-point was the most cost effective option. This did not prompt any further discussion at officer level or within the steering committee about the cost effectiveness of a fixed point-to-point system compared to alternatives, such single fixed cameras, mobile cameras or mobile point-to-point cameras.
- 2.98 The re-analysis (September 2011) led to the reduction in the length of the proposed first installation, as announced in September 2010, on Hindmarsh Drive from a 5.5 km length, interrupted by two traffic light controlled intersections, to an uninterrupted 2.8 km length. The September 2011 re-analysis also resulted in the prioritisation of Athllon Drive covering 3.7 km<sup>31</sup> as the second installation site.
- 2.99 Professor Max Cameron advised that a comparison of the ACT's point-to-point site selection criteria with practice in other jurisdictions in Australia is not currently possible. From his review of the report Austroads *Point-to-point speed enforcement* (2012), he advised that there is not yet consistency in the site selection criteria used by jurisdictions that have point-to-point systems.
- 2.100 While there are currently two point-to-point installations in the ACT, the initial forward design study (2010) identified ten or potentially more being implemented in a phased approach following a pilot. However, there is no evidence that advice has been sought or received by the Justice and Community

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<sup>28</sup> Territory and Municipal Services Directorate, *Supplementary point-to-point speed enforcement sites*, November 2010

<sup>29</sup> Territory and Municipal Services Directorate, *P2P Data Analysis and Ranking*, September 2011

<sup>30</sup> Territory and Municipal Services Directorate, *P2P Data Analysis and Ranking*, September 2011, p.4

<sup>31</sup> Athllon Drive was 19<sup>th</sup> highest priority in November 2010, and 3<sup>rd</sup> highest priority in September 2011

Safety or the Territory and Municipal Services Directorates as to the extent to which the current two installations or the initially proposed ten installations, as part of the phased approach, would provide a general effect across the network, or a local effect on the road lengths between the pairs of cameras.

2.101 The national road safety strategy encourages the adoption of targeted automated speed enforcement, *where appropriate* (refer to paragraph 2.81). The recent introduction of point-to-point speed cameras in the ACT is experimental as:

- this technology has not previously been used in an urban area;
- short road lengths are used compared with those initially recommended or used in other jurisdictions; and
- there is a lack of information on the effectiveness of this type of system, as no Australian jurisdiction where it has been implemented has undertaken an evaluation.

2.102 Furthermore, the pilot of the point-to-point speed camera system in the ACT does not have a supporting evaluation plan that would ensure learnings from this experiment are maximised. Evaluating the pilot is important in order to determine if this type of system is providing value for money and should be further deployed in urban areas. There is further discussion about point-to-point cost effectiveness in paragraphs 3.38 and 3.40 in Chapter Three.

### **Recommendation 4 (Chapter 2) multi-part recommendation**

The ACT Government, for its two existing point-to-point speed camera installations, should:

- b) develop and implement an evaluation plan to assess their effectiveness in reducing speeding and road trauma

### 3. EFFECTIVENESS OF SPEED CAMERAS

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- 3.1 This chapter considers the effectiveness of speed cameras in the ACT in reducing speed through examining infringement rates, speed survey results, community attitudes and evaluations. Data management and security is also considered.

#### Conclusion

##### **The effectiveness of speed cameras in the ACT has not been established.**

There is a persistent speeding problem in the ACT, according to survey and infringement data, which calls into question the effectiveness of the ACT Government's speed camera systems.

Evaluations of speed camera systems, particularly the mid-block speed cameras and the recently implemented point-to-point cameras have not been undertaken. Furthermore the value for money of the two point-to-point camera installations is questionable. It is likely there has been a three-fold increase in the cost per km of road treated from the initial design stage through to implementation.

While the speeding problem in the ACT is persistent, its extent is unknown. Residents report high levels of speeding, but this cannot be confirmed with any accuracy. The use of infringement data from camera sites is an unreliable indicator of speeding behaviour across the road network and speed surveys have not been designed to be representative. There is therefore limited information on whether the problem of speeding is increasing or diminishing on the road network.

Limitations in data used in the development of the ACT's speed camera systems are not identified to decision makers. The planning and coordination of data collection is not effective. Information on camera effectiveness has not been routinely made public. The administration of requests for the disclosure of vehicle images is inadequate.

#### Key findings

##### ***Infringements***

- Infringement rates for fixed speed cameras in the ACT are around 0.06 to 0.12 per cent over the long term, i.e. approximately one vehicle in one thousand is issued an infringement notice for speeding at camera sites. Infringement rates are of limited use in determining the extent of speeding. These rates are likely to grossly understate the level of speeding above the speed limits across the whole ACT road network as:
  - camera detected infringements are only issued for speeding offences that are significantly above the speed limit; and
  - the overt nature of fixed speed cameras and signs in the ACT provides road users with ample warning to slow down approaching camera sites. (paragraphs 3.9 and 3.10)

- The *National road safety strategy action plan 2007-08* outlines measures for best practice including adopting 'tight enforcement tolerances'. The ACT Government agreed to review the discretionary speed enforcement tolerance in the ACT in 2007-08. However, there is no a documented rationale for the ACT's enforcement tolerance. (paragraphs 3.11 and 3.12)

### **Community attitudes**

- The *National Survey of Community Satisfaction with Policing* surveys shows that the ACT has a speeding problem as over 60 per cent of drivers surveyed each year from 2009-10 to 2011-12 stated that they had driven 10 km/h or more above the speed limit. This is higher than the Australian average and other jurisdictions in Australia, except for New South Wales in 2011-12 and Western Australia in 2010-11 where reported speeding was similar to that in the ACT. (paragraph 3.13)
- Public perceptions of crime problems are also considered in the *National Survey of Community Satisfaction with Policing* surveys. Survey data suggests that ACT residents had the second highest level of concern for speeding as nuisance behaviour in residential neighbourhoods compared to residents in other Australian jurisdictions in 2011-12. (paragraph 3.14)
- Attitudes of ACT residents, as identified in surveys, are difficult to reconcile. When compared to residents of other jurisdictions, ACT residents:
  - are more likely to see poor driving skills as a contributory factor in crashes;
  - are less likely to link speeding with the incidence of crashes;
  - have the strongest support for more speed enforcement activity;
  - feel they are less likely to get caught speeding; and
  - are more likely to agree with the speed limits.

It is not clear in the draft *ACT road safety camera strategy* how community attitudes are influencing speed camera systems in the ACT. (paragraph 3.17)

### **Speed surveys**

- The ACT Government conducts and annually publishes the results of a large number of roadside speed surveys. In the last fourteen years there have been 3 644 surveys which show that free-flow traffic speed is greater than 5 km/h over the speed limit for approximately 50 per cent of the survey sites and ranges from 41 and 65 per cent. (paragraph 3.18)
- While this identifies the extent of the speeding problem at specific locations this data does not provide an accurate indicator of speeding across the network. This is because the selection of survey sites is not a representative sample of road types and conditions of the ACT road network. Sites are generally identified for surveying as a result of perceived problems. (paragraph 3.19)

- Speeding infringement rates, community surveys and roadside speed surveys indicate there is persistent speeding in the ACT. Since there is no network representative roadside speed survey or any other speed monitoring system, it is not possible to determine whether this problem is increasing or diminishing across the whole road network. (paragraph 3.22)

### **Evaluation**

- Over the past fourteen years, the Government has planned but not undertaken evaluations for many aspects of its speed camera operations. Two camera systems (mobile, and speed and red light cameras) were evaluated but this was over ten years ago, and neither was conclusive. There is no overarching evaluation framework to gauge the effectiveness of speed camera activity across the whole ACT network despite the adoption and siting of camera systems in the ACT that is either contrary to prevailing research or where there is an absence of accepted practice. (paragraphs 3.28 and 3.32)
- The draft *ACT road safety camera strategy* recognises that formal evaluations of the effect of ACT road safety cameras have been limited and proposes options for the evaluation of effectiveness of the Government's speed cameras. However, there is no commitment in the strategy to a forward program of evaluations. In November 2013 the Government committed to undertaking an evaluation of the ACT's speed cameras in the first half of 2014. (paragraphs 3.33 and 3.36)
- No evaluation plan has been developed to guide the assessment of the pilot of the point-to-point system in the ACT. Such a plan is important to determine if this type of system is providing value for money and should be further deployed in urban areas. (paragraph 3.38)
- The value for money of the point-to-point system pilot is likely to have been compromised by changes to the lengths of road covered by the two installations. The reduction in the length of the road between the pairs of point-to-point cameras, combined with the increase in actual costs (compared to the estimated cost) of installing this system, has led to a three-fold increase in the cost per km of road treated. (paragraphs 3.39 and 3.40)

### **Data collection**

- The national road safety strategy action plans advise that the collection of speed data should be done independently of the data generated by enforcement activity at speed cameras sites. This is achieved in the ACT since the Traffic Data Unit in the Territory and Municipal Services Directorate provides such data to Legislation, Policy and Programs in the Justice and Community Safety Directorate, that is, the Directorate that leads on road safety policy and enforcement. However, the planning and coordination of activities between these sections is not fully effective. (paragraph 3.44)
- The siting criteria for speed camera systems currently used in the ACT have relied on data which is primarily sourced from surveys of road speeds and traffic

conditions, management information from camera operations such as infringement rates, and information on crashes. File records identify that many data sources used in the siting methodologies are imperfect as they are often incomplete or imprecise. There is a risk that decision makers are asked to make decisions on recommendations without knowing the robustness of the data. (paragraphs 3.45 and 3.46)

- Data utility is improving as the Territory and Municipal Services Directorate has been able to plot crash sites more accurately since 2011, using precise coordinates rather than attributing crashes to long sections of roads. Also a larger number of traffic light-controlled intersections can now be monitored for red light running, which can be a very useful predictor of potentially dangerous intersections. (paragraph 3.47)

### **Camera operations data**

- The draft *ACT road safety camera strategy* identifies the need to improve the public availability of camera siting information, but the strategy does not identify a need to improve the availability of camera effectiveness information. Information on camera effectiveness has not been routinely made public. Other jurisdictions are considering publishing or have already published information on the effectiveness of camera operations. (paragraphs 3.49 and 3.50)

### **Protecting and disclosing images of vehicles**

- Disclosure of images from speed camera operations is permitted if it is 'reasonably necessary for the enforcement of criminal law'. The point-to-point installation on Hindmarsh Drive takes images of an estimated 900 000 vehicle movements a month. ACT Policing has made 22 requests for images since January 2012. No other agencies have made requests. (paragraphs 3.58, 3.59 and 3.60)
- The Traffic Camera Office's administration of these requests is an area where procedures, practice and record keeping should be improved in order to provide assurance that camera image disclosure is 'reasonably necessary'. (paragraphs 3.59 and 3.60)



## INTRODUCTION

- 3.2 International research<sup>32</sup> is widely used in road safety strategies to show the relationship between excessive speed and the incidence of road casualties. According to the *National road safety strategy 2001-2010* 'on urban main roads with 60 km/h speed limits, the risk of involvement in a serious injury crash has been found to double with each increase of 5 km/h above the speed limit'.
- 3.3 Roads ACT in the Territory and Municipal Services Directorate reviews speed limits according to national criteria on a periodic basis. ACT speed limits are changed in response to this. The last review of arterial road speed limits in the ACT took place in 2010. Appropriate speed limits provide the foundation for speed enforcement and for encouraging compliance.
- 3.4 The *ACT road safety strategy action plan 2003-04* states that:
- ... the speed enforcement programs backed by extensive publicity were a major factor in the substantial national reduction in road fatalities (37 per cent) that occurred between 1989 and 1997. Compliance with speed limits is still far from perfect, and better compliance would cut road deaths significantly. The National Strategy notes the need for enforcement and education initiatives to promote the public perception that compliance 'everywhere, all the time' is the best way of avoiding penalties and improving safety (page 10).
- 3.5 There is evidence of the Government's sustained commitment to educating and encouraging road users to respect speed limits in the ACT. A three E's (i.e. Education, Enforcement, Engineering) approach has been applied in road safety strategy action plans for more than ten years. Actions include targeted media campaigns for ACT residents driving interstate, awareness raising relating to the 50 km/h default speed limit in response to poor compliance levels, and expansion in the use of variable message signs. The effectiveness of such programs is in part reflected by infringement rates, community attitudes and speed survey results.

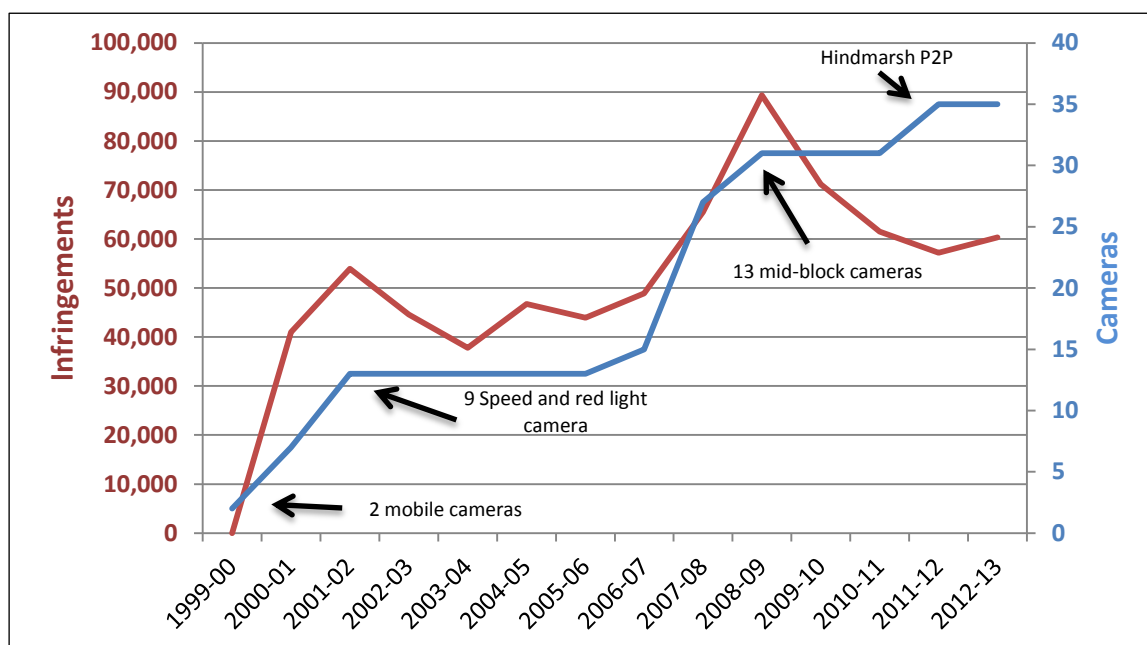
## INFRINGEMENTS

- 3.6 Growth in the number of speed cameras in the ACT has generally been accompanied by a growth in the number of infringements issued (refer to Figure 3.1).

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<sup>32</sup> G Nilsson, *Traffic safety dimensions and the power model to describe the effect of speed on safety*, 2004, and Kloeden et al (1997, 2001, 2002) research on the link between casualty crash risks and individual driver's speed

Figure 3.1: Growth in cameras in operation and infringements



Source: Traffic Camera Office adjudication system data, Justice and Community Safety Directorate, October 2013

3.7 While overall there has been an increase in the number of infringements there was a decline after a peak in 2008-09 which followed the introduction of the mid-block cameras.

3.8 Infringements for 2012-13 totalled 60 303. Factors that affect the level of infringements include:

- the number, siting, and mode of operation of speed cameras (refer to Chapter Two);
- camera reliability and infringement administration (refer to Chapter Four);
- speed limits and enforcement tolerances; and
- changes in the road speeds of road users as a result of speed cameras or other influences.

3.9 Infringement rates<sup>33</sup> for fixed speed cameras in the ACT are around 0.06 to 0.12 per cent over the long term, i.e. approximately one vehicle in one thousand is issued an infringement notice for speeding at camera sites. This rate is similar to that in Victoria, where this type of data is published.

3.10 Infringement rates are of limited use in determining the extent of speeding. Infringement rates are likely to grossly understate the level of speeding above the speed limits across the whole ACT road network as:

<sup>33</sup> The number of infringements issued, compared to the number of vehicles speed-checked by the fixed speed cameras

- camera detected infringements are only issued for speeding offences above both the mandatory tolerance (2 km/h) and the discretionary tolerance (not publically disclosed), that is, for speeds significantly above the speed limit; and
- the overt nature of fixed speed cameras and signs in the ACT provides road users with ample warning to slow down approaching camera sites. Research indicates speed cameras have a limited zone or 'halo' of effectiveness, outside of which road users revert to habitual road speeds. Therefore the incidence of speeding at camera sites is no indicator of road user behaviour elsewhere in the road network.

3.11 Victoria is recognised<sup>34</sup> as applying tight enforcement tolerances, that is, the level at which speeding infringements are pursued above the mandatory tolerance of 2 km/h or (2 per cent) over the posted limit. The *National road safety strategy action plan 2007-08* outlines measures for best practice including adopting 'tight enforcement tolerances'.

3.12 It is good practice that this discretionary tolerance is consistent with a jurisdiction's speed management strategy. The ACT Government agreed to review the discretionary speed enforcement tolerance in the ACT in 2007-08<sup>35</sup>. However, there is no documented rationale for the ACT's enforcement tolerance.

## COMMUNITY ATTITUDES

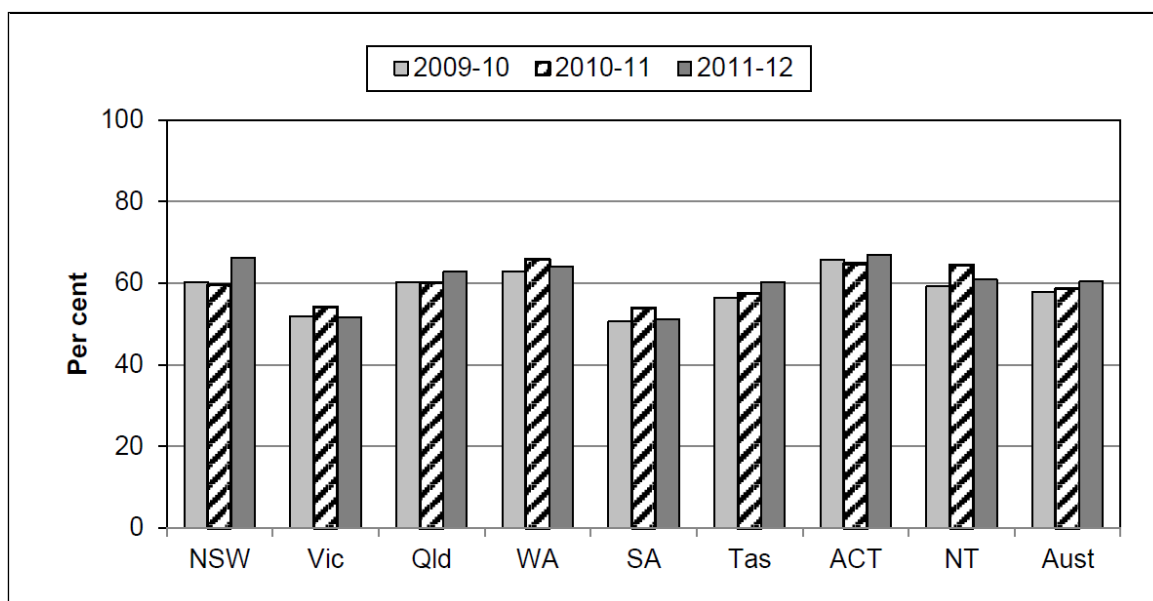
3.13 The *National Survey of Community Satisfaction with Policing* surveys shows that the ACT has a speeding problem as over 60 per cent of drivers surveyed each year from 2009-10 to 2011-12 stated that they had driven 10 km per hour or more above the speed limit. This is higher than the Australian average and other jurisdictions in Australia, except for New South Wales in 2011-12 and Western Australia in 2010-11 where reported speeding was similar to that in the ACT (refer to Figure 3.2).

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<sup>34</sup> *National road safety strategy 2011-2020*, Victorian case study, p. 61

<sup>35</sup> *ACT road safety strategy action plan 2007-08*, p. 14

Figure 3.2: People (self-reported) driving 10 km/h or more above the speed limit



Source: Survey data from ANZPAA table 6A.35, published in Report on Government Services 2013 para 6.48

- 3.14 Public perceptions of crime problems are also considered in the *National Survey of Community Satisfaction with Policing* surveys. Survey data indicates that ACT residents had the second highest level of concern for speeding as nuisance behaviour in residential neighbourhoods compared to residents in other Australian jurisdictions in 2011-12. However, as mentioned in paragraph 3.13, ACT residents consistently self-report higher levels of speeding than do residents of nearly all other jurisdictions.
- 3.15 The attitudes of ACT residents surveyed are likely to reflect experience based on a wider inter-jurisdictional travel pattern than that of residents of other jurisdictions. A significant proportion of ACT residents' driving, and an even greater proportion of the safety risk, is likely to be beyond the ACT border. According to recent research<sup>36</sup>, half of ACT residents' fatal crashes and serious injury crashes occur outside the ACT. ACT road safety strategies include actions targeting ACT residents driving interstate.
- 3.16 Attitude surveys were conducted as part of an early evaluation of the ACT's speed and red light cameras (2001). These identified relatively strong support for speed and red light cameras<sup>37</sup>. Two further surveys commissioned by the Government, which are broadly comparable, were conducted in 2010 and 2013. To the statement 'using speed cameras helps to lower the road toll', 51 per cent of survey respondents agreed in 2010, while 56 per cent agreed in 2013. This

<sup>36</sup> NRMA-ACT Roads Safety Trust, *ARRB analysis of crashes involving ACT drivers and riders in NSW 2006 to 2010*, November 2013

<sup>37</sup> Sample of 301 households with an 80 per cent response rate. More than 70 per cent thought speed and red light cameras behind only RBT and 40 km/h zones for improving road safety

suggests only moderate public support for speed cameras with respect to saving lives, despite the strong evidence<sup>38</sup> from studies of their value.

- 3.17 Other survey results relating to attitudes towards speeding and enforcement can be compared more widely between jurisdictions<sup>39</sup>, and over time<sup>40</sup>. Attitudes of ACT residents, as identified in surveys, are difficult to reconcile. According to recent surveys, when compared to residents of other jurisdictions, ACT residents:
- are more likely to see poor driving skills as a contributory factor in crashes;
  - are less likely to link speeding with the incidence of crashes;
  - have the strongest support for more speed enforcement activity;
  - feel they are less likely to get caught speeding; and
  - are more likely to agree with the speed limits.

It is not clear in the draft *ACT road safety camera strategy* how community attitudes are influencing speed camera systems in the ACT.

## SPEED SURVEYS

- 3.18 The ACT Government conducts and annually publishes the results of a large number of roadside speed surveys. Speed surveys are conducted by laying measuring devices across the carriageways, usually temporarily. These are unobtrusive and designed not to alter road user behaviour. In the last fourteen years there have been 3 644 surveys. These show that free-flow traffic speed<sup>41</sup> is greater than 5 km/h over the speed limit for approximately 50 per cent of the survey sites, and ranges from 41 and 65 per cent (refer to Figure 3.3).
- 3.19 While this identifies the extent of the speeding problem at specific locations this data does not provide an accurate indicator of speeding across the network. This is because the selection of survey sites is not a representative sample of road types and conditions of the ACT road network. Sites are generally identified for surveying as a result of perceived problems.

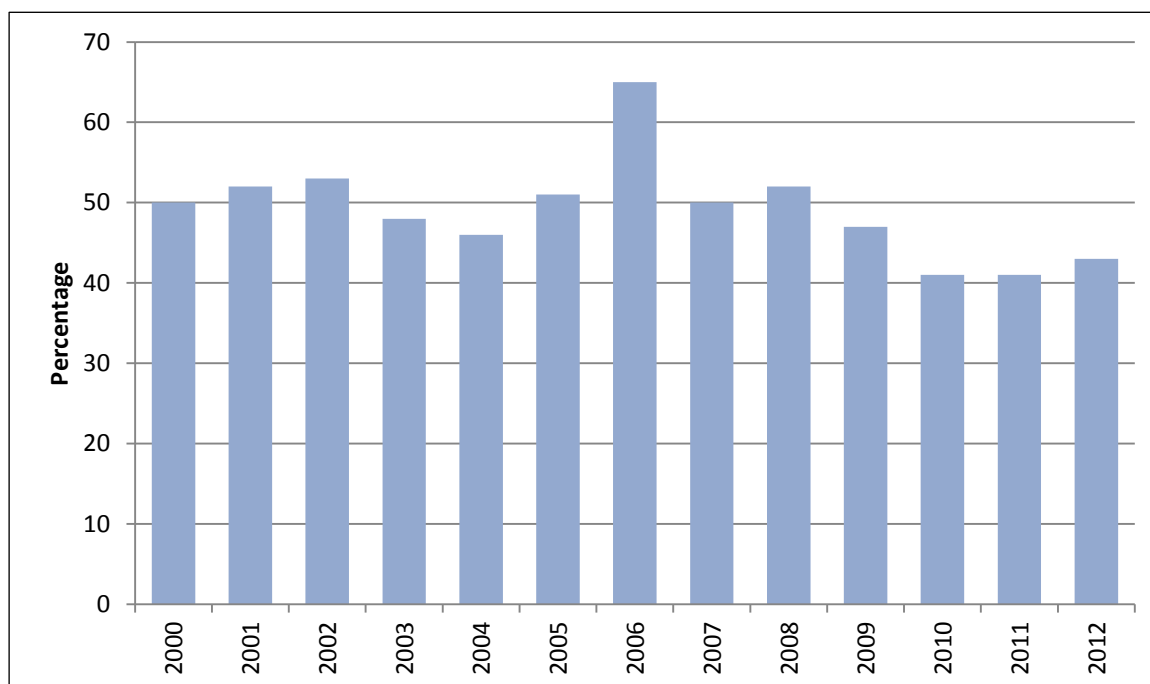
<sup>38</sup> The Cochrane Collaboration, *Speed cameras for the prevention of road traffic injuries and deaths*, 2011. In this review of 35 qualifying studies, the authors conclude there is a high consistency of evidence of the positive effect of cameras but that magnitude of effect is not deducible

<sup>39</sup> Austroads, *Driver attitudes to speed enforcement*, 2013

<sup>40</sup> J Fleiter & B Watson, *Automated speed enforcement in Australia*, 2012

<sup>41</sup> A generally accepted engineering principle where the de facto operating speed of traffic is viewed to be the speed of the 85<sup>th</sup> percentile vehicle speed, as established by traffic surveys

**Figure 3.3: Percentage of the surveyed sites where the free-flow traffic speed is above the speed limit by 5 km/h or more**



Source: ACT Roads annual speed survey reports, the Territory and Municipal Services Directorate

3.20 Identifying the extent of speeding across the road network in the ACT is important as it would assist in determining the scale of the speeding problem and whether speed management activities, including speed cameras designed to achieve a general effect, are effective. This in turn could inform resourcing decisions and revisions to camera systems.

3.21 Professor Max Cameron advised that:

... given the small size of ACT, [the ACT Government should] place emphasis on implementing a relatively large, network-representative, speed monitoring system rather than relying on camera site-specific before-after crash-based evaluations of the fixed camera systems ...

And

... that speed survey trends can provide an early indication of crash risk trends, without waiting for sufficient crash data to occur to provide direct measures of changes in crash risk ...

3.22 Speeding infringement rates, community surveys and roadside speed surveys indicate there is persistent speeding in the ACT. Since there is no network representative roadside speed survey or any other speed monitoring system, it is not possible to determine whether this problem is increasing or decreasing across the whole road network.

**Recommendation 5 (Chapter 3)**

The ACT Government should develop and implement a 'relatively large, network-representative, speed monitoring system' in order to determine changes in the extent of speeding on ACT roads.

**EVALUATION**

- 3.23 Studies in Australia and other places in the developed world have identified that speed camera systems are effective in reducing speed, fatalities and the severity of injuries (refer to paragraph 3.2). Recent practice in Australia is for speed camera networks to be designed as a complementary set of systems that affect road user behaviour across a jurisdiction's whole road network. Different camera systems are implemented in order to make a distinct contribution to overall network effectiveness. Evaluation is designed to confirm the extent to which a strategy has been successful and to enable adjustments to be made.
- 3.24 Although an increasing number of speed cameras and speed camera systems were implemented in the ACT from 1999 onwards, the ACT Government has not developed an evaluation framework to test the cumulative effectiveness of all its speed cameras on speeding and crashes across the whole ACT road network. However, limited individual system evaluations have been undertaken for two of the four speed camera systems: mobile speed cameras in 2001 (refer to paragraph 3.26), and speed and red light cameras in 2003 (refer to paragraph 3.27).
- 3.25 The ACT Government's road safety strategy action plans identify many evaluative tasks in order to confirm or refine the delivery of the Government's medium or long-term road safety strategies. Evidence of the implementation of many actions relating to gauging the effectiveness of speed enforcement measures is limited. For example, the following was proposed but not implemented in full:
- review of current intersection crash data to ensure most efficient allocation of red light cameras, referred to in the Government's road safety actions plans 2003-04, and 2005-06;
  - review of current speed camera policy to provide a more flexible and responsive method to determine appropriate sites based on known crash and speeding data, referred to in the Government's road safety action plan 2005-06; and
  - an ongoing program of monitoring and evaluation of camera systems, referred to in the Government's road safety action plans 2003-04, 2007-08, 2009-10 and 2011-13. Such a program could reasonably have been expected to have considered the effect of actions targeting specific road user groups, such as:
    - motorcyclists referred to in the Government's road safety action plan commentary in 2003-04 and 2005-06; and

- low-level and high-end speeding drivers, referred to in the Government's road safety action plan commentary in 2011-13.

### Evaluations undertaken

3.26 In June 2001, the NRMA-ACT Road Safety Trust published the *Evaluation of the effectiveness of speed cameras in the ACT* report. This report considers the effectiveness of mobile speed cameras deployed to the first two groups of locations set out in Schedule 1 of the regulation<sup>42</sup>. The report concludes:

At the initial 27 speed camera sites, injury crashes have fallen by 26 per cent with is statistically significant. This indicates that the policy of targeting locations with a history of speed related crashes, for the first set of speed cameras was effective. There is, as yet, insufficient crash data to give statistically significant results from the second group of camera sites ... three years of program operations should be sufficient for a more complete analysis of crash data...

3.27 In March 2003, the Department of Urban Services produced a report *Evaluation of the effectiveness of fixed digital red light and speed cameras*. This examined the effectiveness of the speed and red light camera installations at the first three sites in the ACT, based on the first eighteen months' data. The report highlights that:

- there has been a significant reduction in red light and speeding offences at the three trial sites during the first eighteen months;
- at the three trial sites selected for cameras, 'there were not a large number of accidents of the type that may be reduced by the installation of red light cameras';
- due to the longer amber and red red light periods of ACT traffic lights<sup>43</sup>, the 'extent to which the [trial] camera sites may affect accidents in the ACT needed to be quantified';
- the accident profile (that is, rear end, right angle and other types of crashes) had changed in a comparison of trial versus control sites; but that
- the 'analysis is that the red light cameras have not made any significant improvements to the overall crash frequency at the three trial sites'.

3.28 The report also identified that eighteen months<sup>44</sup> is a relative short period to allow conclusive results to be drawn following the installation of cameras. Neither evaluation has therefore been conclusive. There has been no further evaluation of the effectiveness of these two speed camera systems.

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<sup>42</sup> *Road Transport (Safety and Traffic Management) Regulation 2000* (SL2000-10 and SL2000-52)

<sup>43</sup> The report refers to advice from New South Wales Road Traffic Authority, and in particular the experience in Sydney, p.6

<sup>44</sup> Accepted practice (E Hauer, *Observational Before-After studies*, 1996) is that three years is sufficient, although others (Nicholson & Wong, 1993) argue five years' data is needed



3.29 As for the ACT Government's mid-block and point-to-point speed camera systems, system evaluations have been proposed or planned for each, but not implemented:

- *Evaluating the effectiveness of fixed speed-only [i.e. mid-block] cameras and road safety message signs* (September 2010) functional brief by the Territory and Municipal Services Directorate; and
- 'the effectiveness of the point-to-point program will be subject to an evaluation report based on pre and post-installation speed and crash data' ACT Government *road safety action plan 2011-13*.

3.30 Neither of these two systems has been the subject of an evaluation in the ACT, and no functional brief for the point-to-point system evaluation has been prepared. As for the mid-block camera functional brief, it includes six evaluation objectives, one of which is to:

... consider the general incidence of speeding and speed related crashes on the ACT network before and after the introduction of fixed speed only cameras ...

The inclusion of this objective is consistent with the Government's intention to achieve a general effect across the network from the thirteen mid-block cameras. However, this objective, as stated in paragraphs 2.70 and 2.78 is not supported by research evidence.

3.31 There has been review activity that provides a limited assessment of specific aspects of camera systems, but this is inadequate to draw conclusions about speed camera system effectiveness:

- one speed and red light camera was resited shortly after its initial installation on the basis of it generating an unexpectedly low infringement rate (Department of Urban Services, 2001);
- The Department of Urban Services identified from speed surveys and infringement rates relating to mobile camera sites in 2003 and 2004 that road users were becoming familiar with existing sites. It concluded the effects of mobile operations were wearing off. Development of the 'anytime, anywhere' policy followed in 2005; and
- The *ACT Road Safety Report Card 2012*<sup>45</sup> identifies a major reduction in speeding, from 800 to 10 vehicles a day on average in the month before and after the commencement of the first point-to-point installation on 27 February 2012. The report card identifies that the extent to which this translates into reduced crashes or reduced crash risk will be evaluated.

3.32 Over the past fourteen years, the Government has planned but not undertaken evaluations for many aspects of its speed camera operations. Two camera

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<sup>45</sup> ACT Government 2012 Road Safety Report Card, compiled by Justice Planning and Safety Programs of the Justice and Community Safety Directorate, p. 5

systems (mobile, and speed and red light cameras) were evaluated but this was over ten years ago. There is no overarching evaluation framework to gauge the effectiveness of speed camera activity across the whole ACT network despite the adoption and siting of camera systems in the ACT that is either contrary to prevailing research or where there is an absence of accepted practice.

**Evaluation framework**

3.33 The draft ACT *road safety camera strategy* recognises that formal evaluations of the effect of ACT road safety cameras have been limited and proposes options for the evaluation of effectiveness of the Government’s speed cameras.

**Table 3.1: Evaluation options for speed cameras**

Camera type	Evaluation data required	Measure of effectiveness
Mobile	Speed across network	Improved compliance with speed limits in annual speed surveys
	Compliance data	Reduction in rate of infringements issued
	Crash data	Reduction in crashes on roads approved for mobile camera enforcement
Red light/speed	Speeds at location	Reduction in rate of speeding infringements issued
	Red light compliance at location	Reduction in rate of red light infringements issued
	Crash data	Reduction in right angle crashes (type 1 and 2) at the intersection
Fixed speed only (mid-block)	Speeds at location	Improved compliance with speed limit within the vicinity of the camera
	<b>Speed across network</b>	Improved compliance with speed limits in annual speed surveys
	Compliance data	Reduction in rate of speeding infringements issued
	Crash data	Reductions in crashes at the camera site
Point-to-point	<b>Speed across network</b>	Improved compliance with speed limits in annual speed surveys
	Compliance data	Reduction in rate of infringements
	Crash data	Reduction in crashes and casualties within the enforcement corridor

Source: Draft ACT *road safety camera strategy* (September 2013), p. 35

3.34 These options include two evaluation data requirements (column two items in bold in Table 3.1) that are contrary to research evidence, since they seek an effect from point-to-point and from mid-block camera systems on vehicle speeds across the whole network.

3.35 While Table 3.1 sets out possible measures for the effectiveness of the ACT’s speed camera systems and network, for example reductions in infringement rates, and crash and casualty rates, no targets are set for these measures. This is because the scale of the intended impact of distinct camera systems has never been established. It is highly desirable to set targets. The *ACT road safety action plan 2009-10* proposal ‘to have tighter targets’, and to use ‘empirically derived targets based on quantitative modelling or intervention options’ (refer to paragraph 2.21) has not yet been achieved. While this means an evaluation may

identify a positive effect on road user behaviour from speed cameras it will not be clear whether the scale of this impact is in line with what was intended.

- 3.36 Ongoing evaluation is recognised as important in the draft *ACT road safety camera strategy*. However, there is no commitment in the strategy to a forward program of evaluations. A Ministerial media release on 20 November 2013 outlined a commitment to a system-wide evaluation:

The ACT Government's road safety camera program will be evaluated.....in the first half of 2014. The camera program has evolved over more than a decade and now includes mobile, red light and speed, fixed speed only and point-to-point cameras. With a decade of operation now established, it is appropriate to evaluate the performance of the program as a whole... an evaluation will assist the Government to identify any opportunities to gain improved road safety effectiveness from the existing program and help ensure that any future changes are as well informed as possible ...

- 3.37 An evaluative framework is needed to guide future data collection and develop an understanding of the speed camera systems and overall network performance.

#### **Recommendation 6 (Chapter 3)**

The ACT Government should develop and implement an ACT speed camera evaluation and data collection plan.

#### **Point-to-point value for money**

- 3.38 No evaluation plan has been developed to guide the assessment of the pilot of the point-to-point system in the ACT. Such a plan is important to determine if this type of system is providing value for money and should be further deployed in urban areas.
- 3.39 As described in paragraphs 2.91 to 2.93, the initial value for money of the point-to-point system pilot compared to alternative systems is likely to have been compromised by changes to the lengths of the two installations. This did not prompt further discussion (refer to paragraph 2.97) about the value for money of the point-to-point pilot when it would have been reasonable to have done so.

Case Study - Changes in the cost effectiveness of point-to-point

Cost per treated km, from Forward design study to implementation	
4 May 2010	Government approves budget proposal for \$1.35 million for point-to-point pilot.
30 July 2010	Territory and Municipal Services Directorate finalises point-to-point Forward design study which proposes minimum lengths covered by pairs of cameras of 5 km and for each installation site to cost an estimated \$350 000. It could therefore be expected that a minimum of 20 km of road length would be covered by the point-to-point speed cameras from installations at four sites, costing \$1.4m (circa the Government budget proposal figure), or <b>\$70 000 per km</b>
21 Sept 2010	Minister announces 'point to point would be an effective and economically viable speed deterrent in the ACT'.
18 Nov 2010	Hindmarsh Drive site point-to-point installation revised from 5.5 km in length to 2.8 km.
27 Feb 2012	Hindmarsh point-to-point commences operation at a cost of \$800 000.
6 Sept 2013	Athllon Drive site point-to-point installation, covering 3.7 km, commences operation at a cost of \$830 000.
<b>Conclusion</b>	The treated road length that eventuated is 6.5 km (2.8 km and 3.7 km) costing \$1.63 million (\$800 000 and \$830 000), that is <b>\$250 000 per km</b> .  From the point-to-point initial design stage to the implementation stages for the two installations there was therefore a more than three-fold increase in cost per treated km length.

Source: Auditor-General's Office assessment based on information from the Territory and Municipal Services and Justice and Community Safety Directorates' point-to-point files (2009 to 2013)

3.40 The reduction in the length of the road sections between the pairs of point-to-point cameras, combined with the increase in actual costs (compared to the estimated cost) of installing this system, has led to a three-fold increase in the cost per km of road treated<sup>46</sup>. With such an increase in cost per km, the value for money of using this system is likely to have changed. However, at no stage was this assessed. An evaluation when costs had changed may have identified that an alternative speed management treatment would be more cost effective.

<sup>46</sup> Treated road refers to the section of road between the pair of cameras, that is, the road section subject to enforcement

**Recommendation 4 (Chapter 3) Multi-part recommendation**

The ACT Government, for the two existing point-to-point speed camera installations, should:

- c) determine their value for money compared with other speed management treatments to inform future decisions.

**DATA COLLECTION**

3.41 Speed camera system monitoring and evaluation is dependent on the availability of adequate data. The draft *ACT road safety camera strategy* states (page 36):

The methodology used for a future evaluation of the ACT road safety camera program will depend on the availability and completeness of data.

3.42 As in many instances data gaps cannot be retrospectively filled it is important that data requirements for evaluative purposes, such as ‘before and after’ evaluations, are established before a project is implemented.

3.43 In the absence of a well-specified whole-program evaluative framework (refer to paragraph 3.37) there is a risk that data collection is not effectively organised, and therefore, its value may be limited in future evaluations. Recommendation 6 addresses this risk.

3.44 National road safety strategy action plans advise that the collection of speed data should be done independently of the data generated by enforcement activity at speed cameras sites<sup>47</sup>. This is achieved in the ACT since the Traffic Data Unit in the Territory and Municipal Services Directorate provides such data to Legislation, Policy and Programs in the Justice and Community Safety Directorate, that is, the Directorate that leads on road safety policy and enforcement. However, the planning and coordination of activities between these sections is not fully effective as, for example:

- there is no systematic feedback between the road safety policy officers in Legislation, Policy and Programs and the Traffic Camera Office of the same directorate. The Traffic Camera Office collects data on infringement rates for all four speed camera systems. This is not shared with Legislation, Policy and Programs. This information could be used by road safety policy officers in Legislation, Policy and Programs to plan the development of the ACT’s speed camera systems, such as determining strategies for the expansion of mobile camera sites.
- The Traffic Data Unit in the Territory and Municipal Services Directorate coordinates and reports annually on the results of many speed surveys. Over 3 500 have been conducted in the last fourteen years. As described in

<sup>47</sup> National road safety strategy action plans 2003-04 and 2005-06

paragraph 3.19, the choice of speed survey sites has not been informed by the need to develop a network-wide speed profile that would assist the development of road safety policy.

The data collection plan in response to Recommendation 6 will facilitate improved coordination between sections in the Justice and Community Safety Directorate and the Territory and Municipal Services Directorate.

3.45 The siting criteria for speed camera systems currently used in the ACT have relied on data which is primarily sourced from surveys of road speeds and traffic conditions, management information from camera operations such as infringement rates, and information on crashes. File records identify that many data sources used in the siting methodologies are imperfect as they are often incomplete or imprecise. For example:

- for the point-to-point system, 'data was unavailable for some sites for some factors, therefore the average scores were based on the data that was available for that site (November 2010 report<sup>48</sup>);
- for the mid-block system, no speed surveys had been undertaken since 1999 on the Tuggeranong Parkway, and so single vehicle crash data was used as a proxy; and
- prior to 2011, crash data was attributed to a section of road that could be several km in length rather than a specific point on a road.

3.46 In the subsequent proposals relating to siting methodology and the resulting recommended priority sites there is no level of confidence stated to indicate to decision-makers the quality of the data. There is a risk that decision makers are asked to make decisions on recommendations without knowing the robustness of the data.

The data collection plan in response to Recommendation 6 could address this risk.

3.47 However, data utility is improving. The Territory and Municipal Services Directorate has been able to plot crash sites more accurately since 2011, using precise coordinates rather than attributing crashes to long sections of roads. Also a larger number of traffic light-controlled intersections can now be monitored for red light running, which can be a very useful predictor of potentially dangerous intersections.

### **CAMERA OPERATIONS DATA**

3.48 The ACT Government legislates and publishes its camera sites. Information is publically available, for example, through media releases and the Justice and Community Safety Directorate road safety web-pages, for all fixed camera sites,

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<sup>48</sup> Territory and Municipal Services Directorate, *Supplementary point-to-point speed enforcement sites*, Nov 2010, p. 2

that is, for its speed and red light cameras, its mid-block cameras and its point-to-point cameras. Information on service levels for these cameras, referred to as camera 'up time', is published on an annual basis in Directorate annual reports (refer to Figure 4.1). It does not include mobile camera operations.

- 3.49 The draft *ACT road safety camera strategy* identifies that 'to improve public understanding of speed and associated issues, and to counter the perception that speed enforcement, particularly by camera technology, is only "revenue raising" will be challenging'. The strategy identifies the need to improve the public availability of camera siting information, but does not identify a need to improve the availability of camera effectiveness information.
- 3.50 Information on camera effectiveness has not been routinely made public. A freedom of information<sup>49</sup> request to the Justice and Community Safety Directorate in April 2013 led to the publication in the press of site by site camera activity levels according to fine revenue. The *National road safety strategy 2011-2020* (page 67) identifies the need for 'a national community dialogue explaining the safety rationale for speed management actions'. Other jurisdictions are considering publishing or have already published information on the effectiveness of camera operations to facilitate this dialogue.

#### Recommendation 7 (Chapter 3)

The ACT Government should routinely publish information on the effectiveness of all its speed camera systems according to the stated purpose of each system.

### PROTECTING AND DISCLOSING IMAGES OF VEHICLES

- 3.51 The *Road Transport (Safety and Traffic Management) Act 1999* (Section 29) provides for:
- (1) the use of an image taken by a traffic offence detection device only:
    - (a) in connection with the enforcement of the road transport legislation;
    - (b) if the use of the information is reasonably necessary for the enforcement of the criminal law or a law imposing a monetary penalty;
    - (c) if the use of the information is required or authorised by:
      - (i) a law of the Territory;
      - (ii) a law of the Commonwealth; or
      - (iii) an order of a court of competent jurisdiction.

Section 29A limits the disclosure of images other than for these purposes.

<sup>49</sup> The *Freedom of Information Act 1989* (FOI) provides the legal right for individuals to view personal and non-personal information held by ACT Ministers, their directorates and some statutory authorities. The Canberra Times published an article on 18 April 2013 based on information requested under FOI, on speed camera revenues

- 3.52 Unlike other camera systems in operation in the ACT, point-to-point systems capture images of all vehicles passing through the pair of cameras, and not just those vehicles committing a speeding offence. This potentially gives rise to privacy, appropriate use and data storage issues. The Section 29 provisions were introduced into the Act in advance<sup>50</sup> of the point-to-point system going 'live' in February 2012.

### Protecting images

- 3.53 The *Road Transport (Safety and Traffic Management) Act 1999* (Section 24) also establishes that an 'approved average speed detection system' (i.e. a point-to-point system) must ensure that:

... each image of a vehicle taken at a detection point is deleted from the camera that took the image not later than 14 days after the image is taken.

- 3.54 Officers at the Traffic Camera Office advised that:

... a script has been deployed that runs periodically to ensure any images held on the roadside servers are deleted after 13 days and hence ensure no images are stored more than the 14 days allowed under current ACT legislation.

The operation of the script was confirmed by an audit officer. No images were identified on roadside equipment that were more than 13 days old.

- 3.55 Images are downloaded from the roadside cameras and uploaded to the adjudication database at the Traffic Camera Office during the 13 day period if the image supports a potential infringement. Images are decrypted at the Traffic Camera Office. These images are then retained in the adjudication database whether or not an infringement is confirmed through the adjudication process (refer to paragraph 4.74).

- 3.56 The provisions in the legislation only cover the deletion of images from roadside cameras, not from the adjudication database. Some images remain in the adjudication database even though they have not been used to support an infringement. Of the 5 609 point-to-point images adjudicated between February 2012 and June 2013, 1 342 images (24 per cent of those adjudicated) were retained where no infringement had taken place.

- 3.57 The deletion of camera images, other than point-to-point camera images, is not legislated. Officers at the Traffic Camera Office confirmed there are procedures that relate to maximising data storage on the roadside devices, and that this requires the periodic deletion of images.

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<sup>50</sup> *Road Transport (Safety and Traffic Management) Act 1999* A1999-80 Republication No 18 Effective: 15 January 2012 – 3 April 2012



## Disclosing images

- 3.58 The point-to-point installation on Hindmarsh Drive detected an average of 330 speeding vehicles per month of which 250 per month resulted in infringement notices being issued in the period February 2012 to June 2013. A very small number of road users are issued an infringement notice compared to the number of vehicles that use this stretch of road. Images are captured and retained on the roadside equipment for up to 13 days of the estimated 900 000 vehicle movements per month on this stretch of road.
- 3.59 Section 29A of the *Road Transport (Safety and Traffic Management) Act 1999* (refer to paragraph 3.51) provides that image disclosure is permitted if it is 'reasonably necessary for the enforcement of criminal law'.
- 3.60 Officers of the Traffic Camera Office advised that ACT Policing has made 22 requests for images of vehicles since the changes to the Act were introduced in January 2012. All were approved. No requests have been made by other agencies. An assessment of the administration of these requests identifies that:
- requests are made in writing;
  - there is no documented procedure for the assessment of requests;
  - requests from ACT Policing do not always include sufficient information to determine whether the request is reasonably necessary; and
  - records are not kept of the assessment as to what is 'reasonably necessary'.

This is an area where procedures, practice and record keeping should be improved in order to provide assurance that camera image disclosure is 'reasonably necessary'.

### Recommendation 8 (Chapter 3)

The Justice and Community Safety Directorate should document its procedures, and maintain comprehensive records, for its administration of requests for the disclosure of camera images.

- 3.61 In addition, a larger number of images are disclosed in requests for assistance to ACT Policing as a result of concerns raised by the Traffic Camera Office. These concerns relate to the identification of drivers and vehicles, and to excessive speeding:
- vehicles whose registration details in rego.act<sup>51</sup> do not match the vehicle image (i.e. wrong registration plates);

<sup>51</sup> Or if a non-ACT registered vehicle, the details in the National Exchange of Vehicle and Driver Information System (NEVDIS)

- vehicles that do not have registration plates; and
- vehicles speeding in excess of 45 km/h over the speed limit.

3.62 The Traffic Camera Office identified 275 such cases over the period March 2013 to February 2014 where images had been shared with ACT Policing. A log is maintained of these cases, and approval of requests limited to three named officers.

3.63 Officers from the Justice and Community Safety Directorate confirmed that images of vehicles are used by the Traffic Camera Office for the above purposes, namely: for evidencing camera detected speeding offences, for assisting ACT Policing where this is reasonably necessary for the enforcement of criminal law, and for seeking ACT Policing assistance in the identification of drivers and vehicles in order to pursue camera detected speeding offences. Officers confirmed that images are not used for the pursuit of vehicle registration offences under the *Road Transport (Vehicle Registration) Act 1999*.

## 4. SPEED CAMERA RELIABILITY AND OPERATIONS ADMINISTRATION

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- 4.1 This chapter examines speed camera reliability and the administration of camera operations including infringement management. In so doing camera maintenance and accuracy is considered.

### Conclusion

**Speed camera reliability is poor. However, this has no effect on the validity of infringements issued.**

Reliability problems, particularly with mobile cameras, have led to escalating maintenance costs, limited camera availability, and a greater number of rejected infringements when checked by adjudicators prior to issuing. This compromises the effectiveness of the Government's speed enforcement activities as fewer speeding motorists receive a Camera Infringement Notice, despite speeding occurring at camera sites. In 2013-14 the Government funded (\$1.55 million) the replacement of most of its speed camera equipment that is more than ten years old.

The Government's administration of Camera Infringement Notices with respect to the verification of infringements is robust thereby reducing the risk of issuing invalid infringements. However, the relatively high rejection rate of potential infringements indicates inefficiencies. The Traffic Camera Office is aware of the limitations of its adjudication system which will be the subject of an options evaluation in 2013-14.

All fixed speed cameras receive routine checks with planned maintenance currently meeting requirements. While this is the case, the current maintenance cycle for these cameras may be too frequent in some instances. This needs to be investigated as savings may be able to be realised if cameras are being over serviced.

Although the Government has provided funding in 2013-14 for existing equipment replacement and maintenance, there is no documented strategy to guide how best to program and integrate these activities.

The planning and review of the sites scheduled for mobile speed van operations is inadequate. This makes strategic forward planning difficult and presents the risk that these cameras are not being used effectively.

## Key Findings

### *Speed camera reliability*

- Annual reports show that the Government's target level of fixed speed cameras being 'in use' for 95 per cent of the time has been achieved in six of the last seven years. (paragraph 4.6)
- The Justice and Community Safety Directorate target of 43 shifts per week for mobile speed camera operations was not achieved in the last three years. Operational availability fell markedly in 2012-13 with fewer than 40 per cent of the 43 shifts per week being possible in three of the four quarters of the year. This was due to equipment failure, which has resulted, at times, in only two of the five camera vans being available. (paragraph 4.8)
- The number of reactive maintenance work requests has increased in the last three years by 109 per cent, from 114 in 2010-11, to 174 in 2011-12, and to 238 in 2012-13. An estimated two per cent of mobile camera detected potential infringements had to be rejected during adjudication due to camera errors in the two-year period to June 2012. (paragraphs 4.27 and 4.30)

### *Maintenance of speed camera equipment*

- The current and previous maintenance contracts covering the period August 2009 to date have a requirement for fortnightly planned maintenance for fixed speed cameras. This was not achieved in 2011 or 2012 but was met in 2013. While this is the case, it may not be problematic as in Victoria planned maintenance for fixed camera devices is specified to be undertaken on a monthly basis. It was not evident why fortnightly maintenance inspections are necessary in the ACT, rather than monthly. The estimated additional cost to the ACT of requiring fortnightly rather than monthly planned maintenance is \$120 000 a year. (paragraph 4.13)
- For the management of reactive maintenance, the Traffic Camera Office has improved its ability to track and confirm the responsiveness of its contractor. However, there remain areas for further improvement. (paragraph 4.26)
- The Government agreed on 4 June 2013 to fund the replacement of six of its eight speed and red light cameras that are over ten years old and all its mobile cameras, costing \$1.55 million. Once implemented, this will ensure all except two cameras in use on ACT roads are less than ten years old. (paragraph 4.29)
- While the Government is funding the replacement of older speed cameras in 2013-14, there is no documented strategy that sets out the rationale and the program for speed camera maintenance and replacement. (paragraph 4.31)

### ***Speed camera accuracy***

- In considering the accuracy of speed measuring devices for the period 2010 to 2013, the Audit Office identified a lack of a master inventory of devices. In addition there is no readily accessible record system that identifies whether speed measuring devices are either in or out of use, or their location or certification dates. Justice and Community Service Directorate officers acknowledge the desirability of such a system, and advised that the use of an electronic diary for annual certification reminders, introduced after the February 2010 audit, was a stand-in measure until a new adjudication system was introduced that would incorporate the means to monitor annual certification. This system has not been designed or implemented. (paragraph 4.38)
- There is no verification process for when test certificates are received by the Traffic Camera Office to check that their key content is correct, such as device details, test and signatory dates. (paragraph 4.41)

### ***Mobile speed camera operations***

- Based on a walk-through of systems and procedures by an audit officer on 24 September 2013, the assessment of records and a review of other documentation, it is considered that operational practices are aligned with legislative requirements and internal standard operating procedures regarding initial mobile camera operator training, and associated operator approval. (paragraph 4.62)
- Auditing mobile camera operators, once approved, is an area where the record keeping, and potentially practice, is not in accordance with the internal standard operating procedures. The internal standard operating procedure for this indicates this should comprise one, two and three-month audits, as well as a number of unannounced audits and the evaluation of traffic camera operator effectiveness. There was no documented evidence of this audit process occurring. (paragraph 4.64)
- In planning the shift schedule for mobile camera operations, the Traffic Camera Office takes limited account of site by site infringement history, that is, whether previous camera van shifts at the same site identified a high number of infringements and therefore evidence of a continuing speeding problem. (paragraph 4.69)
- There was no evidence that demonstrated that the Traffic Camera Office periodically assesses road accident statistics to ensure that sites that are statistically significant are allocated mobile speed camera coverage, as the *ACT Traffic Camera Office Mobile camera unit site selection criteria* states should happen. There is no routine analysis of the results of mobile speed camera operations. (paragraphs 4.70 and 4.71)

***Infringement validity***

- The ACT Traffic Camera Office has a relatively high rejection rate of potential infringements due to adjudication. Between 18 and 43 per cent of all potential infringements per year over the last fourteen years have been rejected during adjudication. Rejected infringements are deemed to have not met evidentiary requirements. Professor Max Cameron advised that other Australian states typically achieve a lower than 20 per cent rejection rate as a result of adjudication, with one state managing an improvement from 25 down to 10 per cent over a fifteen-year period. He further advised that the percentage that is rejected is something that can be reduced, given effective systems. (paragraphs 4.81 and 4.82)
- Officers in the Traffic Camera Office identified that the existing adjudication database introduced in 2000 has many monitoring and reporting limitations due to its age and design. This makes it difficult to systematically focus on process improvements that may lead to reducing the infringement rejection rate. For example, officers advised that it is not possible to identify trends in the reasons for rejecting cases, the identity of previous adjudicators or the reasons for changes. As a result of a 2013-14 budget proposal from the Justice and Community Safety Directorate being supported by the Government, funding of \$50 000 has been allocated to evaluate adjudication system replacement options. This is currently being undertaken. (paragraphs 4.83 and 4.89)
- In the 60 infringement cases reviewed by an audit officer, there was sufficient evidence to re-adjudicate the case and the same conclusion could be derived as that made in the original adjudication. (paragraph 4.87)
- An analysis of the supervisory control sheets showed that there was disagreement between the first adjudicator and the cross checker in about 0.3 per cent of all cases adjudicated for the most recent twelve-month period. This indicates that adjudicators, for a very high percentage of infringements, are consistent in their decision making regarding an infringement's validity. (paragraph 4.91)
- Training and development is effective in enabling new staff members to develop the skills and knowledge necessary to undertake the adjudication role and to be approved as competent. However, there is no independent training provided to the adjudicators, and there is no documented procedure for the adjudication training process. The Office is heavily reliant on the corporate knowledge of a few key members of staff with learning occurring through the sharing of experience. (paragraph 4.95)

### ***Infringement administration***

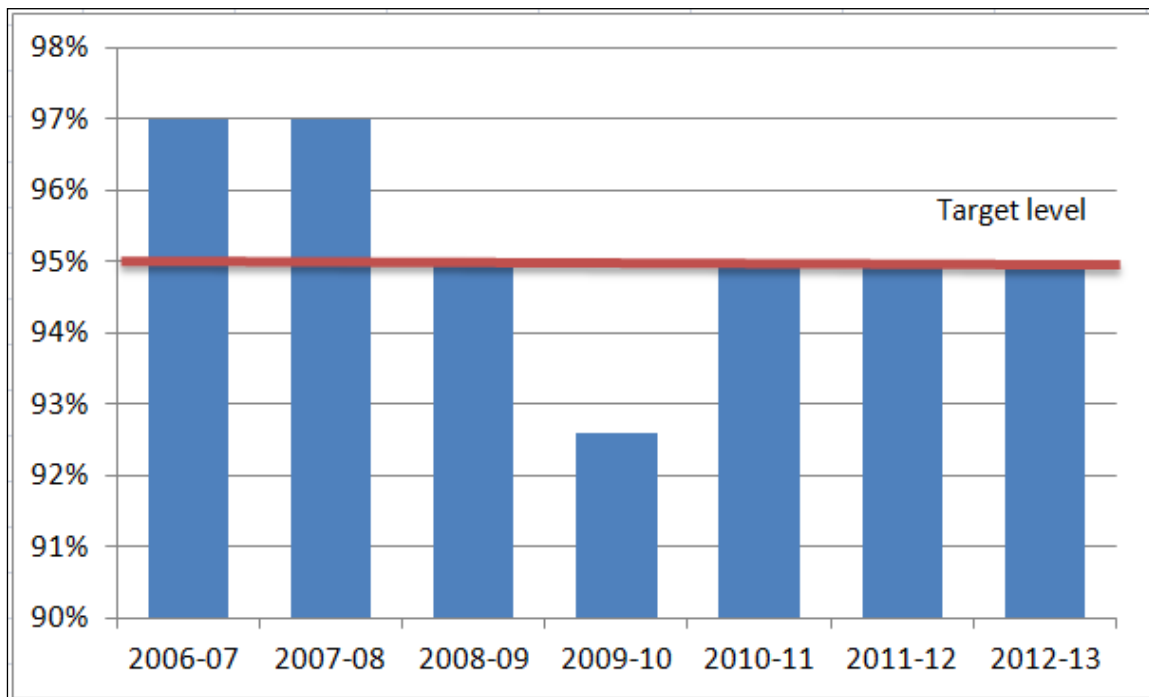
- Thirty case studies were assessed by an audit officer with respect to the three matters of: extension of time to pay 'out of time' applications, withdrawal of Camera Infringement Notices, and unknown drivers. The assessment identified inadequacies in procedures and their implementation, and in record keeping, since:
  - internal standard operating procedures were not up to date;
  - while there were internal standard operating procedures, at least in part, for each of these three matters, these were not always followed;
  - there was insufficient evidence in rego.act of the actions taken to understand why some decisions were made; and
  - the identity of the administrator approved to take a particular action was not available in every case. (paragraph 4.120)
- The ACT Government has issued around 60 000 Camera Infringement Notices a year in the past three years, and collected around \$10 million a year in fines. At any time over this period there is around \$2 million to \$3 million in uncollected fines. The value of uncollected speeding fines has grown from \$448 528 as at 1 July 2001 to \$2 939 455 as at 1 July 2013. (paragraphs 4.121 and 4.122)
- In June 2013 the Government legislated and implemented arrangements to enable people in receipt of infringement notices, who are having difficulties, to seek an extension of time, and to pay off fines according to an agreed plan. Long-term or high-level debtors are being encouraged to use the new arrangements. A priority group of road users with \$4.8 million in debt have been contacted. Plans have been agreed for over 1 700 road users which account for \$2.5 million in debt. (paragraph 4.124 and 4.125)
- Limited management information is routinely drawn from the rego.act system to provide assurance as to the effectiveness of the system, for example, in terms of the transparency, consistency and fairness of administration of Camera Infringement Notices. (paragraph 4.128)

### **SPEED CAMERA RELIABILITY**

- 4.2 The speed camera network comprises four systems (refer to paragraph 2.11). Each of these has devices for data capture (including images), storage and transmission. The Traffic Camera Office in the Justice and Community Safety Directorate uses this data to issue infringements.

- 4.3 In this audit device maintenance was assessed for equipment at all of the 30 fixed camera sites<sup>52</sup> and the five mobile vans. The focus of this was on device maintenance requirements and whether these were being met.
- 4.4 Maintenance is defined as either planned or reactive. Planned maintenance is usually part of a cyclical program of work designed to prevent equipment failure. Reactive maintenance is undertaken when equipment failure occurs and is undertaken in order to rectify a problem.
- 4.5 The performance of fixed cameras is reported in the responsible directorate's annual report. In the last two financial years (2011-12 and 2012-13) this was the Justice and Community Safety Directorate. The percentage of time that fixed speed cameras are in operation per year is measured and reported (refer to Figure 4.1).
- 4.6 Annual reports show that the Government's target level<sup>53</sup> of cameras being 'in use' for 95 per cent of the time has been achieved in six of the last seven years.

Figure 4.1: Percentage of 'in use' time for fixed cameras



Source: Directorate Annual Reports (published)<sup>54</sup>

<sup>52</sup> 30 camera sites relates to all mid-block cameras (13) and all speed and red light cameras (13), and the point-to-point camera sites (4) in operation up in August 2013

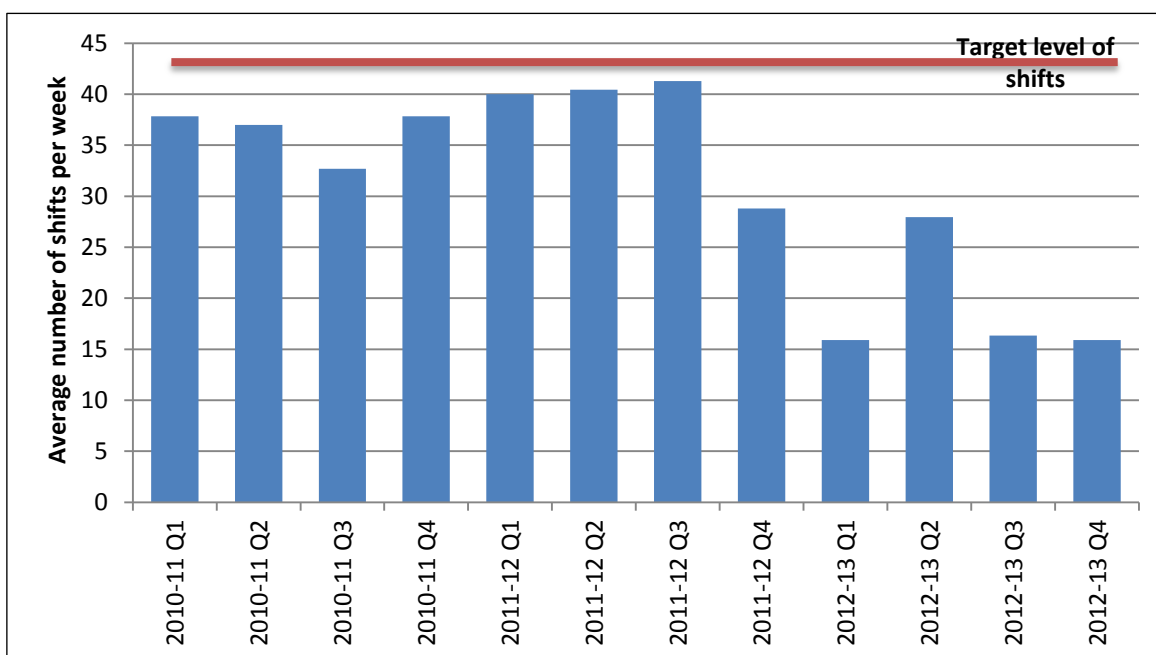
<sup>53</sup> Territory and Municipal Services Directorate and the Justice and Community Safety Directorate annual reports have stated a target of either 95 per cent 'up time' or 5 per cent 'down time' in the last seven years

<sup>54</sup> An explanatory note in the *Territory and Municipal Services Directorate Annual Report 2009-10*, p 120 identifies that 'the down time of fixed speed cameras was below target due to two cameras being off-line for a short period while adjacent road works were undertaken'



4.7 With respect to mobile cameras, the Justice and Community Safety Directorate aims to deploy five speed camera vans during normal business hours five days a week (25 shifts), and two vans every weekend (4 shifts) and every evening (14 shifts). The Directorate’s target for operational availability for mobile cameras is 43 shifts a week.

**Figure 4.2: Level of mobile camera operations compared to the target of 43 shifts per week**



Source: Traffic Camera Office quarterly data on scheduled shifts July 2010 to September 2013

4.8 The Justice and Community Safety Directorate target of 43 shifts per week for mobile speed camera operations was not achieved in the last three years (refer to Figure 4.2). Operational availability fell markedly in 2012-13 with fewer than 17 (40 per cent) of the 43 shifts per week being possible in three of the four quarters of the year. This was due to equipment failure, which has resulted, at times, in only two of the five camera vans being available. As part of a Justice and Community Safety Directorate 2013-14 budget proposal, the Government allocated \$400 000 for the replacement of all the existing mobile speed cameras. These are planned to be in service before the end of the 2013-14 year.

### MAINTENANCE OF SPEED CAMERA EQUIPMENT

4.9 Regular planned maintenance and efficient reactive maintenance is important as it ensures cameras remain in operation and are reliable. Effective maintenance minimises the risk of potential infringements being found to be invalid during the manual checking process undertaken at the Traffic Camera Office prior to the issuing of an infringement. The *Road Transport (Safety and Traffic Management)*

*Act 1999*<sup>55</sup> defines procedures in the event that an infringement is challenged on the grounds of inadequate maintenance.

- 4.10 Speed camera maintenance is undertaken via renewable one-year contracts. Planned and reactive maintenance for all speed camera devices is covered in the one contract.

### Planned maintenance

- 4.11 Justice and Community Safety Directorate internal standard operating procedures<sup>56</sup> specify that planned maintenance is to take place fortnightly for fixed camera sites, and monthly for mobile speed cameras.
- 4.12 The Audit Office reviewed maintenance records for the last three years. Planned maintenance records were examined for all fixed camera devices in operation over a four-week period in each of the years 2011, 2012 and 2013<sup>57</sup>. Records show that maintenance occurred on average on a two-weekly basis in 2013, a three-weekly basis in 2012 and on a four-weekly basis in 2011.
- 4.13 The current and previous maintenance contracts covering the period August 2009 to date have a requirement for fortnightly planned maintenance for fixed speed cameras. This was not achieved in 2011 or 2012 but was met in 2013. While this is the case, it may not be problematic as in Victoria planned maintenance for fixed camera devices is specified to be undertaken on a monthly basis<sup>58</sup>. It was not evident why fortnightly maintenance inspections are necessary in the ACT, rather than monthly. The estimated additional cost to the ACT of requiring fortnightly rather than monthly planned maintenance is \$120 000 a year<sup>59</sup>.
- 4.14 Although the specified planned maintenance for devices at fixed camera sites has not been achieved consistently in two of the last three years, there were regular planned maintenance inspections to all sites in 2011, 2012 and 2013.
- 4.15 A contractor undertakes visits to camera sites in order to conduct planned maintenance. A report of the maintenance undertaken is developed. According to the standard operating procedures a report should be signed off by the contractor and a member of staff from the Traffic Camera Office on the return of the camera cabinet keys on the day of the site visit.

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<sup>55</sup> (A1999 80) Republication No 22, 25 November 2013, Section 28

<sup>56</sup> The Justice and Community Safety Directorate has developed and approved a set of internal standard operating procedures relating to Traffic Camera Office operations. These are referred to subsequently in this report as *internal standard operating procedures*

<sup>57</sup> Four-week periods in November-December 2011, August 2012, and April 2013. Audit sample comprised 28 devices x 2 site visits x 3 four-week periods. This equates to 8 per cent of all reports for the period

<sup>58</sup> Victorian Auditor-General's Office, *Road Safety Camera Program*, Aug 2012, p. 44

<sup>59</sup> Based on contract costs set out in the *Aspect Traffic Pty Ltd 2009* contract

- 4.16 In practice, no reports were signed off by a member of staff from the Traffic Camera Office in 2011 and 2012. For 2013, reports were signed off by a member of staff from the Traffic Camera Office but this happened up to a month after the site visit date.
- 4.17 This practice does not meet the process described in the standard operating procedure and does not provide a timely check on work undertaken. Officers at the Traffic Camera Office advised that the timing of report sign-off in 2013 relates to the contractor's submission of invoices and the Office's authorising of these payments, and not as a confirmation of what maintenance work was completed. As required in the internal standard operating procedure, there needs to be a confirmation of the work undertaken prior to payment.
- 4.18 The contractor is required to provide a monthly report (10<sup>th</sup> of the month) which includes a summary of the planned and reactive maintenance undertaken in the previous month. This is not happening. While invoices with site reference numbers are submitted by the contractor confirm the number of visits and which camera sites have been inspected, these can only be used to confirm the number of visits, and not the completeness of maintenance checks.
- 4.19 Mobile camera equipment planned maintenance, according to internal standard operating procedures and the current maintenance contract, should be undertaken monthly. This is not happening. Traffic Camera Office staff advised that:
- camera equipment failure and an inability to source replacement parts for ageing equipment has made it impossible to undertake monthly maintenance; and
  - mobile camera operators undertake daily checks at the beginning and end of shifts and in so doing identify problems well ahead of what a monthly check could achieve. Therefore the lack of the contractual monthly maintenance check is not considered by staff to be an inadequacy.
- 4.20 Maintenance practices implemented by the Justice and Community Safety Directorate for fixed and mobile speed cameras do not accord with the Directorate's own internal operating procedures. While the regular planned maintenance of fixed cameras in 2011 and 2012 did not occur on a two weekly basis, this may not be an issue as a two weekly maintenance inspection may be too frequent. If this is the case savings may be achieved if the inspection frequency is decreased. Maintenance scheduling for fixed cameras needs to be reviewed, and internal operating procedures updated.

#### Reactive maintenance

- 4.21 There is no internal standard operating procedure for reactive maintenance. However, the maintenance contract requires a 'next day' response from the contractor following the request from the Traffic Camera Office.

4.22 There were 402 reactive maintenance requests made between July 2011 and June 2013. It is routine practice for these to be made on the Traffic Camera Office's *Equipment work request/repair form*. This form requires the signature of the contractor and a staff member at the Traffic Camera Office, and the date and the time of the work undertaken. A review of twenty work requests<sup>60</sup> in this period<sup>61</sup> identified that the signing and dating of work requests is insufficient to confirm contractual time requirements were met:

- Nine (45 per cent) were not signed by the contractor within 24 hours of the request;
- Four (20 per cent) were signed off by the contractor after more than six months;
- Ten (50 per cent) were not signed off or dated by the Traffic Camera Office at all; and
- Nine (45 per cent) were signed off by the Traffic Camera Office around a month after the contractor's sign-off.

With respect to the last two points above, Traffic Camera Office staff advised that invoicing had been the point at which work requests would have been checked for completion and signed off.

4.23 Only one (5 per cent) of the twenty work requests was signed and dated by the contractor within 24 hours and the Traffic Camera Office within one or two days subsequent to this, that is, within a reasonable timeframe to confirm the work request had been fulfilled within the required contractual time. This means the work request forms alone are an unreliable record of the timely completion of reactive maintenance tasks. They cannot be used to confirm that contractual terms are being met.

4.24 Officers confirmed that for part of the audit period, that is 2011 and part of 2012, the only record system was the work requests (using the *Equipment work request/repair form*). No other system, either electronic or paper-based, existed for managing reactive maintenance requested that can be relied upon to confirm the timeliness of the contractor's response.

4.25 From mid 2012 onwards an existing electronic database has been used to provide evidence of contractual compliance with the 'next day' response requirement. This is now done through Traffic Camera Office staff logging maintenance request times and the time a device is back 'on line'. Using this system, officers were able to demonstrate high levels of compliance with the 'next day' response requirement, and provided reasons for when it was not met.

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<sup>60</sup> 5 per cent sample based on requests in November and December 2011, August 2012, December 2012, April 2013

<sup>61</sup> November 2011 to April 2013

- 4.26 For the management of reactive maintenance, the Traffic Camera Office has improved its ability to track and confirm the responsiveness of its contractor. However, there remain areas for further improvement such as the need to:
- set out intended practice in an internal standard operating procedure covering reactive maintenance; and
  - review the function and use of the pro forma *equipment work request/repair form*, so that it provides a reliable confirmation of work undertaken if this is one of its purposes.

#### **Recommendation 9 (Chapter 4)**

The Justice and Community Safety Directorate should align its speed camera maintenance practices, internal standard operating procedures and contractual requirements.

#### **Maintenance and replacement strategy**

- 4.27 The number of reactive maintenance work requests has increased in the last three years by 109 per cent, from 114 in 2010-11, to 174 in 2011-12, and to 238 in 2012-13. Reports<sup>62</sup> commissioned by the Traffic Camera Office and undertaken by consultants in August and November 2012 highlight the growing cost of reactive maintenance, associated with much of the mobile and fixed camera equipment. These reports state that:
- around 30 per cent of all the mobile and fixed speed cameras in operation in 2012 were at least ten years old;
  - ageing mobile equipment has been costing an average of \$50 000 a year in reactive maintenance costs for the four-year period to June 2012;
  - pre-2003 fixed cameras have been costing<sup>63</sup> in reactive maintenance bills per year twice that of post-2003 cameras over the same four-year period; and
  - fixed camera 'in use' time (refer to Figure 4.1) has been six per cent lower for the pre-2003 cameras, than for the post-2003 purchased speed cameras.
- 4.28 Budget proposals in 2010-11 and 2013-14, which have been funded, factor in a two per cent per year increase in costs for camera maintenance after their second year of operation. Expenditure in the four years to June 2012, according to the above reports (August and November 2012) on reactive maintenance alone has been more than five times this estimated two per cent figure for

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<sup>62</sup> AECOM *Review of Fixed Speed Cameras for the ACT* (6 November 2012) and AECOM *Review of Mobile Speed Cameras for the ACT* (2 Aug 2012) prepared for ACT Office of Regulatory Services, Justice and Community Safety Directorate

<sup>63</sup> An average \$8 900 per camera per year

mobile camera maintenance, and more than twice the two per cent figure for pre-2003 fixed speed cameras.

- 4.29 The Government agreed on 4 June 2013 to fund the replacement of six of its eight speed and red light cameras that are over ten years old and all its mobile cameras, costing \$1.55 million. Once implemented, this will ensure all except two cameras in use on ACT roads are less than ten years old.
- 4.30 The same two (August and November 2012) reports also estimated the effect of the high levels of mobile camera equipment failure in the two-year period to June 2012 on potential infringements as around two per cent. These are the potential infringements that have to be rejected during adjudication due to camera errors. Rejected infringements due to camera faulting erode the effectiveness of the Government's mobile speed camera enforcement activities, which are already limited due to the reduced availability of mobile camera equipment (refer to Figure 4.2).
- 4.31 While the Government is funding the replacement of older speed cameras in 2013-14, there is no documented strategy that sets out the rationale and the program for speed camera maintenance and replacement. Such a strategy could:
- be based on whole-of-life asset management;
  - guide maintenance requirements (planned and reactive) including the frequency of planned maintenance;
  - define replacement priorities, taking account of estimated equipment life-spans and performance; and
  - state how speed camera equipment reliability would be monitored and evaluated.

### **Recommendation 10 (Chapter 4)**

The ACT Government should develop and implement a speed camera maintenance and replacement strategy (This could be part of the speed camera strategy which is the subject of Recommendation 1).

### **SPEED CAMERA ACCURACY**

- 4.32 The required accuracy of speed measuring devices is specified in the *Road Transport (Safety and Traffic Management) Regulation 2000*, Section 104:
- ... [tests] must show whether the device is accurate within a tolerance of 2 km/h.
- 4.33 Device accuracy is tested in three ways to minimise the risk of issuing infringements based on inaccurate readings:

- ‘Major testing’ of all devices is required, at a minimum of every twelve months in accordance with the Regulation<sup>64</sup>, by an independent testing authority. Following testing, the authority must provide a signed certificate<sup>65</sup>;
- ‘Drive-through testing’ is required after the installation or reinstallation of fixed speed measuring devices. This is done using a calibrated, tested and certified secondary device, as defined in internal standard operating procedures developed and agreed by the Justice and Community Safety Directorate; and
- Mobile devices are required to be tested at the beginning and end of every shift in accordance with the Regulation<sup>66</sup>.

4.34 The speed camera systems in use in the ACT rely upon a number of interlinked components which include devices to measure speed, to identify a speeding vehicle, and to process, record, store and transmit data.

4.35 The *Road Transport (Safety and Traffic Management) Regulation 2000* specifies what are speed measuring devices. It specifies the use of radar and laser speed measuring devices, loop detectors and piezo strips, approved Police speedometers, and the average speed detection system. The Regulation also makes clear that it is not the image capture technology, that is, the camera, but the speed measuring technology that requires testing, calibrating and independently certifying.

### Major testing

4.36 An internal audit<sup>67</sup> undertaken by the Territory and Municipal Services Directorate in February 2010 reviewed speed camera enforcement activities, and specifically considered the annual certification of speed measuring devices. The audit identified that there were inadequacies in the management arrangements to ensure devices were tested within the specified twelve-month period. Between 2001 and 2010, 155 certificates were issued of which 33 (21 per cent) were outside the twelve-month period. The audit considered whether these 33 devices were in operation for issuing infringements. Four instances were found (in 2004 and 2009) where this was the case. As a result, new procedures were introduced to ensure devices were removed with sufficient time to facilitate a re-test within the twelve-month period.

4.37 No further review of the timeliness or accuracy of annual certification to meet the requirements of major testing has been undertaken since February 2010.

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<sup>64</sup> SL2000-10 Section 104 and Section 104a

<sup>65</sup> SL2000-10 Section 104b

<sup>66</sup> SL2000-10 Section 105

<sup>67</sup> Internal Audit for the Territory and Municipal Services Directorate, *Camera enforcement*, February 2010

- 4.38 In considering the accuracy of speed measuring devices for the period 2010 to 2013, the Audit Office identified a lack of a master inventory of devices. In addition there is no readily accessible record system that identifies whether speed measuring devices are either in or out of use, or their location or certification dates. Justice and Community Service Directorate officers acknowledge the desirability of such a system, and advised that the use of an electronic diary for annual certification reminders, introduced after the February 2010 audit, was a stand-in measure until a new adjudication system was introduced that would incorporate the means to monitor annual certification. This system has not been designed or implemented.
- 4.39 The diary system is inadequate since there is no independent means by which the diary entries in it for each device can be reconciled. This means an incorrectly recorded re-test date cannot be easily identified. The diary system only helps, not guarantees, action is taken to ensure speed measuring devices are taken off-line, and sent away for testing, returned and reinstalled in a timely way.
- 4.40 A master inventory of speed measuring devices estimated to be in use in the last three years was compiled by the Audit Office. It was determined that there are 58 speed measuring devices. The inventory was established from secondary sources, from test certificates and reports, and confirmed with Traffic Camera Office staff. This was then used for audit testing.
- 4.41 Internal standard operating procedures specify the appropriate accredited testing organisations for different types of devices. However, procedures do not specify a verification process for reconciling the details in the certificate with some other reliable source. In the audit sample period (December 2010 and August 2013) there were two errors in three years' certification of the 58 devices: one related to the spelling of the name of a camera device, and the other to the signed date on the certificate. The errors do not relate to specific requirements in the *Road Transport (Safety and Traffic Management) Regulation 2000* but do represent a risk to the validity of the infringement if challenged.
- 4.42 The internal standard operating procedure states that a certified replacement device is to be used when the primary device is sent away for certification. A key risk is therefore that the replacement is not put in place in time, that is, by the anniversary date. This happened for one device during the course of the last three years over three days, 3 March 2013 to 6 March 2013. This equates to a quantifiable risk of one in 20 000 infringements being issued on a non-certified device. On this occasion, the Traffic Camera Office became aware of the problem in time and rejected any potential infringements from that device for those three days.
- 4.43 The Audit Office did not identify any other speed measuring devices operating in the absence of annual certification.
- 4.44 Two key risks were identified: that annual certification is flawed by inaccuracies, and that devices are used to issue infringements when they are not certified.



Both risks could affect significant numbers of infringements. While neither risk eventuated, action can be taken to further reduce the risk of invalid infringements by:

- creating and maintaining a master inventory of speed measuring devices that are currently capable of being used as part of speed enforcement;
- periodically, and at least annually, reconciling the master inventory with certificate dates and equipment; and
- conducting a verification process when certificates are received to check that their key content is correct, such as device details, and test and signatory dates.

#### **Recommendation 11 (Chapter 4)**

The Justice and Community Safety Directorate should develop and maintain a master inventory of speed camera devices and use this to verify the key content of new certification against primary and / or secondary sources.

#### **Drive-through testing of newly installed or reinstalled devices**

- 4.45 The Traffic Camera Office maintains two vehicles with approved Police speedometers and auxiliary speedometer units which are used for drive-through testing. There is an internal standard operating procedure for the drive-through tests.
- 4.46 Documentary evidence confirmed that annual certification has been undertaken for the speed measuring devices used in drive-through testing, and that these devices are routinely used to verify the accuracy of the speed measuring devices in the fixed camera systems once returned from annual testing and certification. The drive-through tests confirm fixed camera equipment still functions as independently tested and has not been damaged in transit or during installation.

#### **Mobile camera testing**

- 4.47 Mobile camera speed measuring devices are required to be tested annually as part of the major testing described in paragraphs 4.36 to 4.43. In addition, the *Road Transport (Safety and Traffic Management) Regulation 2000* Section 105 describes requirements for the operation of a mobile speed camera, that is:
- ... a digital camera detection device that is located in a vehicle that can be moved from place to place to detect traffic offences.
- 4.48 Section 105 of the Regulation describes requirements of the operation of mobile cameras, their alignment at the roadside, activation, and daily testing:
- The operator of a digital camera detection device that includes as a component a laser speed measuring device must ensure that the following operations are done in accordance with the manufacturer's instructions for the device:

- (a) testing the laser speed measuring component of the device at the beginning and end of each shift of the operator by carrying out the following checks:
  - (i) an instrument confidence check;
  - (ii) a calibration verification check; and
  - (iii) a scope alignment check;
- (b) activating the device
- (c) operating the device

4.49 An internal standard operating procedure<sup>68</sup> also states the above requirement of the Regulation for daily testing. A form named the *Traffic cameras operators' log* identifies and records the tests undertaken prior to and at the end of a shift (refer to Figure 4.3).

**Figure 4.3: Log entry for a mobile camera operator's shift**

Detection Device Use / Testing	Beginning of Shift	End of Shift
<b>Instrument Confidence Test (Laser and Radar)</b>		
Camera self-test (test image radar)	Pass / Fail	Pass / Fail
Computer self-test	Pass / Fail	Pass / Fail
<b>Calibration Verification Test (Laser)</b>		
Fixed Distance Test	Pass / Fail	Pass / Fail
Zero velocity Test	Pass / Fail	Pass / Fail
<b>Scope Alignment Test (Laser)</b>		
Vertical Alignment	Pass / Fail	Pass / Fail
Horizontal alignment	Pass / Fail	Pass / Fail
<b>Camera Alignment Test (Laser)</b>		
Telephoto mode	Pass / Fail	Pass / Fail
Wide angle mode	Pass / Fail	Pass / Fail

Source: *Traffic cameras operators' log* from Traffic Camera Office 24 September 2013

4.50 Walk-through tests and observation of operations by an audit officer, on 24 September 2013, confirmed that the internal standard operating procedure was being followed, that calibration tests were being undertaken and records kept in relation to mobile camera operations for each shift. A random selection of records (operators' logs) for twenty shifts in the past twelve months identified that records had been maintained for each of the twenty shifts, and that device tests were undertaken and passed prior to and at the end of each shift, and for certain tests, at the beginning and end of each of the sessions within each shift<sup>69</sup>.

4.51 Traffic Camera Office records indicate that the two Traffic Camera Office staff<sup>70</sup>, other than the camera operator, confirm and transfer information from the

<sup>68</sup> Section 6.1 Daily Camera Calibration in the Standard Operating Procedures for Daily Operation, Traffic Camera Office

<sup>69</sup> The audit sample confirmed that an 'instrument confidence test' and a 'calibration verification test' were undertaken at the beginning and end of each shift, and that a 'scope alignment test' and a 'camera alignment test' had been undertaken at the beginning and end of each session. A shift comprises a number of 60 to 90 minute sessions.

<sup>70</sup> An adjudicator and the shift supervisor

camera operators' log into the Office IT systems. In addition, as different operators share the same equipment, it is highly probable that errors in testing by one operator will be quickly identified by a different operator on the next shift. These measures provide a further degree of assurance that the daily calibration tests are undertaken and satisfactory. This audit did not identify any examples of mobile cameras being used in daily operations without being tested.

#### Point-to-point synchronisation

- 4.52 Point-to-point cameras rely on the distance between the two cameras being accurately measured and synchronised clocks to calculate the average speed of a vehicle.
- 4.53 On 18 October 2010 the Victorian Police suspended the use of all point-to-point cameras along the Hume Highway in Victoria for 20 months due a technical fault in the system. An investigation found that a small number of infringements<sup>71</sup> had been issued when the clocks in the camera system were being automatically re-synchronised, and this produced unreliable infringements.
- 4.54 Officers from the Traffic Camera Office were aware of the risks associated with clock inaccuracies, and advised that procedures are in place for the two ACT point-to-point installations to ensure infringements are rejected while clocks are being re-synchronised, since:
- systems are set up to identify infringements that occur during re-synchronisation;
  - systems were tested before the systems went live (in February 2012 and August 2013);
  - a small number of images are regularly 'quarantined' and then rejected where they coincide with resynchronisation times; and
  - a secondary time monitoring process is being implemented. This is wholly independent of the primary clocks and this will check and automatically report to the Traffic Camera Office whether there is any time 'drift' in the primary clocks.
- 4.55 The ACT Government therefore has taken steps to reduce the risk of invalid infringements being generated while clocks are being synchronised.

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<sup>71</sup> Newspapers at the time reported 9 cases out of 68 000 infringements as being affected by the error, over a 30 month period

## MOBILE SPEED CAMERA OPERATIONS

- 4.56 Mobile speed camera operations can be considered to be higher risk than fixed camera activities because:
- they depend on manual operation, and are set up and sited in the potentially dangerous environment of the roadside;
  - a workplace health and safety risk assessment of the period 2010 to 2012 identified 29 incidents whereby members of the public had engaged in threatening behaviour<sup>72</sup> towards the camera operators; and
  - the use of ageing equipment has led to increasing reliability problems (refer to paragraph 4.28).
- 4.57 Two aspects of the management of mobile camera operations have been assessed in this audit, since these require separate management arrangements to those in place for fixed site camera operations (the point-to-point, mid-block, and speed and red light cameras):
- arrangements that ensure mobile cameras are operated by appropriate people; and
  - arrangements for prioritising the deployment of speed camera vans to the sites approved, as set out in the Regulation (refer to paragraph 2.45).

### Approved operators

- 4.58 Mobile camera operation is undertaken by qualified or experienced ‘approved operators’ who operate ‘digital camera detection devices’, that is, speed cameras. Approval is required by the *Road Transport (Safety and Traffic Management) Regulation 2000*. Section 107 of this Regulation states:

#### Approved people – use

- (1) Each police officer is approved to use any traffic offence detection device (other than a fixed camera detection device).
  - (2) The road transport authority may approve a person who is not a police officer to use digital camera detection devices.
  - (3) The road transport authority may only approve a person under subsection (2) if the authority is satisfied that the person has appropriate qualifications to operate, or experience in the operation of, digital camera detection devices.
- 4.59 Appropriate management action occurred to ensure that all operators receive suitable training and induction, and are approved by a person with the appropriate delegated authority in order that camera operations are in accordance with Section 107 of the Regulation. The number of Traffic Camera

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<sup>72</sup> Verbal abuse, swerving towards the van, and throwing objects are given as examples in the assessment

Office staff operating mobile cameras each month over the last twelve months has been between seven and nine.

- 4.60 Training is hands-on, and is both knowledge and competency-based. It has been tailored to the specific requirements of the mobile camera equipment in use in the Traffic Camera Office. Training is provided in-house by senior staff. Following competency and knowledge testing, new operators receive certificates and are able to be formally approved.
- 4.61 Mobile camera approved operators are also provided with in-service training which is tailored to their roles. This can include diffusing difficult situations and specialist driving skills. However, there is no periodic refresher training of those training and checking new staff to ensure their equipment and protocol knowledge keeps pace with industry and manufacturer standards. This will be important with the introduction of replacement mobile camera equipment, which is scheduled to occur in 2013-14.
- 4.62 Based on a walk-through of systems and procedures by an audit officer on 24 September 2013, the assessment of records and a review of other documentation, it is considered that operational practices are aligned with legislative requirements and internal standard operating procedures regarding initial mobile camera operator training, and associated operator approval.
- 4.63 In addition to operators' initial training and approval, an internal standard operating procedure outlines the process for auditing approved mobile camera operators. The procedure aims to ensure operators are tested regularly in the first three months through scheduled visits by the supervisor, and then unannounced visits thereafter.
- 4.64 This is an area where the record keeping, and potentially practice, is not in accordance with the internal standard operating procedures. The internal standard operating procedure (Daily Operations, page 25) for this indicates this should comprise one, two and three-month audits, as well as a number of unannounced audits and the evaluation of traffic camera operator effectiveness. There was no documented evidence of this audit process occurring. However, Traffic Camera Office supervisors advised that such assessments take place and inform completion of probationary arrangements. If this is the case, this should be documented.

**Recommendation 12 (Chapter 4)**

The Justice and Community Safety Directorate should undertake and document audits of approved mobile speed camera operators in accordance with its internal standard operating procedures.

### Scheduling mobile speed camera operations

4.65 Shift supervisors in the Traffic Camera Office schedule the work of those who operate mobile speed cameras, and determine the deployment of camera vans on the 177 possible sites. The principles for scheduling where operations are to take place are set out in the Justice and Community Safety Directorate's web-pages<sup>73</sup>:

Mobile speed cameras are deployed by the Traffic Camera Office (TCO) to sites taking into consideration the following factors:

- Intelligence received from ACT Policing traffic operations;
- Road safety data on areas recording recent or frequent serious/fatal traffic crashes (particularly those involving excessive speed);
- Information or complaints from members of the community concerning speeding vehicles or the potential for crashes to occur in the area; and
- Ensuring Traffic Offence Detection Devices are not operating in the same direction on the same road within a distance of one kilometre of each other.

The deployment of mobile speed cameras, based on the above methodology is determined at least one week in advance in accordance with identified priority areas.

4.66 In addition, an operations guide titled *ACT Traffic Camera Office Mobile camera unit site selection criteria*, identifies that there is:

... a requirement ... to periodically assess road accident statistics and ensure that locations that are statistically significant are allocated traffic camera coverage.

This accords with research that indicates camera effectiveness should be a major determining factor in continuing to site cameras at specific locations.

4.67 Due to mobile camera van equipment failure and therefore the limited availability of operational vans in the last three years, supervisors have had to contain their forward scheduling to only one day in advance. This provides less time for full consideration of all factors in the methodology.

4.68 The ACT road network is divided in five zones<sup>74</sup> for managing mobile camera deployment. Supervisors advised that the current shift scheduling practice is to ensure a balance of operations across the five zones. In addition, the recent (up to twelve months) pattern of previously selected sites is reviewed when planning the sites for a shift to ensure broad coverage and that randomised site selection is occurring. Randomised site selection is important as it prevents road users

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<sup>73</sup> <http://www.justice.act.gov.au/page/view/3060/title/mobile-speed-cameras> extracted 10 December 2013

<sup>74</sup> North, Central North, Central, Central South, South

predicting van operations. This increases the potential for a greater general effect on speeding across the road network (refer to paragraph 2.8).

- 4.69 The main Traffic Camera Office database<sup>75</sup> identifies that nearly all infringements come from 80 percent of the 177 sections of arterial and collector roads listed in Schedule 1 of the Regulation each year. However, supervisors when planning the shift schedule take limited account of site by site infringement history, that is, whether previous camera van shifts at the same site identified a high number of infringements providing evidence of a continuing speeding problem.
- 4.70 There was no evidence that demonstrated that the Traffic Camera Office periodically assesses road accident statistics to ensure that sites that are statistically significant are allocated mobile speed camera coverage, as the *ACT Traffic Camera Office Mobile camera unit site selection criteria* states should happen.
- 4.71 A record is maintained of the sites scheduled for camera operations, but there is no record as to the factors being applied to derive the schedule. There is no routine analysis to determine whether each zone receives equal emphasis. Equally, there is no routine analysis of the results of mobile speed camera operations. For example, the following issues are not monitored and reported for all mobile speed camera activity:
- traffic volumes, the number of vehicles whose speed is checked, and the number of valid infringements generated;
  - the intensity of coverage for particular priorities, such peak travel times, high-end speeding, or arterial roads; and
  - requests for mobile camera operations, raised by public complaints, or from the Police as a result of one-off incidents or campaigns.
- 4.72 The planning and review of the sites scheduled for mobile speed camera van operations is inadequate, as it is poorly supported by management information. This makes forward planning difficult, and presents the risk that mobile speed cameras are not being used effectively.

**Recommendation 13 (Chapter 4)**

The Justice and Community Safety Directorate should strategically plan its mobile speed camera operations by fully applying the principles in the *Mobile camera unit site selection criteria* guide and as set out on its speed camera web-pages.

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<sup>75</sup> A bespoke Microsoft ACCESS database referred to as the 'adjudication database'

### INFRINGEMENT VALIDITY

- 4.73 Most staff at the Traffic Camera Office have multiple roles, as they:
- operate mobile speed cameras (refer to paragraphs 4.58 to 4.72);
  - check potential infringements as part of a process known as adjudication (refer to paragraphs 4.84 to 4.91); and
  - administer speeding infringement notices, once issued (refer to paragraph 4.102 onwards).
- 4.74 Adjudication is undertaken prior to the issuing of speeding infringements and is standard practice in Australian jurisdictions. The practice has been in place for all infringements generated by ACT Government operated speed cameras since the cameras were introduced in the ACT in 1999.
- 4.75 The adjudication of infringements involves automated and manual verification checks. Each potential infringement is checked to confirm that it meets evidentiary requirements of legislation.
- 4.76 Evidentiary requirements ensure offences that may be challenged in court will satisfy the court that an offence has taken place, and include such matters as the time and place of the offence, the vehicle identity and its speed at the time. Adjudication is a key procedure since it enables the Government, road users and the wider community to be confident that when speed camera infringement notices are issued, these are valid and defensible.
- 4.77 Adjudication occurs over a three-day period once images and data are downloaded from speed cameras, and uploaded to the Traffic Camera Office's main database, the 'adjudication database'. This database is a custom designed electronic records management system which was introduced in 2000. Adjudication involves four steps:
- (a) automated checking when images and data are uploaded to the adjudication database, when potential infringements are rejected for non-compliance with set parameters in the computer system;
  - (b) manual checking by the primary adjudicator, of information presented on a computer terminal, particularly the vehicle image, and its number plate, but also other information necessary for an offence to have taken place;
  - (c) manual checking by a secondary adjudicator of all cases; and
  - (d) a final check by a supervisor of a selection of cases.

### Adjudication decisions

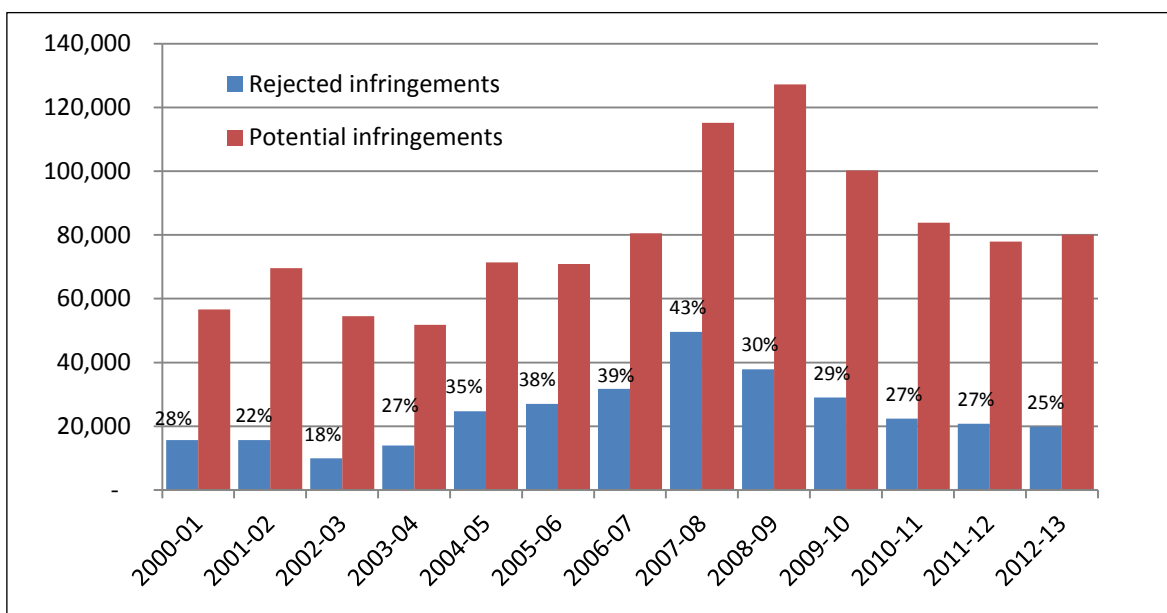
- 4.78 The largest volume of potential infringements adjudicated in any one year to date was 127 000 in the year ending 30 June 2009 (refer to Figure 4.4).



4.79 Traffic Camera Office staff engaged in adjudication duties, that is, steps (b), (c) and (d) (refer to paragraph 4.77), review the evidence available to them, and record their judgement in the adjudication database. Check boxes permit some categorisation of why a particular case is recommended to be rejected. Examples of reasons for rejecting a case during adjudication are outlined in paragraph 4.85.

4.80 As a result of the infringement checking during the adjudication process, a significant proportion of potential infringements are rejected and no notice of infringement is issued.

**Figure 4.4: Share of potential infringements rejected during adjudication**



Source: Traffic Camera Office data October 2013

4.81 The ACT Traffic Camera Office has a relatively high rejection rate of potential infringements due to adjudication. Between 18 and 43 per cent of all potential infringements per year over the last fourteen years have been rejected during adjudication (refer to Figure 4.4). The year with the highest percentage and second highest volume of rejected infringements in the last fourteen years is 2007-08. This coincides with the introduction of mid-point cameras and expansion in the number of traffic light controlled intersections with speed and red light cameras.

4.82 Rejected infringements are deemed to have not met evidentiary requirements. Professor Max Cameron advised that other Australian states typically achieve a lower than 20 per cent rejection rate as a result of adjudication, with one state (Victoria) managing an improvement from 25 down to 10 per cent over a fifteen-year period. He further advised that the percentage that is rejected is something that can be reduced, given effective systems.

4.83 Officers in the Traffic Camera Office identified that the existing adjudication database introduced in 2000 has many monitoring and reporting limitations due to its age and design. This makes it difficult to systematically focus on process improvements that may lead to reducing the infringement rejection rate. For example, officers advised that it is not possible to identify trends in the reasons for rejecting cases. As a result of a 2013-14 budget proposal from the Justice and Community Safety Directorate being supported by the Government, funding of \$50 000 has been allocated to evaluate adjudication system replacement options. This is currently being undertaken.

### Adjudication transparency and consistency

4.84 Previous reviews<sup>76</sup> of the Traffic Camera Office's adjudication system did not identify any procedural inadequacies. These found that Traffic Camera Office staff when involved in adjudication duties had been well trained and that the policy of cross checking via primary and secondary adjudicators was regarded as good practice.

4.85 Adjudication is principally a manual process that includes a straightforward cross checking of data, case by case (e.g. the identity of sites and devices, time, date) to secondary sources. It also involves skilled judgement about the quality of the image and circumstances of the vehicle that is the subject of the potential infringement, as:

- vehicle images can be obscured;
- there can be a mismatch between a number plate and the vehicle;
- the vehicle can be missing a plate or the plate may be unreadable;
- the image can show multiple vehicles with the identity of the offending vehicle uncertain; or
- it may be that the vehicle is an emergency vehicle responding to an emergency.

4.86 Sixty cases (0.075 per cent), adjudicated between September 2012 and August 2013, were selected for review by an audit officer on 26 September 2013. This was done to determine whether there was sufficient evidence available to staff undertaking adjudication duties within the database and from secondary sources to re-adjudicate cases, and make the same conclusion.

4.87 The 60 cases covered valid and rejected infringements generated from fixed site and mobile speed cameras. Each decision was separately reviewed. The adjudication process was found to be straightforward in most cases, but some were complex, such as those for speed and red light cameras covering multiple lanes and right filters at heavily trafficked times. In each of the 60 cases:

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<sup>76</sup> Internal audits conducted for the Territory and Municipal Services Directorate: *Camera Enforcement Review*, December 2006, *Camera Enforcement*, February 2010

- there was sufficient evidence to re-adjudicate the case; and
- the same conclusion could be derived as that made in the original adjudication.

### Cross checking infringements

- 4.88 During the adjudication process the evidence for each infringement is examined at least twice by Traffic Camera Office staff undertaking adjudication duties. Two officers undertake the adjudication of the infringement evidence independently. Each officer is allocated a batch of infringement cases to adjudicate on a given day. A roster of duties ensures an officer's responsibilities are rotated, so all adjudicators perform primary and secondary adjudication and work with all other officers when adjudicating. The identity of each officer and the infringements they have adjudicated is recorded on a supervisory control sheet.
- 4.89 The supervisory control sheet is an essential management tool. Due to limitations in the design of the adjudication database, now fourteen years old, its individual infringement records only identify one adjudicator's findings. This is the most recent adjudicator's decision. There is no means of identifying in the database whether this is the first, second or even third adjudication, or whether the findings have changed, for example from a rejected to a valid infringement, and for what reason a change was necessary.
- 4.90 The supervisory control sheets provide a partial solution to this lack of traceability of previous adjudicators in the adjudication database. The sheets ensure that there is sufficient evidence in place to confirm all infringements have been adjudicated and then cross checked, and the identity of each adjudicator. While these control sheets also identify the scale of agreement or disagreement between the initial adjudicator and the cross checker, the sheets only provide minimal information on the reasons for any change in the infringement decision. This means it is difficult to target supervisory final checking. Although supervisory checking of some infringements takes place there is no electronic or paper-based record identifying the scale or impact of these checks.
- 4.91 An analysis of the supervisory control sheets showed that there was disagreement between the first adjudicator and the cross checker in about 0.3 per cent of all cases adjudicated for the most recent twelve-month period<sup>77</sup>. This indicates that adjudicators, for a very high percentage of infringements, are consistent in their decision making regarding an infringement's validity.
- 4.92 For the purpose of ensuring the issuing of infringements is fair and evidence based, and for targeting of training and development, it is important that records are maintained for all steps in the adjudication process, particularly when changes are made as a result of re-adjudication by a cross checker or supervisor.

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<sup>77</sup> Audit Office review of supervisory control sheets October 2012 to September 2013, of circa 80 000 infringements

#### Recommendation 14 (Chapter 4)

The Justice and Community Safety Directorate should improve its recording of adjudication information so that this can be used to target improvements for reducing the infringement rejection rate.

#### Training, development and authorisation of adjudicators

4.93 The adjudication process is reliant in part on the judgement of Traffic Camera Office staff. While quality assurance, for example from the cross checking process, is important in providing valid infringements, staff training and development is also essential. Adjudicators' training and development, the scope of procedures and the controls in place to ensure only trained and authorised adjudicators perform this role were assessed in this audit.

4.94 Most Traffic Camera Office staff perform the adjudication role, which is a core duty of the office. Currently there are thirteen staff approved<sup>78</sup> to issue infringements and reminder notices, a process which includes adjudicating. The nine officers who perform adjudication duties are part of this group of thirteen. Training and development includes:

- a test module and read-only function for the adjudication database;
- specialised in-house training provided by the Traffic Camera Office;
- on-the-job training provided by Traffic Camera Office staff; and
- guidelines and procedures for determining the adjudication of images.

The manager of the Traffic Camera Office gives authorisation for a person to be added as an 'approved person' only after being satisfied that the person is competent as an adjudicator.

4.95 Training and development is effective in enabling new staff members to develop the skills and knowledge necessary to undertake the adjudication role and to be approved as competent. However, there is no independent training provided to the adjudicators, and there is no documented procedure for the adjudication training process. The Office is heavily reliant on the corporate knowledge of a few key members of staff with learning occurring through the sharing of experience.

#### INFRINGEMENT ADMINISTRATION

4.96 Once the Traffic Camera Office has checked the validity of camera-detected speeding infringements via the adjudication process, infringements are transferred from the adjudication database to a different computer system. This

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<sup>78</sup> *Road Transport (General) Act 1999* Section 19 requirements for suitably trained and authorised people to issue infringements

system is the rego.act system. It is the primary system used in Road User Services in the Justice and Community Safety Directorate. The system allows the Government to maintain up-to-date details of vehicle registration, driver licensing and traffic-related infringements. It is a client-centric system, that is, it enables all relevant vehicle and driving related information to be linked to unique road users.

- 4.97 The administration of camera-detected speeding infringements accounts for a small proportion of the daily workload managed using the rego.act system. Members of staff from the Traffic Camera Office are approved to perform administrative tasks using the rego.act system as part of:

... [the] powers of an authorised person to issue infringement and reminder notices relating to offences regulated by the Traffic Camera Office<sup>79</sup>.

### Speeding infringements in rego.act

- 4.98 Infringements, once validated during the adjudication process, are uploaded to rego.act in batches at least twice weekly. These batches are manually checked by a Traffic Camera Office supervisor to ensure they are complete. Three members of staff of the Traffic Camera Office are authorised to perform this key task. Speeding infringements from a Friday, Saturday or Sunday are uploaded to the adjudication database and adjudicated on a Monday or Tuesday and uploaded to rego.act once the adjudication task is completed, usually by the Tuesday. Infringements occurring Monday through to Thursday are adjudicated and uploaded to rego.act by Friday of the same week.
- 4.99 As a result of the manual checking of the batches that are uploaded to the rego.act system, there is a very low risk of the Justice and Community Safety Directorate either sending out rejected infringements erroneously or not sending out valid infringements, as a result of their transfer to the rego.act system.
- 4.100 Once in the rego.act system, speeding infringements result in the issuing or 'serving' of an infringement notice to the registered owner of the vehicle. The notice is called a Camera Infringement Notice. The rego.act system automatically undertakes a large number of steps for the purposes of issuing Camera Infringement Notices, collecting fines and applying sanctions to licence holders, such as demerits and suspension of licences.
- 4.101 The system is designed to generate Camera Infringement Notice letters in batches, and to record the payment of fines, and to apply demerit points to the licence holder without the need for any manual intervention. For example, rego.act system automatically prepares for sending, according to the requisite 'due' dates:

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<sup>79</sup> *Road Transport (General) Act 1999* Section 19 provides that 'the road transport authority may appoint a person to be an authorised person for the road transport legislation'

- the Camera Infringement Notice, providing 28 days for the recipient to pay the fine;
- a reminder notice, providing a further 28 days to pay the fine once the original period has expired; and
- a courtesy letter prior to licence suspension with a specified number of days by which this will occur, after the reminder notice period has expired.

4.102 The majority of Camera Infringement Notices do not require manual intervention (refer to Table 4.1). However, a significant proportion, that is, more than 40 per cent of all validated infringements uploaded to rego.act in the last three years, have involved manual administrative intervention by the officers operating the rego.act system. This intervention has been necessary either prior to serving the Camera Infringement Notice, or in response to queries arising from the Notice. These may, for example, relate to vehicle ownership or driver details, infringement validity or payments.

**Table 4.1: Volume of infringements in rego.act not requiring manual intervention after service of the Camera Infringement Notice**

	Total number of validated infringements uploaded to rego.act	Infringements administration where no manual intervention was necessary
2010-11	61 483	34 689 (56%)
2011-12	57 162	32 399 (57%)
2012-13	60 303	34 443 (57%)

Source: Road User Services and Traffic Camera Office adjudication system data October 2013

4.103 Manual administrative intervention by officers is necessary for a number of reasons. These include matters relating to:

- an extension of time to pay ‘out of time’ applications;
- the withdrawal of a notice due to Traffic Camera Office errors; and
- an unknown driver, i.e. a notice recipient not being able to identify the driver of the vehicle.

4.104 These three reasons for manual administrative intervention were selected as they involve a high degree of judgement which increases the risk of:

- variability in decisions; and
- challenges as to how decisions are made and recorded.

**Case studies - administration of manual intervention of Camera Infringement Notices**

4.105 In 2012-13 there were 25 860 cases where manual intervention in the Camera Infringement Notice process occurred in the rego.act system. Of these cases, 1 049 cases involved one of the three reasons, or matters, in paragraph 4.103.

Thirty cases were selected from the 1 049 cases, with ten relating to each of the three matters.

- 4.106 The case studies assessment examined whether:
- internal standard operating procedures had been followed, where they exist for each of the three matters;
  - there was sufficient evidence of the actions taken in rego.act to support the decision; and
  - the rego.act system operator was approved to take the action they did.
- 4.107 Since the rego.act administrative record for each Camera Infringement Notice is extensive, and may cover many months, the case studies assessment only focused on the three matters. The case study assessment did not examine all manual administrative changes for all 30 case studies.

#### Case studies - Extension of time to pay 'out of time' applications

- 4.108 The internal standard operating procedure does not cover the management of 'out of time' applications which seek an extension of time to pay after the 28 days specified in the Camera Infringement Notice or the reminder notice. It only covers the management of requests made during the period specified in the notice. This is consistent with Section 29 of the *Road Transport (General) Act 1999*.
- 4.109 Officers in the Traffic Camera Office advised that administrative changes, as proposed in the *Road Transport (General) Bill 2012*, began being applied during the 2012-13 year<sup>80</sup>, but that the internal standard operating procedure still refers to the procedure prior to the changes proposed in the Bill.
- 4.110 The Bill proposes amendments<sup>81</sup> to Section 29 of the Act such that:
- ... a person may apply to the administering authority for an extension of time.... including any extension of time [after the Notice period] has ended.

And that:

An application must -

- (a) be in writing; and
- (b) state the special circumstances relied on; and
- (c) include any other information required by the authority.

And that:

The administering authority must allow the application if it reasonably believes special circumstances justify allowing an extension of time.

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<sup>80</sup> The *Road Transport (General) Bill 2012* was notified on 15 May 2012. The 'out of time' application form was developed and agreed in October 2012

<sup>81</sup> The *Road Transport (General) Bill 2012* Amendment 14D, pp. 53 & 54

- 4.111 Officers confirmed that in practice, 'out of time' applications for an extension of time to pay are considered by staff at the Traffic Camera Office and are granted.
- 4.112 The ten case studies audited indicate that the content of forms and evidence of the processing of information for extensions of time to pay the 'out of time' applications was inadequate. This is because:
- in four cases, forms were unsigned by officers of the Traffic Camera Office, and therefore the authority of the decision maker is not identified. This is important because the granting of an extension of time to pay according to the current internal standard operating procedure requires managerial authority;
  - in one case, the form did not state the reasons for the request. A reason is necessary in order to evaluate the request;
  - in one case, the form did not state the reason for refusal; and
  - in three cases, the decision of the officer was not recorded.
- 4.113 Officers confirmed that the internal standard operating procedure was not up to date when this audit was undertaken, that there is no published guidance<sup>82</sup> for how officers should evaluate reasons necessary to justify decisions, and that there is no training beyond initial training of Traffic Camera Office staff using the rego.act system.

### Case studies – Withdrawal of Camera Infringement Notices

- 4.114 An internal standard operating procedure identifies that only where the Traffic Camera Office incorrectly issues a Camera Infringement Notice can it be withdrawn. The procedure states that a valid reason must be provided and the request must be approved by a manager.
- 4.115 In the ten case studies assessed, there were eight instances where the name of the officer considering and approving the reason for a withdrawal is not identified in records. Although the letter conveying the decision is signed by the appropriate officer, that is, a delegated manager, it does not provide a reason. Records in rego.act can be used to confirm a reason but do not contain information on who made the decision. There is therefore no link between the decision maker and evaluation of the reason.
- 4.116 There was only one case in the ten case studies in which the Camera Infringement Notice was withdrawn due to an error by the Traffic Camera Office. The majority of cases where the Camera Infringement Notice was withdrawn relate to difficulties in the identification and address of the driver, for example, where a driver is identified as living overseas, or where the vehicle had been stolen. This is clearly not a Traffic Camera Office error, and it is not a

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<sup>82</sup> *Road Transport (General) Act 1999* Republication 15 November 2012, Section 30 states the Minister may issue guidelines, in a disallowable instrument, for deciding applications relating to an extension of time



circumstance set out in the internal standard operating procedure for which a withdrawal can be applied.

#### Case studies – unknown drivers

- 4.117 While it is important that the driver of a vehicle is identified for the purposes of issuing a Camera Infringement Notice, there are circumstances where the driver's identity is disputed. An internal standard operating procedure provides guidance for managing situations where driver identity is contested, and where a statutory declaration is to be made that the driver is unknown.
- 4.118 Such a declaration needs to provide sufficient evidence of the *genuine effort*<sup>83</sup> a person, often the Camera Infringement Notice recipient, has taken to identify the driver. The internal standard operating procedure does not provide guidance as to what genuine effort may involve, such as what is reasonable to expect of the vehicle owner when the vehicle has been borrowed or sold. However, officers stated that a new pro forma letter provides a greater clarity by setting out obligations of the recipient. It was not possible to review the effectiveness of this approach as the letter had been introduced after the 2012-13 year.
- 4.119 The internal standard operating procedure requires that the Traffic Camera Office staff member who administers the infringement must seek management approval if the declaration is to be accepted, or otherwise to seek managerial advice. Managerial involvement in decision making about the 'unknown user declarations' was not evidenced in four of the cases assessed, and therefore there is a risk that these decisions are invalid.

#### Case studies findings summary

- 4.120 Thirty case studies were assessed by an audit officer with respect to the three matters of: extension of time to pay 'out of time' applications, withdrawal of Camera Infringement Notices, and unknown drivers. The assessment identified inadequacies in procedures and their implementation, and in record keeping, since:
- internal standard operating procedures were not up to date;
  - while there were internal standard operating procedures, at least in part, for each of these three matters, these were not always followed;
  - there was insufficient evidence in rego.act of the actions taken to understand why some decisions were made; and
  - the identity of the administrator approved to take a particular action was not available in every case.

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<sup>83</sup> Internal standard operating procedure for processing statutory declarations (19 August 2013), requires the administrator to establish whether *genuine effort* has been made by the notice recipient to identify the person in possession or control of the vehicle at the time. This is based on requirements in *Road Transport (General) Act 1999*, Section 35

**Recommendation 15 (Chapter 4)**

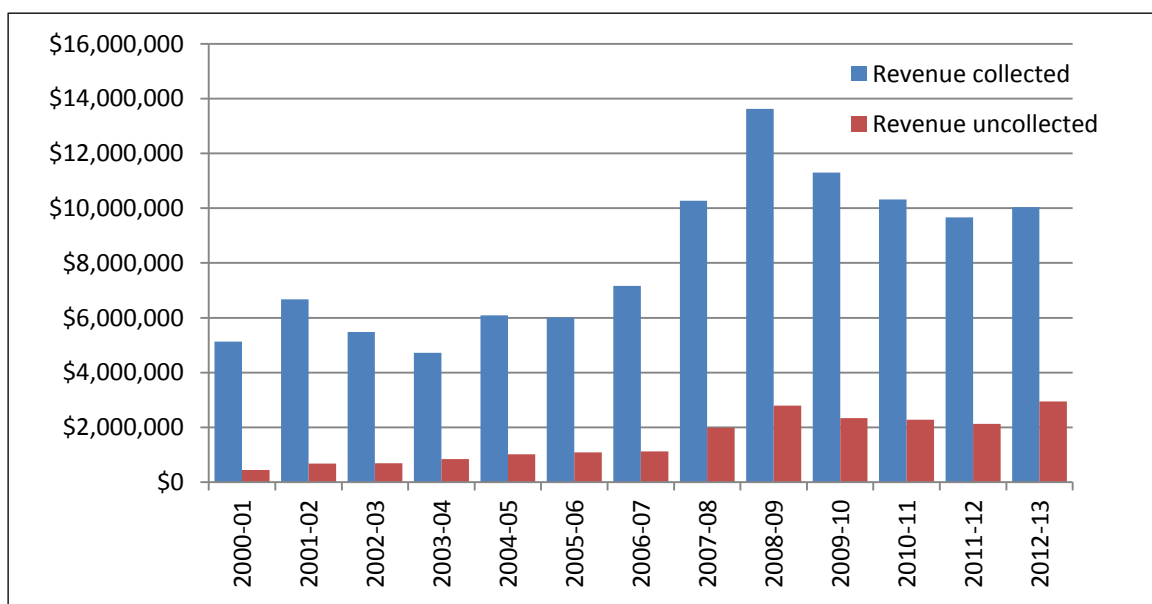
The Justice and Community Safety Directorate, in its administration of infringements in the rego.act system, should:

- a) update its internal standard operating procedures;
- b) align practice with procedure; and
- c) maintain comprehensive records for all manual interventions.

**Administration of fines**

4.121 The ACT Government has issued around 60 000 Camera Infringement Notices a year in the past three years, and collected around \$10 million a year in fines. At any time over this period there has been around \$2 million to \$3 million in uncollected fines.

**Figure 4.5: Growth in speeding fine income, collected and uncollected, since 2001**



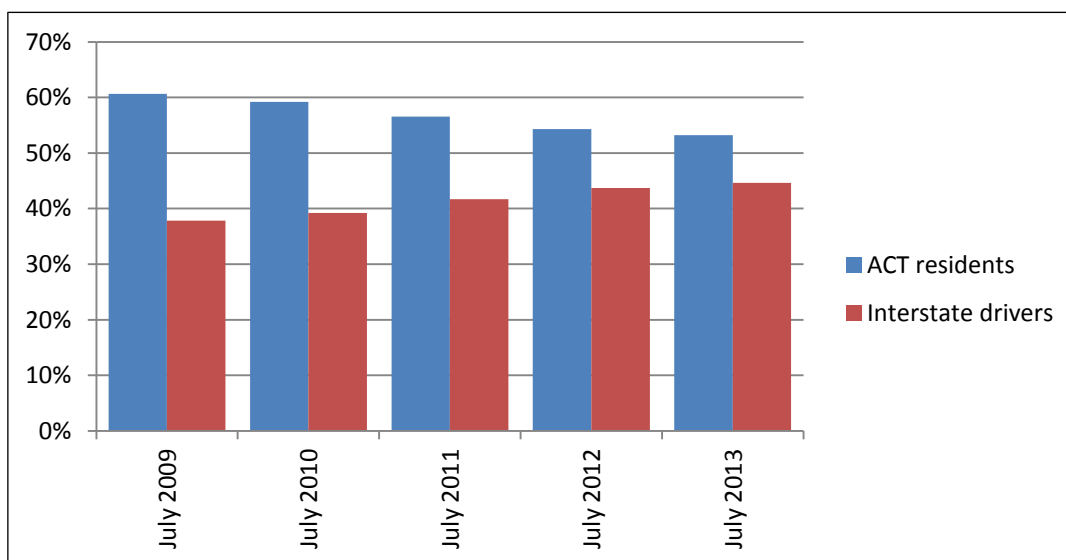
Source: Road User Services data from the rego.act system, October 2013

4.122 The value of uncollected speeding fines has grown from \$448 528 as at 1 July 2001 to \$2 939 455 as at 1 July 2013 (refer to Figure 4.5). These figures reflect the accumulated debt at year end. This debt also includes unpaid fines prior to their ‘due’ date, which can account for around 11 to 16 per cent of this debt<sup>84</sup>. On this basis, unpaid Camera Infringement Notice fines past their due date in the last five years are estimated to be between \$1.9 million and \$2.6 million at any one time.

<sup>84</sup> This range is based upon Road User Services unrealised debt reports for all traffic related infringements (but not parking infringements) at year end, June 2009 to June 2013. Traffic related infringements also include a small proportion of traffic infringements from ACT Policing operations

- 4.123 Justice and Community Safety Directorate internal monthly debt reports for all traffic related (including parking) infringements indicate that there is \$32 million in debt<sup>85</sup> recorded within the rego.act system as a whole relating to 177 000 infringements. Camera Infringement Notice debt is a small proportion, around \$2.6 million (8 per cent), of the \$32 million.
- 4.124 In June 2013 the Government legislated and implemented arrangements<sup>86</sup> to enable people in receipt of infringement notices, who are having difficulties, to seek an extension of time, and to pay off fines through:
- infringement notice management plans<sup>87</sup>; and
  - extension of time to pay ‘out of time’ infringements<sup>88</sup>.
- 4.125 Long-term or high-level debtors are being encouraged to use the new arrangements. A priority group of road users, with \$4.8 million in debt, have been contacted by the Justice and Community Safety Directorate. Plans have been agreed for over 1 700 road users which account for \$2.5 million in debt.
- 4.126 ACT residents and interstate drivers account for 98 per cent of the debt<sup>89</sup>. Interstate debt has been increasing and ACT resident debt declining (refer to Figure 4.6). Diplomats and privileged vehicle users account for a very small percentage of debt.

**Figure 4.6: Share of speeding fine debt, ACT residents and interstate drivers**



Source: Road User Services data from rego.act October, all Traffic Infringement Notice debt

<sup>85</sup> This is the value of total debt from all traffic and parking infringements past their due date, as at 1 July 2013

<sup>86</sup> The Government's 2013-14 budget states this is part of the Government's targeted assistance strategy for lower income Canberrans, p. 204

<sup>87</sup> Introduced in *Road Transport (General) Act 1999* (republication no.40) effective from 14 June 2013, Section 31A

<sup>88</sup> Introduced in the *Road Transport (General) Act 1999* (republication no.40) effective from 14 June 2013, Section 29

<sup>89</sup> Based on analysis of all Traffic Infringement Notices over five years (years ending June 2009 to June 2013)

4.127 Since rego.act is a client-centric system, it is important to attach all relevant infringement and administrative activity to a specific client and to avoid multiple accounts for the same client. The existence of multiple accounts for the same client is a substantial risk to the effectiveness and fairness of the application of sanctions for road user infringements. The extent of duplication of clients in the system is not precisely known. It is now the focus of additional management effort, with additional measures being taken to avoid the possibility of creating duplicate accounts for the same road user.

4.128 Although debt reports are compiled monthly, limited management information is routinely drawn from the rego.act system to provide assurance as to the effectiveness of the system, for example, in terms of the transparency, consistency and fairness of administration. In relation to speeding infringements, there is no arrangement in place for the qualitative and / or quantitative review, for example, of:

- withdrawals of infringements due to administrative error;
- decisions requiring managerial sign-off;
- new procedures arising from legislated changes, such as those relating to the responsibility to identify drivers of company-owned vehicles;
- the consistency of decision making for cases with similar circumstances; and
- compliance with internal standard operating procedures.

### **Recommendation 16 (Chapter 4)**

The Justice and Community Safety Directorate should monitor the transparency, consistency and fairness of the administration of Camera Infringement Notices in the rego.act system by conducting qualitative and / or quantitative reviews.

# APPENDIX A: AUDIT CRITERIA, APPROACH AND METHOD

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## AUDIT CRITERIA

The audit objective is to provide an independent opinion to the Legislative Assembly on the effectiveness of the ACT Government's use of speed cameras. In doing this the Audit Office will provide assurance as to the proper purpose of the speed camera network, and integrity in the administration of infringements arising from the operation of the camera network.

### **Question 1 Are there the right number of speed cameras in the right places?**

#### **1.1 Establishing a strategy – the right number of cameras**

- The existing network results from a sound strategic approach
- There are sound longer-term plans for the scale of the network

#### **1.2 Implementing the strategy – cameras are in the right places**

- Each camera in the network is sited according to agreed criteria
- There are no cameras in the wrong place

### **Question 2 Are cameras effective in reducing speeding?**

#### **2.1 Gauging the impact of the camera network**

- The strategy has achieved its purpose
- A program of evaluation ensures camera and network effectiveness is established
- The Government effectively builds public support for the camera network and its aims

### **Question 3 Are cameras reliable?**

#### **3.1 Maintenance of cameras**

- Routine maintenance of cameras meets requirements
- Camera accuracy and reliability is set out in, and meets, established standards
- Mobile camera operation meets established standards

#### **3.2 Adjudication, administration of infringements**

- The validity of infringements is established
- Data and images are handled securely
- The collection of fines is in accordance with legislation and related agreed procedures

### AUDIT APPROACH AND METHOD

The performance audit was conducted under the authority of the *Auditor-General Act 1996*, and in accordance with the principles, procedures, and guidance contained in Australian Auditing Standards relevant to performance auditing. These standards prescribe the minimum standards of professional audit work expected of performance auditors. Of particular relevance is the professional standard on assurance engagements - *ASAE 3500 Performance Engagements*.

Fieldwork consisted of:

- interviews and discussions with key staff in Justice and Community Safety Directorate, particularly from the Traffic Camera Office, and the Legislation, Policy and Programs branch;
- a review of submissions from stakeholder organisations, including;
  - National Roads and Motorists' Association (NRMA)
  - NRMA - ACT Road Safety Trust
  - Australasian College of Road Safety, ACT and Region Chapter
- reviews of key strategic, planning and governance documentation associated with camera siting and operations (2000 to 2013);
- the substantive testing of administrative procedures in relation to an audit sample of infringement cases within the adjudication and rego.act systems; and
- Walk-throughs and observation of operations of the Traffic Camera Office

Professor Max Cameron of Monash University Accident Research Centre was engaged to provide technical advice throughout the audit, particularly on the effectiveness of different speed camera systems, and on how these have been introduced in other jurisdictions. Advice was also provided on the audit criteria at the outset. The Audit Office also tested key findings with Professor Cameron at the conclusion of the fieldwork phase.

In addition, Professor Richard Tay, Chair in Road Safety Management, at La Trobe University reviewed the proposed report and provided an opinion on accepted practice and research relating to the use of speed cameras, and on the use of evidence in the report in arriving at key findings and conclusions.

Mr Graham Smith of Courage Partners was engaged to undertake an external quality control review with respect to the proposed report and the audit evidence supporting findings, conclusions and recommendations.

## APPENDIX B: GLOSSARY OF TERMS

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**Adjudication** – Infringements are verified by trained officers who check that all the necessary evidence is in place to confirm a camera-detected speeding offence has been committed.

**Anytime, anywhere** – This is the media slogan for an approach to speeding enforcement that involves developing the *perception* of speed enforcement operating anywhere, anytime, but not necessarily being so.

**Covert cameras** – The effectiveness of mobile speed camera operations can be influenced by intensity, but also by the balance of covert and overt operation, and the degree of unpredictability, that is apparent randomness, in scheduling. These are factors in achieving optimal scheduling.

**Enforcement intensity** – there is a general relationship between enforcement intensity and casualty crash reductions. The relationship is not linear, that is, there comes a point when additional cameras or operations, do not reduce crashes at the same rate.

**General deterrence** – a process of influencing a potential traffic law offender, through his fear of detection and the consequences, to avoid offending.

**General effect** – the range of the behavioural change of the road user carries well beyond the location of the speed camera. This is referred to in some literature as the spill-over effect. It may have a duration in time and distance.

**Local effect** – the observable effect in a road user is limited to immediately upstream and downstream of the location of a speed camera. This is referred to in some literature as the ‘halo’ effect. It may have a duration in time and distance.

**Risk takers** - A further dimension is that road users may be classified as either risk takers or risk averse. The two groups are likely to respond differently on parts of the road network where there are no cameras. A rationale for a camera system will identify the deterrence mechanism that the system exploits, and who its primary target road user group is.

**Specific deterrence** – a process of encouraging an apprehended offender, through his actual experience of detection and the consequences to avoid re-offending.

**Tolerance** – a mandatory allowance is made for instrument inaccuracy (2 km/h or 2 per cent whichever is the greater). A further allowance is determined jurisdiction by jurisdiction that reflects a wide range of considerations that may include fairness, practicality, custom and practice, and public acceptability.





## AUDIT REPORTS

Audit reports published in recent years are listed below.

### Reports Published in 2013-14

Report No. 08 / 2013	Management of Funding for Community Services
Report No. 07 / 2013	2012-13 Financial Audits
Report No. 06 / 2013	Annual Report 2012-13
Report No. 05 / 2013	Bushfire Preparedness

### Reports Published in 2012-13

Report No. 04 / 2013	National Partnership Agreement on Homelessness
Report No. 03 / 2013	ACT Government Parking Operations
Report No. 02 / 2013	Executive Remuneration Disclosed in ACTEW Corporation Limited's (ACTEW) 2010-11 Financial Statements and Annual Report 2011
Report No. 01 / 2012	Care and Protection System
Report No. 10 / 2012	2011-12 Financial Audits
Report No. 09 / 2012	Grants of Legal Assistance
Report No. 08 / 2012	Australian Capital Territory Public Service Recruitment Practices
Report No. 07 / 2012	Annual Report 2011-12
Report No. 06 / 2012	Emergency Department Performance Information

### Reports Published in 2011-12

Report No. 05 / 2012	Management of Recycling Estates and E-Waste
Report No. 04 / 2012	Development Application and Approval System for High Density Residential and Commercial Developments
Report No. 03 / 2012	Early Childhood Schooling
Report No. 02 / 2012	Whole-of-Government Information and ICT Security Management and Services
Report No. 01 / 2012	Monitoring and Minimising Harm Caused by Problem Gambling in the ACT
Report No. 06 / 2011	Management of Food Safety in the Australian Capital Territory
Report No. 05 / 2011	2010-11 Financial Audits
Report No. 04 / 2011	Annual Report 2010-11

### Reports Published in 2010-11

Report No. 03 / 2011	The North Weston Pond Project
Report No. 02 / 2011	Residential land Supply and Development
Report No. 01 / 2011	Waiting Lists for Elective Surgery and Medical Treatment
Report No. 10 / 2010	2009-10 Financial Reports
Report No. 09 / 2010	Follow-up audit – Courts Administration
Report No. 08 / 2010	Delivery of Mental Health Services to Older Persons
Report No. 07 / 2010	Management of Feedback and Complaints
Report No. 06 / 2010	Annual Report 2009-10
Report No. 05 / 2010	Delivery of ACTION Bus Services

Details of reports published prior to 2010-11 can be obtained from the ACT Auditor-General's Office or the ACT Auditor-General's homepage: <http://www.audit.act.gov.au>.



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