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December 23, 2010 BPC #10-0480

The Honorable Public Safety Committee
City of Los Angeles
c/o City Clerk's Office
City Hall, Room 395
Los Angeles, CA 90012

Attention John White:

RE: CITY COUNCIL MOTION RELATIVE TO CONTROLLER'S AUDIT OF THE PHOTO RED LIGHT PROGRAM (CITY COUNCIL FILE NO. 10-1502)

At the regular meeting of the Board of Police Commissioners held Tuesday, December 14, 2010, the Board APPROVED the Department's report relative to the above matter.

This matter is being forwarded to you for approval.

Respectfully,

BOARD OF POLICE COMMISSIONERS

Maria Silva

MARIA SILVA
Commission Executive Assistant I

Attachment

c: Chief of Police

BPC #10-0480 8A

INTRADEPARTMENTAL CORRESPONDENCE

RECEIVED
DEC 01 2010
POLICE COMMISSION

November 30, 2010
16.2
CB# 10-0010
OCOP# 2010-09-03

REVIEWED

TO: The Honorable Board of Police Commissioners

FROM: Chief of Police

RICHARD M. TEFANK
EXECUTIVE DIRECTOR

12/1/10
DATE

SUBJECT: CITY COUNCIL MOTION RELATIVE TO CONTROLLER'S AUDIT OF THE PHOTO RED LIGHT PROGRAM (CITY COUNCIL FILE NO. 10-1502)

RECOMMENDED ACTIONS

1. That the Board of Police Commissioners (Board) REVIEW and APPROVE this report in response to the City Council Motion (Hahn) relative to the City Controller's Audit of the Photo Red Light Program (PRLP), Council File (CF) No. 10-1502;

2. That the Board TRANSMIT the report to the Audits and Governmental Efficiency and Public Safety Committees; and,

3. That the Board APPROVE the continuance of the City's Photo Red Light Program.

BACKGROUND

On September 29, 2010, Councilwoman Janice Hahn moved that the Los Angeles Police Department (Department), with the assistance of the Los Angeles Department of Transportation (LADOT) and the City Administrative Officer, be directed to report on the findings of the City Controller's audit relative to the PRLP and on possible recommendations to terminate the Program.

The motion raised three areas of concern:

1. The PRLP's impact on public safety;
2. The PRLP's impact on City finances; and,
3. The intersection selection process.

DISCUSSION

PART 1: THE PHOTO RED LIGHT PROGRAM'S IMPACT ON PUBLIC SAFETY

The Benefits of Automated Enforcement

The Department supports the continued use of the PRLP as part of an overall strategy to reduce the incidence of serious injury and fatal traffic collisions resulting from red light violations in the City. Traditional field enforcement has been unable to sufficiently address this problem as only seven percent of moving violations written by field personnel are for red light violations.

With the operation of 32 PRL intersections, the Department's PRLP more than quadrupled the number of citations issued from 14,000 to 59,000 citations annually. In addition to providing efficient and accurate enforcement, the PRLP also serves as a high visibility public awareness campaign, putting drivers on notice that *the City of Los Angeles does not tolerate red light running.* The Department believes that the increased driver compliance that accompanies better enforcement leads to a decrease in traffic related accidents.

Measuring Effectiveness

The Department traffic collision analysis has shown an overall decrease in red light collisions at PRL intersections since their deployment. From 2004 to 2009, the Department noted an overall 63 percent decrease in red light related traffic collisions at PRL intersections, as well as an overall decrease of 10 percent in all types of collisions. Additionally, there have been no red light related fatalities since program activation (compared to five fatalities in the three years prior to PRL enforcement, from 2004-2006).

The reduction in red light related traffic collisions is consistent with numerous published studies of PRLPs by research scientists who have conducted extensive statistical analysis far beyond law enforcement capabilities. For example, a meta-analysis on the effectiveness of red light cameras was recently published in the Journal of the Institute of Transportation Engineers *Effectiveness of Red Light Cameras,* Brian Bochner and Troy Walden, ITE Journal, May 2010, (Attachment 2).

This study analyzed hundreds of PRL intersections over various time frames from dozens of different localities and concluded that "red light cameras substantially reduce red light violation rates" and "reduce crashes that result from red light running." It also concluded that red light cameras "usually reduce crash severity by virtue of reducing the more severe right angle crashes."

On June 30, 2010, Michael Geraci, Director of the Office of Safety Programs for the National Highway Traffic Safety Administration (NHTSA), testified before the United States House of Representatives that approximately 1,000 people die in red light related traffic collisions every year in the United States. Mr. Geraci stated that red light cameras have been shown to reduce collisions by 30 to 50 percent. He concluded that "Automated enforcement programs can be an effective countermeasure for reducing crashes at high-risk locations."

The Controller's Assessment of Department Collision Statistics

The Controller's audit contains a discussion of Department traffic collision statistics and recommends several improvements to the gathering and analyzing of statistical data (Attachment 3). The audit states that a definitive conclusion about public safety cannot be made based solely on the Department's location-specific statistical analysis of collision reports.

The audit raised two main areas of concern: 1) The thorough and accurate capturing of collision data; and 2) The proper analysis of the data.

1. **Thorough and Accurate Capturing of Collision Data.** The audit pointed to several areas that raised questions about the ability of Department statistics to be conclusive:

The Department acknowledges the limitations of current data capturing methods and has committed to making improvements where possible. A plan to increase the number of fields captured by divisional databases is underway and a more integrated statistical tracking system is being investigated.

2. **Proper Analysis of the Data.** The audit recognized that there are many factors that can affect collision rates and suggested that Department statistical analysis incorporate variables such as Citywide collision trends, changes in fuel prices, fluctuations in traffic volume, and weather patterns (Attachment 3, Pages 32-34).

Presently, the Department does not have the resources to complete the level of analysis being recommended. Location-specific statistics are monitored in terms of general trends, primarily to watch for unintended consequences, such as a dramatic spike in rear-end traffic collisions (which the City has not experienced).

Traffic Collision Increases at PRL Intersections

In November 2009, in response to a media report, the Department conducted an in-depth analysis of traffic collision statistics six months before and six months after the installation of PRL equipment. Over six hundred traffic collision reports were manually reviewed to determine their relevancy to the PRLP. The results of this shortened study period showed a decrease in only half of the intersections, with the other half either exhibiting no change or a slight increase. The

Department agrees with the auditor's assessment that the time period of this particular study was insufficient to make conclusions about the impact of the PRLP.

As stated earlier, from 2004 to 2009, there has been an overall decrease of 63 percent in red light collisions at PRL intersections. Additionally, there has been an overall decrease of 10 percent in all types of collisions and no red light related fatalities since program activation (compared to five fatalities in the three years prior to PRL enforcement from 2004-2006).

PART 2: THE PRL PROGRAM'S IMPACT ON CITY FINANCES

The Controller's audit found that the PRLP has not covered its operational costs and cites a $2.5 million net loss over the last two years (Attachment 3, Page 40). Revenues from the PRLP have been lower than expected due to a lower collection rate on PRL citations. Unfortunately, discussion with the Los Angeles Superior Court to modify their procedures to increase collections on outstanding PRL citations has not proven successful.

Court Collections

The Department believes receipts from the PRLP have been lower than expected due to the decision of the Los Angeles County Courts not to use administrative collection tools such as a Department of Motor Vehicle (DMV) hold for failures to appear or the Franchise Tax Board (FTB) in the collection of outstanding PRL cases. While the court currently refers outstanding PRL citations to their contracted collection agency, GC Services, approximately 56,000 PRL citations remain open and unresolved in the court system. These outstanding citations represent over $7 million in potential revenue to the City. The collection rate for fiscal year 2009/2010 was 23 percent.

The DMV hold is an important element to the successful operation of a PRLP. The State legislature recognized this in 1999 when Section 40509 of the California Vehicle Code was amended to specifically allow for notification to the DMV for failure to appear on PRL cases. Without a DMV hold, there is effectively no legal leverage to compel violators to respond to the court order.

Additionally, the FTB is a valuable collection resource that has proved to be highly effective in other counties. For example, when the County of San Diego instituted an aggressive FTB program, they collected over $30 million in outstanding court-ordered debt in the first year.

The DMV hold and FTB programs are currently being utilized for PRL citations in San Bernardino, Riverside, San Diego, and Ventura County courts with highly successful results.

The Department, LADOT, and the City Attorney's Office, have had discussions with senior Los Angeles County Court officials in order to address the low collection rate of PRL citations. Court leadership has decided to stay with the current policy.

PART 3: INTERSECTION SELECTION

The Controller's audit notes that the method used to select the PRL intersections eliminated some intersections that had higher collision rates. The intersection selection criteria were developed in cooperation with the LADOT under the direction of the City Council. Efforts were made to place public safety as a top priority, while also balancing the practicality of implementation and Citywide coverage.

The concerns raised in the report regarding infrastructure funding have been addressed in the recently released PRL Request for Proposals (RFP). The LADOT has also committed to working with Caltrans for the upcoming contract and to allow for a reasonable time schedule.

Citywide Implementation

The audit notes that City Council emphasized the importance of placing at least one PRL in each Council District. The Department sought to accommodate the Council, while still prioritizing public safety, by selecting the most "accident-prone" intersections in their respective districts. Thus, the need for targeted enforcement was balanced with the desire for a broader implementation of the PRLP.

The goal of balanced coverage is also strongly motivated by a public safety awareness component. The PRLP operates as both a high visibility enforcement and educational tool. The ripple effect of a PRL intersection on the surrounding community increases public attention to red light compliance. As such, a PRLP has the maximum public safety benefit when enforced intersections are spread throughout the City.

As a matter of information, selections based on collision history alone would have placed 80 percent of PRL intersections in either the Valley or West Bureaus, leaving little to no coverage for huge swaths of the City and excluding the following five Council Districts entirely: 1, 7, 11, 14, and 15. Uneven distribution can lead to claims that the City is unfairly targeting particular communities. Balanced coverage also provides for equitable distribution of court case load.

The Department acknowledges that limiting the selection region to Council District may have been too narrow to allow for the necessary latitude in intersection selection. For any future contracts, the Department would prefer limiting the selections to the four geographic police bureaus instead of the smaller 15 Council Districts, which would achieve Citywide coverage while allowing for greater latitude to focus on intersections with the greatest collision problems.

CONCLUSION

The Department and the LADOT support the continued use of the PRLP as part of an overall strategy to reduce the incidence of serious injury and fatal traffic collisions resulting from red light violations in the City.

RECOMMENDATIONS

It is requested that the Board approve the aforementioned "Recommended Actions."

If you have any questions regarding this matter, please contact Captain Thomas J. McDonald, Commanding Officer, Emergency Operations Division, at (213) 486-0680.

Respectfully,

CHARLIE BECK
Chief of Police

BOARD OF
POLICE COMMISSIONERS
Approved December 14, 2010
Secretary Maria Silva

Attachments

PUBLIC SAFETY

AUDITS & GOVERNMENTAL EFFICIENC

MOTION

The Controller has just released an audit which concludes that red-light cameras have not improved safety. The audit indicates that the red-light camera program has bypassed some of the City's most dangerous intersections, cost more than $2.5 million over the last two years and failed to adequately demonstrate an improvement in safety.

The audit advises that while the camera program was supposed to reduce accidents at the highest-risk intersections, some of the most accident-prone corners were passed over, and only half of the intersections equipped with cameras showed a reduction in accidents.

The audit also advises that the Police Department operators of this program as well as the Department of Transportation have been unable to conclusively document safety improvements, and that a more comprehensive means of evaluating the effectiveness of red-light cameras is needed.

I THEREFORE MOVE that the Police Department with the assistance of the Transportation Department and the City Administrative Officer be directed to report on the findings of the Controller's audit relative to the photo red-light program and on possible recommendations to terminate this program if the findings warrant termination.

PRESENTED BY: _____
JANICE HAHN
Councilwoman, 15th District

SECONDED BY: _____

September 29, 2010
ak

Traffic-law enforcement and risk of death from motor-vehicle crashes: case-crossover study

Donald A Redelmeier, Robert J Tibshirani, Leonard Evans

Summary

Background Driving offences and traffic deaths are common in countries with high rates of motor-vehicle use. We tested whether traffic convictions, because of their direct effect on the recipient, might be associated with a reduced risk of fatal motor-vehicle crashes.

Methods We identified licensed drivers in Ontario, Canada, who had been involved in fatal crashes in the past 11 years. We used the case-crossover design to analyse the protective effect of recent convictions on individual drivers.

Findings 8975 licensed drivers had fatal crashes during the study period. 21 501 driving convictions were recorded for all drivers from the date of obtaining a full licence to the date of fatal crash, equivalent to about one conviction per driver every 5 years. The risk of a fatal crash in the month after a conviction was about 35% lower than in a comparable month with no conviction for the same driver (95% CI 20–45, p=0·0002). The benefit lessened substantially by 2 months and was not significant by 3–4 months. The benefit was not altered by age, previous convictions, and other personal characteristics; was greater for speeding violations with penalty points than speeding violations without points; was no different for crashes of differing severity; and was not seen in drivers whose licences were suspended.

Interpretation Traffic-law enforcement effectively reduces the frequency of fatal motor-vehicle crashes in countries with high rates of motor-vehicle use. Inconsistent enforcement, therefore, may contribute to thousands of deaths each year worldwide.

Lancet 2003; **361:** 2177–82
See Commentary

Department of Medicine, University of Toronto, Clinical Epidemiology and Health Care Research Program, Sunnybrook and Women's College Health Sciences Centre, and Institute for Clinical Evaluative Sciences in Ontario, Toronto, ON, Canada (Prof D A Redelmeier MD); **Departments of Statistics and of Health Research and Policy, Stanford University, Stanford, CA, USA** (Prof R J Tibshirani PhD); **and Science Serving Society, Bloomfield Hills, MI, USA** (L Evans DPhil)

Correspondence to: Prof Donald A Redelmeier, Sunnybrook and Women's College Health Sciences Centre, G-151, 2075 Bayview Avenue, Toronto, ON, Canada M4N 3M5 (e-mail: dar@ices.on.ca)

Introduction

Motor-vehicle crashes are a common cause of death, disability, and demand for emergency medical care. Globally, about 1 million people die each year from traffic crashes and about 25 million are permanently disabled.[1] Unlike many common diseases, the victims are frequently young and need substantial related care for decades. Most crashes are unintended, unexpected, and could have been prevented by small differences in driver behaviour.[2] Prevention is particularly important for protecting health, given that most drivers will be in at least one crash during their lifetime. Moreover, about half of all crash deaths occur at the scene, with no opportunity for life-saving treatment.[3]

An individual's crash risk depends on how that person drives and how other road users behave,[4] yet the public is somewhat sceptical about traffic-law enforcement.[5,6] News exposés and the entertainment industry have suggested some law-enforcement efforts are merely revenue generating in locations with low crash rates, done by biased officers.[7] Any balance between safety and mobility involves trade-offs, and people generally resist efforts that interfere with their driving.[8] Police, themselves, sometimes view traffic enforcement as a duty beneath their skills.[9] Furthermore, the effectiveness of most laws has not undergone scientific scrutiny, and the few available studies are mostly ecological analyses using disputable before-and-after comparisons of intermediate outcomes (adherence) rather than definitive outcomes (death).[10,11]

Rigorous testing of the effectiveness of traffic enforcement for preventing deaths might contribute to better decisions. First, testing could check the popular claim that enforcement yields no lives saved and a contrary net increase in crashes because drivers watch for police instead of hazards[12] would be useful. Second, testing could help to assess the effect of allocation of scarce police resources to traffic safety compared with other community services, and also affect attitudes about charging.[13] Third, results could raise debate on adoption of new enforcement technologies such as photo radar and red-light cameras.[14,15] A shortage of data may underlie inconsistency in enforcement practices globally, which could indirectly contribute to hundreds of preventable deaths each day.[16]

Methods

Setting

Ontario, Canada, in 1993—the study mid point—had a population of about 9·6 million people and 6·8 million drivers; 0·4 million drivers were involved in crashes, and there were 1135 crash deaths.[17] Police were responsible for 6·0 million licensed vehicles, 20 000 km of roads, and 1·0 million traffic convictions, but used no special enforcement technologies.[18] Licences were graduated for the first 2 years of driving (restrictions on highway

ATTACHMENT 1

driving and other limitations), and general licences could be suspended after accumulation of nine penalty points (the annual rate of suspension was about 0·6% of drivers). A conviction for speeding at 20 km per h higher than the limit, for example, involved a Can$100 fine (around UK£42) and three penalty points. Ontario had no programmes for dismissing convictions if a person completed a driver improvement course.

Drivers and driving records

We identified all drivers involved in fatal crashes between Jan 1, 1988, and Jan 1, 1999, in Ontario. A fatal crash was defined as causing death of any person at the scene, on arrival at hospital, or within 1 month of the event. We included drivers irrespective of whether they survived, were at fault, or held special diplomatic immunity from prosecution. We excluded drivers who were unidentified by police, whose licences were not registered in Ontario, or who had held licences for less than 2 years, because of graduated licence restrictions. Duplicate records were deleted if they showed identical time, place, and driver. The primary analyses focused on drivers whose driving permit was maintained during the study period; we assessed drivers whose permits were suspended in secondary analyses.

Ontario drivers' records were traceable to individual-driver level and accessible for research purposes.[17,18] Such research did not require voluntary consent and covered a person's full driving record. These databases were identical to the official files on drivers, serious crashes, and traffic convictions. Individual convictions could be removed from the public record after 2 years, but were not erased from computer files; hence, drivers' lifetime histories were available for analysis. The available data did not include parking violations or driving violations on roads outside Ontario. Similarly, the information on the date of obtaining a full licence reflected Ontario residency and did not include earlier licences elsewhere.

Records were linked by use of the encrypted licence number to data on the person, vehicle, and roadway conditions, with the following stipulations. Age, years of licensed driving, and previous convictions were current on the day of the crash. Licence class was simplified to the highest certification for people holding multiple licences. Data on alcohol were based on police reports, and missing values were coded as negative. Vehicles were classified as car, truck, or other because of small numbers of specific types. Road surface conditions were classified as dry, wet, or snowy (including ice, sleet, slush, and similar winter conditions). Crash locations were described as related or unrelated to an intersection, as recorded in the police report.

Analysis

We analysed convictions by use of a case-crossover design, a technique for assessing a temporary change in risk associated with a transient exposure.[19] Each person was his or her own control and thereby eliminated confounding due to all fixed characteristics, including genetics, personality, education, lifestyle, and chronic diseases.[20] The primary analysis used a pair-matched analytical approach to contrast a period immediately before the crash with a comparable period substantially before the crash.[21] This analysis would identify a safety benefit if periods with convictions were followed by fewer crashes than would be expected due to chance. Therefore, a benefit is implied if the absence of a conviction is associated with the onset of a crash.

In the primary analysis we assessed licensed drivers and compared the month immediately before the crash with the same month 1 year before. For example, for a crash on July 1, 1995, we compared the month of June, 1995, with June, 1994. Supplementary analyses compared the same immediate previous period to five alternative control periods to check the robustness of our findings: with the month 11 months previously, 13 months previously, 24 months previously, 36 months previously, or an extended full-year span centred 12 months previously. For example, we compared the control month of June, 1994, with July, 1994, May, 1994, June, 1993, June, 1992, and the 1-year period with July 1, 1994, as the central date. We repeated the analysis for suspended drivers to test whether smaller safety benefits were observed where smaller safety benefits would be anticipated.[22,23]

We assessed further issues by stratification. The first approach relied on grouping drivers by personal characteristics or crash features and testing for discrepancies across major subgroups. We analysed crash severity by two separate methods. First, fatal crashes were investigated by police who estimated the damage to drivers' vehicles. Second, a fatal crash did not always kill all persons involved and we assessed benefits among drivers who survived admission to hospital, were discharged into the community, and returned to active driving by analysis of their driving records after the crash. In addition, we explored how long a potential association might persist, denoted as a persistence analysis, by examining hazard intervals shifted progressively backward in time from the crash day (with corresponding displacements of control intervals). For

	Number (% [n=8975])
Characteristics	
Age (years)*†	
<30	2229 (25)
30–50	3921 (44)
>50	2800 (31)
Sex	
Male	6512 (73)
Female	2463 (27)
Years of licensed driving*†	
≤9	4032 (45)
≥10	4918 (55)
Corrective eyewear	
Yes	3224 (36)
No	5751 (64)
Licence class	
General	7110 (79)
Advanced‡	1865 (21)
Previous driving convictions*	
≤3	6853 (76)
≥4	2122 (24)
Alcohol detected	
Yes	634 (7)
No	8341 (93)
Road surface condition	
Dry	5822 (65)
Wet	1636 (18)
Snowy	1517 (17)
Road configuration	
Intersection	2836 (32)
Non-intersection	6139 (68)
Vehicle type	
Car	5689 (63)
Truck§	2649 (30)
Other¶	637 (7)

*Updated to time of fatal crash. †Excludes 25 drivers with missing birth dates. ‡Includes permits for motorcycles, trucks, and special vehicles. §Includes passenger vans or sports utility vehicles (n=605) and delivery vans (n=165). ¶Includes motorcyles (n=227), buses (n=137), bicycles (n=58), and 17 other types (n=215).

Table 1: **Selected characteristics of drivers and crashes**

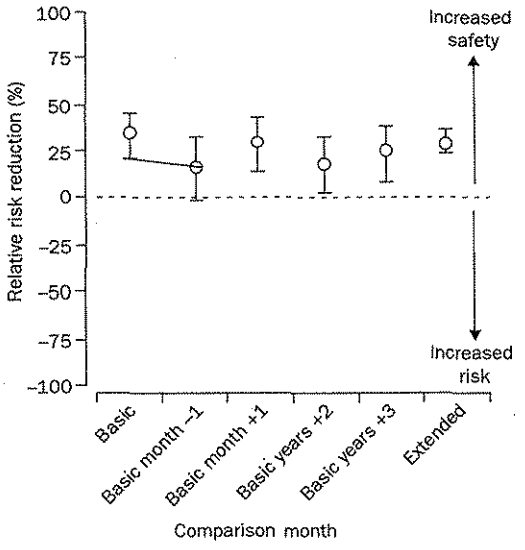

Figure 1: **Estimated relative risks (95% CI) for six different control intervals**

Basic=1-month control periods before collision separated by 12 months. Basic -1 month=separation of 11 months. Basic +1 month=separation of 13 months. Basic +2 years=separation of 24 months. Basic +3 years=separation of 36 months. Extended=1-year control period centred on date 12 months before collision.

example, a 1-month persistence interval would include May 1994 and May 1995 when assessing a crash on July 1, 1995.

Statistical analysis

We calculated the sample size to provide an 80% chance of detecting a 15% increase or decrease in crash rates. Relative risks were estimated with methods for matched-pairs studies on the basis of exact binomial tests and conditional logistic regression. Analogous methods were applied when the control interval was 12 months rather than 1 month in length. In all analyses, the time immediately before the crash was 1 month in length (estimates based on intervals of 2, 6, and 8 weeks yielded similar results and are not shown). Each month before the fatal crash was assessed as an independent hazard time period. All p values were two-tailed, all relative risks calculated with 95% CI, all analyses drawn from all data available. Relative risk reductions greater than zero show a safety benefit, and CI that exclude zero are significant. We did all analyses on S-PLUS (version 3.4) and Statview (version 5.0) software.

Role of the funding source

The study sponsors had no role in the study design, data collection, data analysis, data interpretation, the writing of the report, or in the decision to submit the paper for publication.

Results

8975 licensed drivers were involved in fatal crashes during the 11-year study period. In addition, 4861 suspended drivers were involved in fatal crashes. Data on convictions showed no anomalous entries or gaps related to licence numbers or to date, description, and demerit points for each offence. Data on crashes also showed no irregularities over the critical data on drivers' licence numbers and dates. Data on sex, licence class, road surface, road configuration, and vehicle type had no irregularities. Data on corrective eyewear and alcohol consumption were assumed complete with missing values interpreted as negative. Data on previous convictions were derived directly from the file of each individual. Data on birth date and first licensing date were missing for 25 individuals; these individuals appear in the primary analysis but are excluded from the subanalyses of driver age and experience.

The typical licensed driver was a man aged 43 years holding a general permit, and who drove a car in dry road conditions (table 1). Most of the crashes did not involve alcohol and were not at intersections. Before the crashes, the lifetime driving-conviction history of the entire group of licensed drivers accounted for 21 501 convictions, most commonly for speeding without penalty points (6682 convictions) or speeding with penalty points (6493 convictions). There was a notable seasonal pattern; crashes and convictions were more common in the summer than the winter.

135 licensed drivers had had driving convictions in the month before the fatal crash, 204 had had convictions in the same month 1 year before, and six had had convictions in both months. The primary analysis indicated that convictions were associated with a 35% reduction in the relative risk of a crash (95% CI 20–45, p=0·0002). Analyses based on alternative control time periods yielded similar findings (figure 1). As expected, the analysis of the extended control time of 1 year resulted in a minor drift of the point estimate and narrowing of the CI. For suspended drivers, however, there was no significant decrease in risk associated with

	Number with conviction in previous month	Relative risk reduction (95% CI)*
Complete cohort	135	35 (20 to 45)
Age (years)		
<30	58	34 (10 to 52)
30–50	62	28 (2 to 48)
>50	15	55 (13 to 75)
Sex		
Male	111	37 (20 to 50)
Female	24	19 (-47 to 50)
Years of licensed driving†		
⩽9	66	39 (17 to 54)
⩾10	69	30 (6 to 48)
Corrective eyewear		
Yes	47	26 (-6 to 48)
No	88	39 (20 to 52)
Licence class		
General	104	32 (13 to 45)
Advanced	31	42 (10 to 61)
Previous driving convictions		
⩽3	64	33 (10 to 50)
⩾4	71	37 (17 to 52)
Alcohol detected		
Yes	15	42 (-15 to 68)
No	120	34 (17 to 45)
Road surface condition		
Dry	90	35 (17 to 50)
Wet	25	31 (-15 to 57)
Snowy	20	38 (-15 to 62)
Road configuration		
Intersection	31	48 (20 to 64)
Non-intersection	104	29 (10 to 43)
Vehicle type		
Car	83	26 (2 to 43)
Truck	42	47 (23 to 62)
Other	10	36 (-54 to 70)

*Indicates decrease in chance of a fatal crash during month after conviction compared with month after no conviction. †Positive values indicate increased safety, negative values indicate increased risk.

Table 2: **Relative reduction in crash risk associated with a conviction**

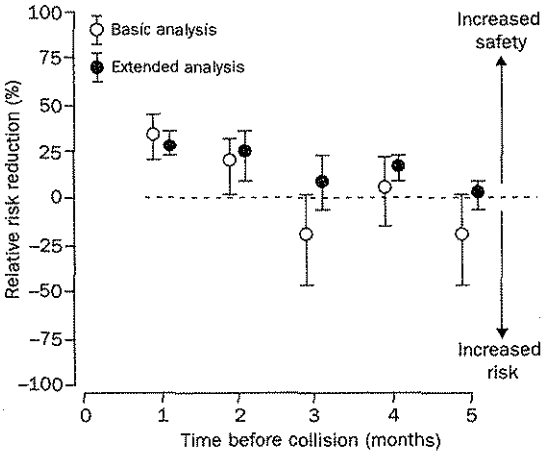

Figure 2: **Relative risks (95% CI) for different persistence intervals**

Basic analysis=1-month control periods before collision separated by 12 months. Extended analysis=1-year control period centered on date 12 months before collision.

convictions (relative risk reduction −16% [−36 to 2], p=0·12).

The relative risk reduction associated with traffic convictions was consistent among subgroups of licensed drivers. In no group were traffic convictions associated with a harmful effect (table 2). The smallest relative risk reduction was for women, although the inconsistency between women and men was not significant (p=0·39) and women were generally under-represented in fatal crashes. The relative risk reduction was almost the same for drivers with four or more and for those with three or fewer previous convictions and almost the same for drivers with alcohol and with no alcohol detected by police. Analyses of each of the 11 separate years showed

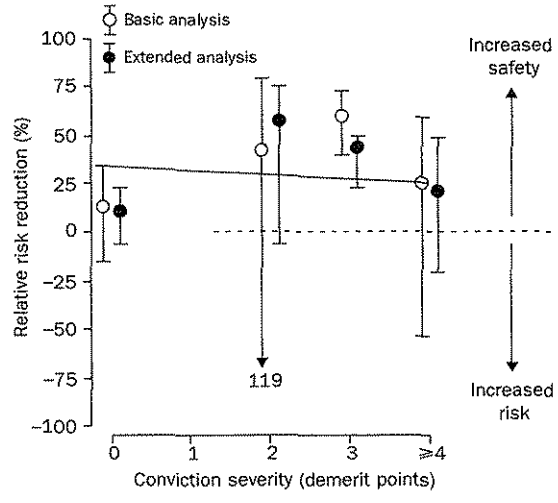

Figure 3: **Relative risks (95% CI) for different types of convictions**

Basic analysis=1-month control periods before collision separated by 12 months. Extended analysis=1-year control period centered on date 12 months before collision. Drivers with no convictions excluded. Relative risks undefined at severity=1 because no driver accumulated exactly 1 point, and do not increase proportionately with conviction severity.

a relative risk reduction in all but 1 year and no significant increasing or decreasing trends.

The decrease in risk was greatest for convictions made close to the time of the crash. In the analysis of persistence of effect, for control periods of 1 month's duration the decrease in risk was greatest for convictions made less than 1 month before the crash and was not significant for convictions made 3 or more months before the crash (figure 2). The same analysis with control periods of 12 months' duration indicated that a decrease in risk did not persist for convictions 5 or more months into the past. In no analysis did we find a significant increase in risk. In addition, we found a consistent relative risk reduction after convictions, irrespective of hour of day (range 24–55%), day of week (24–53%), or season of year of the crash (17–52%).

Analysis of crashes according to police estimates of damage, showed marginally inconsistent higher relative risk reduction for drivers whose vehicles were demolished compared with those whose were not (42 *vs* 23%, p=0·22). Relative risk reductions were similar for drivers who did or did not have objective evidence of subsequent driving activity (35 *vs* 34%, p=0·95). Together these findings suggest that safety benefits extended to crashes of greater or lesser severity.

In the subgroups of convictions, speeding convictions in which the driver received penalty points were associated with a larger relative risk reduction than speeding convictions with no penalty points (51 *vs* 0%, p=0·011). Convictions related to administrative errors, careless driving, seatbelt failure, and disobeying of a traffic signal were all associated with similar relative risk reductions (range 31–57%). When based on severity of punishment rather than the type of offence, convictions for which two to three penalty points were awarded showed generally more safety benefit than did convictions with no penalty points (figure 3).

We tested for adverse effects related to enforcement by review of coroners' data on all deaths involving police activity. We found 24 deaths related to traffic enforcement during the study period. These deaths included 17 drivers suspected of criminal activity, five bystanders, and two police officers. The typical driver who died was a man aged 26 years pursued by police after fleeing a spot check for alcohol or a speeding violation. Four of the five bystanders were passengers in a vehicle fleeing a spot check, four had positive toxicology at autopsy (alcohol or illicit drugs), and four were teenagers. The two police officers who died (separate events) were each hit by drivers while writing a speeding ticket for another motorist.

Discussion

Almost no driver wants to be in a serious crash, yet almost all drivers violate traffic laws at some time, such as by intermittent speeding.[24] We studied more than 10 million people for longer than a decade and found that convicting drivers for traffic offences reduces the rate of fatal crashes. Each conviction leads to a 35% decrease in the relative risk of death over the next month for drivers and other road users; conversely, each conviction not issued would lead to a corresponding increase in risk. Our findings also imply that increasing the frequency of traffic enforcement might further reduce total deaths, that emphasis of moderate penalties (around three points) is useful, and that past procedures led to some deaths that might not have otherwise occurred.

Our findings extend past research because the individual rather than the region is the unit of analysis

and because each person is their own control rather than using statistical models to adjust for confounding. A meta-analysis of past ecological data implied a 2% risk reduction from manual speed enforcement, a 19% reduction from automated speed enforcement, an 11% reduction from red-light violation enforcement, and a 4% reduction from enforcement of drink-driving laws.[25] The results of individual reports varied even more, presumably because of difficulties in separating the effects of enforcement from publicity campaigns, fallible implementation, statistical artifact, and unmeasured ecological bias.

The major impediment to general traffic-law enforcement is a lack of public support. Unlike when receiving preventive health care, individuals commonly resist convictions with deception or argument.[23,26] Enforcement can reduce civil liberties, disrupt traffic flow, restrict mobility, or have other unintended consequences on quality of life and economic prosperity. Enforcement strategies are also inconsistent, since many drivers have violations, but few are apprehended, and even fewer have malicious intent.[7] Finally, police resources are scarce and apprehending other types of offenders may be a higher societal priority because one murder may draw more attention than the thousands killed daily in motor-vehicle crashes worldwide.

Traffic enforcement has potential indirect effects on health of uncertain importance. A road-safety programme may intercept other unlawful activity because criminals frequently drive to and from their illegal operations, including the traffic of illicit drugs. Visible police presence might deter violent behaviour or stop repeat offenders; for example, the convicted Oklahoma City bomber was apprehended at an incidental traffic stop. In addition, crashes are an economic drain on society—costs are about US$200 billion yearly in the USA[27]—that the public cannot escape because of insurance premiums or other market forces, and that ultimately decreases the funding available for medical care.

Our research has limitations. The intermittent nature of driving and the potential for out-of-region activity leads to spurious positive correlations in case-crossover analysis and causes us to underestimate the risk reduction. Selection bias may cause further underestimation because enforcement targets drivers who are predisposed to crashes and thereby may further obscure potential protective associations.[20,28] Our estimates do not imply that every conviction is effective and do not predict how results might change at extremes of enforcement or with cultural adaptation. Finally, we once more raise the issue of hard-core problem drivers, who drive despite having suspended licences, but we can provide no headway on this issue.[29]

Our research is prone to misinterpretation. We have not assessed other deterrents, such as being charged but not convicted, being stopped but not charged, or being an observer when others are stopped. We have not definitively proved causality, yet a randomised experiment of individual drivers would be very difficult. We have not shown that traffic-law enforcement is the only way to reduce motor-vehicle deaths since gains may also be possible through advances in information, incentives, technology, or culture. We have not tested highly specific questions about road safety because we have limited statistical power and imperfect direct data on alcohol or other disturbances, as is typical in studies of human behaviour.

Our data suggest that about one death is prevented for every 80 000 convictions, one emergency department visit for every 1300 convictions (assuming the benefits apply to crashes of all severity), and $1000 in societal costs for every 13 convictions (including property damage and lost time). The observed 35% relative risk reduction in death is greater in magnitude than the roughly 20% relative risk reduction from all mandatory vehicle improvements of the past 50 years, yet enforcement effects are transient.[3,30] Policies of more frequent enforcement could yield more net savings and could also be revenue neutral if designed efficiently. A small relative risk reduction could immediately prevent a large amount of death, disability, and health-care demands.

Contributors

All researchers contributed to the design, analysis, and reporting of this research. D Redelmeier had full access to all of the data in the study, and bears final responsibility for mistakes.

Conflict of interest statement

D Redelmeier draws income from medical practice at Canada's largest trauma centre, Sunnybrook and Women's. R Tibshirani draws earnings as a member of the advisory board of several companies, none of which is involved in traffic safety. Leonard Evans draws a pension from the General Motors Corporation and has earnings from writing, speaking, and consulting on matters related to traffic safety.

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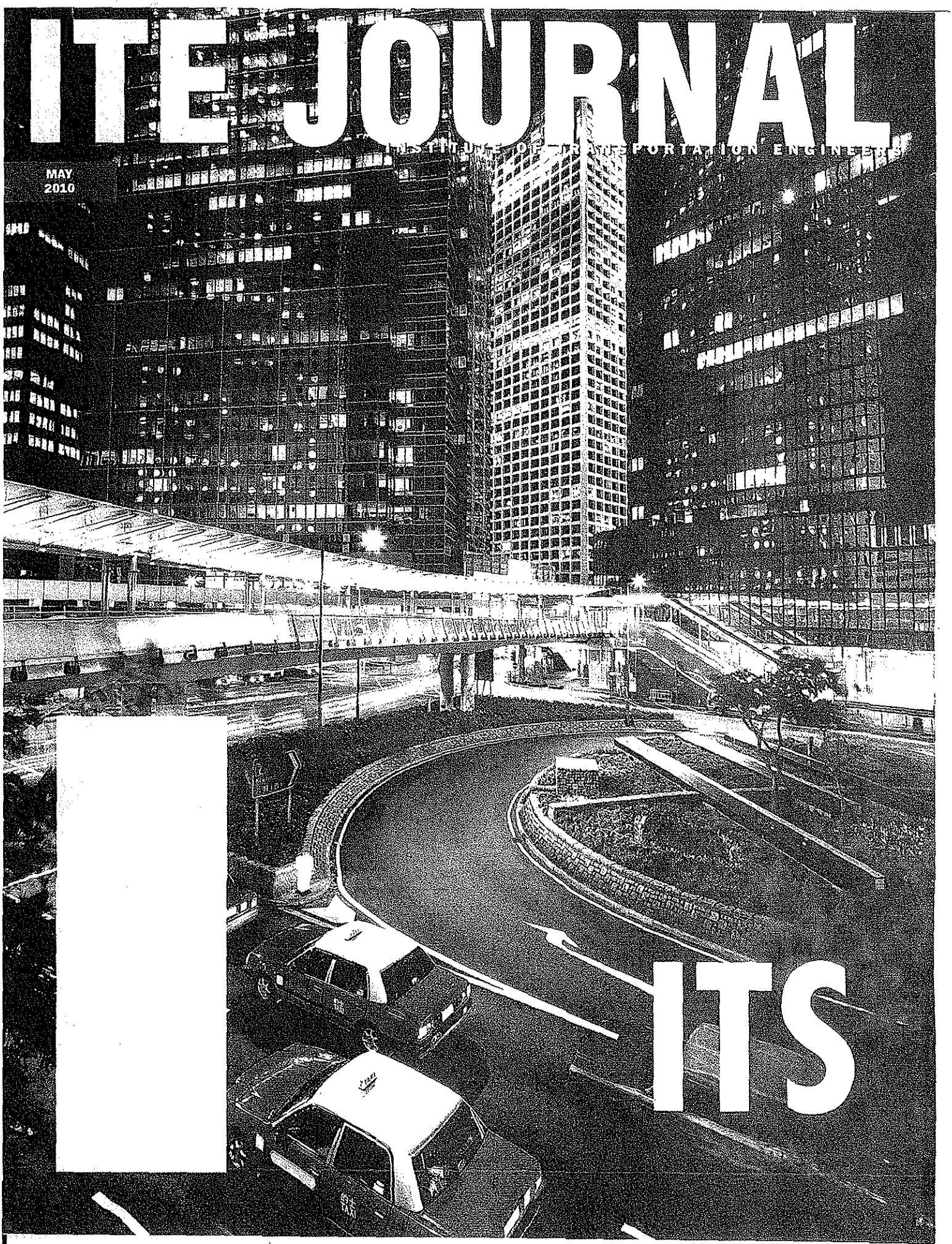

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ATTACHMENT 2

Effectiveness of Red-Light Cameras

WITH RED-LIGHT RUNNING REMAINING ONE OF THE MOST CHALLENGING ENFORCEMENT JOBS, HOW EFFECTIVE ARE RED-LIGHT CAMERAS AT REDUCING THE RATE OF VIOLATIONS? AND EVEN MORE IMPORTANTLY, WHAT EFFECTS DO THEY HAVE ON THE LEVEL AND SEVERITY OF INTERSECTION-RELATED CRASHES? THIS PAPER EXAMINES THE POTENTIAL BENEFITS AND DRAWBACKS OF RED-LIGHT CAMERAS.

BY BRIAN BOCHNER, P.E., PTOE, PTP
AND TROY WALDEN, PH.D.

BACKGROUND

Intersection traffic safety is achieved through a combination of engineering, education and enforcement. This paper addresses only the enforcement component through use of red-light cameras. A comprehensive discussion about the engineering component of signal lights can be found in the *Red-Light Running Handbook: An Engineer's Guide to Reducing Red-Light-Related Crashes.*[1]

Red-light cameras have been used increasingly over the past decade to assist and facilitate enforcement against red-light running at signalized intersections. According to the Insurance Institute for Highway Safety (IIHS), red-light cameras are in use by more than 400 cities in the United States and in at least 22 countries.[2,3]

This paper summarizes the following:

- The purpose of enforcement against red-light running violations;
- Findings from evaluations of the effectiveness of red-light cameras; and
- Conclusions regarding the use of red-light cameras to increase driver adherence to traffic signals.

PURPOSE OF ENFORCEMENT AGAINST RED-LIGHT RUNNING

Enforcement against red-light running violations is an action intended to increase safety by reducing the number of crashes and vehicle conflicts at signalized intersections. An analysis of 1997 U.S. crash data indicated that red-light running crashes accounted for 44 percent of all fatalities at signalized intersections.[4] The city of Toronto, Ontario, Canada, attributes as much as 40 percent of fatalities at its signalized intersections to red-light running.[5] Similarly, statewide in Iowa, about 35 percent of fatal/major injury crashes at signalized intersections between 2001 and 2006 were attributed to red-light running.[6] To understand the importance of enforcement, it is first necessary to understand the safety reasons for which intersections are signalized in the first place.

Purpose of Traffic Signals

Traffic signals are used to assign the right of way to vehicles passing through intersections so conflicting movements (i.e., vehicle paths that cross each other and create crash potential) do not occur. Traffic signals are installed when traffic engineering studies determine that certain conditions (warrants) are met in accordance with the *Manual on Uniform Traffic Control Devices* (MUTCD).[7] Most of the warrants are directly or indirectly associated with preventing conflicts and crashes.

Relationships Between Red-Light Running Violations and Crash Frequency, Severity and Vehicle Conflicts

Traffic signals are installed to separate conflicting traffic movements (called conflicts) through intersections. Those conflicts create crash potential. For example, if a vehicle from each of two crossing streets attempts to enter an intersection at the same time, the paths of the crossing vehicles meet in the intersection and a crash can occur. Figure 1 illustrates the vehicle conflict points that occur within a typical intersection.

Crashes occur when conflicting vehicle movements occur within intersections. Research has shown that the more traffic conflicts that occur, the higher the frequency of crashes. But there is more to the problem of conflicts than just crash frequency. There are different degrees of crash severity. These are most simply characterized as property damage only, injury and fatal crashes. Certain crash types produce a higher degree of severity than others. The two most frequent types of crashes at signalized intersections are angle (vehicle paths from intersecting streets cross each other) and rear-end (one vehicle collides with the vehicle in front of it). Right-angle crashes usually have a higher (more serious) severity than rear-end crashes.

Conflicts lead to crashes. Certain types of crashes produce more serious results. No crash is a good crash, and traffic signals are installed to help prevent conflicts and crashes. Red-light running violations, in addition to being prohibited by state law, are

dangerous to public health and safety. Enforcement of red-light running violations is intended to reduce crashes by reducing vehicle conflicts within intersections.

Purpose of Red-Light Camera Enforcement

Most drivers obey traffic signals all the time. However, some drivers, due to temporary inattention, distractions, poor decision making, or aggressive driving fail to stop for red lights. Those red-light-violating drivers create crash opportunities at the conflict locations shown in Figure 1.

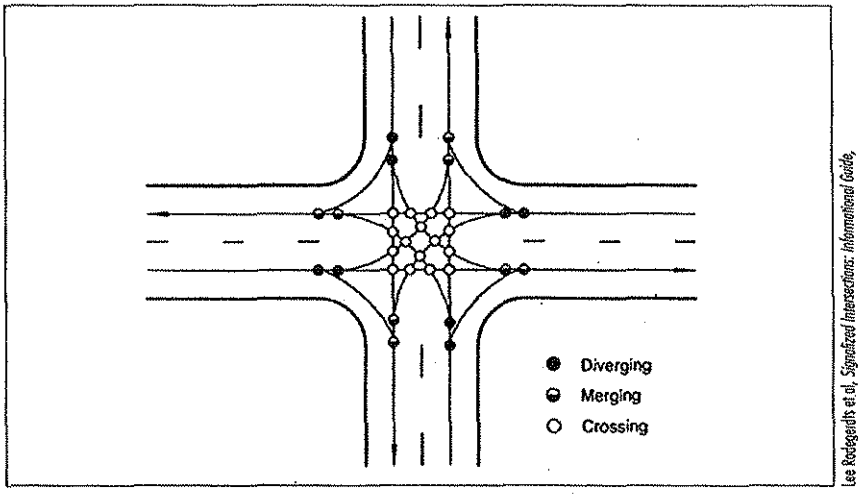
Traffic engineers seek ways to increase compliance with traffic signals at locations where red-light running is higher than normal. Sometimes engineering countermeasures can be used, such as changing signal phasing or timing or modifying signal displays. However, often the problem is driver decision making, and enforcement becomes necessary. The traditional method of enforcement is for police officers to cite violators they observe. This requires police officers to spend their time on the streets and results in an occasional enforcement presence. It also requires police officer time away from other duties.

Red-light cameras were invented to provide more comprehensive enforcement without diverting police officers from other, possibly more important, duties. They are typically used where crashes or violations (which create crash potential) are most frequent. However, they can be used at any signalized intersection. Red-light cameras are normally installed after a traffic engineering evaluation shows that all reasonable and applicable engineering countermeasures have been evaluated and that violations still exist. One advantage of red-light cameras is that they provide continuous coverage and produce a record of the violations that can be reviewed in case of question.

Hence, enforcement by use of red-light cameras is for the purpose of reducing vehicle conflicts and crashes in intersections that experience red-light running violations.

EFFECTIVENESS OF RED-LIGHT CAMERAS

The effectiveness of red-light cameras can be viewed in terms of reductions in crash frequency, crash severity and frequency of red-light running violations. This section provides a cross-section of past findings about the effectiveness of red-light cameras in affecting those three results. It should be noted that, unless otherwise stated, the authors of this summary drew the information from published or Internet summaries and did not have access to the actual data. It also should be noted that many results are based on observations of small numbers of intersections for varying periods and that the intersections may have been selected for red-light camera application based on a variety of existing conditions. Therefore, readers are encouraged to consider general trends and consistency rather than to try to calculate average magnitudes of effectiveness.



Lee Rodegerdts et al, *Signalized Intersections: Informational Guide*, Federal Highway Administration, Washington, DC, August 2004.

Figure 1. Traffic conflict points in a typical intersection.

Crash Frequency

Crash frequency is usually measured in total crashes per year. Some reports separate crashes by whether or not they relate to red-light running or by crash type, usually right-angle or rear-end types.

Crashes at signalized intersections. When a traffic signal is originally installed, one purpose is to reduce right-angle crashes if they make up an inordinately high percentage of the total. It is expected that rear-end crashes may increase if drivers stopping on red are followed too closely by subsequent drivers.

Impact of red-light camera enforcement. Red-light running enforcement is expected to reduce right-angle collisions by virtue of reducing improper entry to the intersection when crossing vehicles are present. At the same time, the additional vehicles stopping when red-light cameras are present may result in an increase in rear-end crashes (or they may not, since drivers should be more cautious and expect drivers in front of them to stop for red).

Numerous studies have been completed to assess the impact of red-light camera enforcement on crash frequency. The examples cited here are before-and-after comparisons at intersections (the only change is the addition of red-light cameras). These provide a good assessment of the impact of red-light cameras since all other factors remain the same. It is assumed that the traffic volumes remain about the same since most data cover 1-2 years before and after installation—in most cases this is rarely enough time for traffic volumes to change significantly.

In one of the most procedurally robust evaluations of red-light camera effectiveness, researchers evaluated 132 sites in seven jurisdictions.[8] Findings included the following:

- Right-angle crashes were reduced by approximately 25 percent overall. Right-angle crashes were reduced by an average of 14 to 40 percent in six of the seven jurisdictions; in one jurisdiction those crashes increased by about 1 percent. Right-angle crashes declined by about 8 percent at other signalized intersections without red-light cameras in the same jurisdictions, indicating that the use of the cameras may produce some effect across the area.

- Rear-end crashes increased in all seven jurisdictions by 7 to 38 percent. The average increase was about 15 percent. At signalized intersections without cameras, the spillover effect was that rear-end crashes increased by about 2 percent.
- The combined total of right-angle and rear-end crashes decreased by less than 1 percent. Total right-angle and rear-end injury crashes declined by about 5 percent.
- The percentage of the respective right-angle and rear-end crashes that resulted in injuries each stayed the same.

Unpublished summaries of Texas Crash Records Information System (CRIS) data for 56 red-light camera-equipped intersections in 10 Texas cities indicate that [9]

- Red-light related crashes decreased by about 17 percent. For red-light related crashes (those attributed to drivers running a red light), six intersections showed decreases, three had increases and one was unchanged. Among the four high-crash locations, three showed decreases and one increased.
- Right-angle crashes declined 18 percent. Right-angle crashes decreased from 67 percent of total crashes before cameras to about 55 percent of the total with camera enforcement.
- Rear-end crashes increased by 56 percent. Only 11 of the 70 (16 percent) rear-end crashes per year before cameras were related to red-light causes. With cameras, 15 of 109 (14 percent) rear-end crashes per year related to red-light causes. Although total rear-end crashes increased, red-light related causes contributed about the same percentage as before cameras.
- Total crashes were virtually unchanged. Total crashes increased at five intersections and decreased at five. Some intersections had very few crashes. However, even among those with more than 20 crashes per year, half showed increases and half showed decreases.

The city of Garland, Texas, USA, compiled 31 months each of before and after data for its six intersections having red-light cameras (one approach each).[10] Two of those intersections are at freeway frontage roads. After adjustment of all data to a monthly basis, the four arterial and one frontage road intersections experienced the following changes:

- Total crashes decreased about 29 percent.
- Red-light running crashes went down 60 percent at the two intersections (down 95 percent on approaches with cameras).
- Rear-end crashes increased by 45 percent.

At the second frontage road intersection, where total traffic increased by almost 50 percent in four years

- Total intersection crashes increased by about 64 percent.
- Red-light running crashes were more than three times as frequent.
- Rear-end crashes declined by about 57 percent (82 percent on camera-equipped approaches).
- Total injuries increased by 29 percent.

The city of Dallas, Texas, installed red-light cameras at 60 sites during the first half of 2007.[11] Preliminary results from data through the beginning of 2009 showed for 17 camera sites with two years implementation that

- Red-light running crashes decreased by an average of about 61 percent (all intersections showing reductions).
- Total crashes were down by 30 percent.

For the other 43 sites with 18 months in place

- Red-light running crashes were down an average of 39 percent (79 percent of intersections have reductions).
- Total crashes were down 23 percent.

Preliminary data obtained from the city of Irving, Texas, indicate that during the first 18 months of operation, red-light camera enforcement resulted in a reduction of total intersection crashes by 56 percent below the 18 months preceding implementation.[12]

IIHS evaluated results of red-light camera effectiveness in Oxnard, California, USA.[13] Eleven of Oxnard's 125 signalized intersections were equipped with red-light cameras. Results reported covered the effects of the cameras on all 125 intersections. They found that

- Total intersection crashes decreased by 7 percent.
- Right-angle crashes decreased by 32 percent.
- Injury crashes declined by about 29 percent.
- Rear-end crashes increased 3 percent.

There was no evaluation focused solely on the red-light camera intersections.

A study of 24 red-light camera intersections in Phoenix and neighboring Scottsdale, Arizona, USA, reported effectiveness of camera enforcement.[14] For 10 intersections in Phoenix

- Total intersection crashes were about unchanged.
- Angle crashes decreased by about 42 percent.
- Left-turn crashes were approximately unchanged.
- Rear-end crashes increased by about 20 percent.

For 14 intersections in Scottsdale

- Total crashes declined by about 11 percent.
- Angle crashes were down by about 20 percent.
- Left-turn crashes declined by about 45 percent.
- Rear-end crashes increased by about 41 percent.

An evaluation of effectiveness of six red-light camera intersections in Mesa, Arizona, another Phoenix area community, showed[15]

- The total crash rate decreased by about 10 percent.
- Half of the intersections experienced small increases in total crashes of 1 to 4 percent while half experienced large decreases (16 to 28 percent).

The same document showed that a North Carolina, USA, study of red-light camera effectiveness in Raleigh and Chapel Hill showed before-and-after comparisons (seven months of after data).

- Red-light related crashes declined by about 32 percent.
- Angle crashes decreased by about 51 percent.
- Total crashes were down by about 30 percent.
- Rear-end crashes increased by an average of about 2 percent.

The researchers cautioned that the seven months of after data might omit some seasonal effects.

The Howard County, Maryland, USA, Traffic Engineering Division reported early results, including that[16]

- Total crashes declined by between 21 and 44 percent at individual camera-enforced intersections.
- Right-angle collisions decreased by an average of 42 percent.
- Rear-end crashes deceased by an average of about 29 percent.

After 10 years of operation with up to 30 camera locations in Howard County[17]

- Total crashes had decreased by 12 to 18 percent (varied by length of service).
- Angle crashes decreased 36 to 57 percent (average 45 percent).
- Rear-end crashes ranged from a long-term 5 percent reduction to shorter-term increases of 2 to 10 percent.

An evaluation of red-light camera experience over 12 to 34 months at 12 intersections in San Diego, California, USA, showed that [18]

- Crashes attributable to red-light running decreased by about 41 percent.
- Rear-end crashes increased by about 37 percent. Rear-end crashes increased at 14 intersections and decreased at five.
- Total crashes increased by about 1 percent. Total crashes declined at 11 of the 19 intersections but increased at the others.
- Right-angle and ran-signal crashes decreased at 12 intersections but increased at two.

Some of the camera-equipped intersections in San Diego had very low crash experience to begin with. One intersection that had about 25 percent of the recorded red-light violations had only 1.5 crashes per year before camera installation. The report cited above referenced a report by the California state auditor that stated that following the introduction of the California red-light camera law

- Crashes attributable to red-light running declined statewide by about 3 percent per month and in cities with red-light cameras those crashes were down 10 percent per month.
- Only one California city showed an increase in red-light running crashes (5 percent).

Finally, the same source stated that following suspension of the San Diego red-light camera program, red-light crashes increased by 14 percent citywide and by 30 percent at former camera intersections.

An evaluation of four to six red-light camera intersections in San Francisco, California, USA, used five years each of before-and-after crash data. The evaluation showed that[19]

- Injury crashes decreased by about 9 percent.
- Fatalities were 50 percent lower (although the numbers are small).

The same source reported that for 17 red-light camera intersections in Baltimore County, Maryland, USA, a comparison of one-year before-and-after crash data showed that

- Total intersection-related crashes decreased by about 57 percent, with 14 intersections experiencing decreases and three experiencing increases.
- Red-light-related crashes decreased by about 21 percent (six intersections decreased, four increased, seven unchanged)
- Injury crashes decreased by about 49 percent (10 intersections had decreases, four had increases, three were unchanged).

The same source also reported an evaluation of Charlotte, North Carolina, USA, experience for 17 red-light camera intersections. There the results were as follows:

- Total intersection crashes were unchanged (10 intersections decreased, seven increased).
- Angle crashes declined by about 37 percent (13 intersections decreased, three increased, one was unchanged).
- Rear-end crashes increased by about 16 percent (six intersections decreased, 10 increased, one unchanged).

On approaches equipped with cameras

- Total crashes decreased about 19 percent (12 approaches decreased, five increased).
- Angle crashed declined by about 60 percent (14 approaches decreased, two increased, one unchanged).
- Rear-end crashes increased by about 4 percent (five approaches decreased, 10 increased, two unchanged).

A report on red-light camera effectiveness in some cities in Georgia, USA, indicated a variety of results from various cities.[20] That report focused on total and rear-end crashes.

- In Rome, where one red-light camera was installed the first year
  - Total crashes decreased by 14 percent.
  - Rear-end crashes decreased by 32 percent.
- In Brunswick (three locations)
  - Rear-end crashes increased by about 70 percent.
- One installation in Duluth showed no clear trend.
- In Snellville, results for two locations showed that
  - Total crashes declined 43 percent at one intersection and increased 2 percent at the other one.
  - Rear-end crashes decreased 36 percent at one and increased 25 percent at the other.
- In Alpharetta, results for two locations showed that
  - Total crashes decreased by about 5 percent.
  - Rear-end crashes increased about 4 percent.

In Seattle, Washington, USA, where red-light cameras were installed on six approaches of four intersections, over the first two years

- Total crashes decreased by 11 percent.
- Angle crashes showed no change.
- There were no red-light-related rear-end crashes.
- Injury crashes decreased by about one-third.[21]

However, the Seattle analysts did not think there were enough data to reach a definite conclusion on effectiveness based on crash frequency.

The city of Calgary, Alberta, Canada, reported in early 2009 that since 2001 when they installed red-light cameras

- Right-angle crashes have decreased at red-light camera locations by about 48 percent.
- Rear-end collisions have dropped by about 39 percent.[22]

A review of 10 controlled before-and-after studies in Australia, Singapore and the United States by The Cochrane Collaboration found that

- Right-angle crashes were reduced by 24 percent.
- There was no significant change in rear-end crashes.[23]

A different canvass of U.S. and international red-light camera evaluations found that

- Angle collisions due to red-light cameras decreased by 10 to 50 percent.
- Rear-end collisions increased from zero to 60 percent.[24]

Crash Severity

Crash severity measures how serious the results of a crash are to those involved. Severity is most often described as a percentage of crashes that involve injuries or fatalities. Sometimes an index is used based on a sliding scale of point values ranging from a high for a fatal crash to a low for no significant damage.

Crash severity at signalized intersections. Some intersection crash types have a higher incidence of injuries and fatalities than others. This results from the angle of vehicle impact and speed of collision. Angle crashes account for more intersection fatalities than any other type (59 percent).[25] They usually involve moderately high speeds and collisions involving the passenger compartment of at least one vehicle. They comprise the majority of red-light running crashes. Rear-end crashes, the other prominent type associated with red-light enforcement, account for only about 4 percent of fatal intersection crashes.

Impact of red-light camera enforcement. In an evaluation of red-light camera effectiveness of 132 sites in seven jurisdictions[26]

- Total of right-angle and rear-end crashes decreased by less than 1 percent.
- Total right-angle and rear-end injury crashes declined by about 5 percent.

The city of Garland, Texas, evaluated four arterial intersections, each with a camera on one approach, and compiled injuries per year before and after implementation.[27] The comparison of 31 month before-and-after periods showed that total injury crashes decreased by about 28 percent. Raw data from Irving, Texas, show that in the first 18 months of red-light camera use, the severity index dropped by 73 percent using a 10-point crash severity scale.[28]

The city of Toronto, Ontario, Canada, reported that red-light cameras resulted in

- Fatal and injury angle crash decrease of about 48 percent.
- Property damage only crash reduction of about 26 percent.[29]

An IIHS review of international red-light camera experience found that with red-light camera enforcement, injury crashes decreased by 25 to 30 percent.[30] Further, a review of 10 controlled before-and-after studies of red-light cameras in Australia, Singapore and the United States showed that total injury crashes decreased by an average of about 16 percent.[31]

Red-Light Violations

Red-light violations result in the possibility that two (or more) vehicles will collide within an intersection. Hence, every red-light running violation creates potential for a crash. Reductions in violations should produce crash reductions, especially in right-angle crashes. However, it is recognized that increased stopping for red lights can cause an increase in rear-end crashes.

The IIHS reported that they found red-light camera enforcement reduces violation rates by about 40 percent.[32] Further, the Garland, Texas, evaluation showed that violations per camera declined by about 56 percent from the first month of implementation to the 31st month.[33] This is about 2.2 percent per month.

In College Station, Texas, the violation rate over the first year of operation for six camera-equipped approaches[34]

- Decreased by about 49 percent; and
- Showed violations by movement type during one four-month period as[35]
  - Through: 50 percent.
  - Right turn: 47 percent.
  - Left turn: 3 percent.

During the first year of red-light camera enforcement, violations were found to have

- Decreased by about 41 percent in Fairfax, Virginia;
- Decreased by over 70 percent in Charlotte, North Carolina;
- Decreased by about 68 percent in San Francisco, California; and
- Decreased by about 92 percent in Los Angeles, California.[36]

During the first year of operation in Georgia

- Violations at one Rome intersection decreased by about 32 percent; and
- Violations at six locations in Alpharetta declined by an average of about 64 percent.[37]

The city of New Orleans, Louisiana, USA, installed red-light cameras at 17 intersections. After seven months of operation, violations dropped by about 85 percent.[38]

The evaluation of red-light camera experience in San Diego showed that at 19 red-light camera intersections

- Violations decreased by a median amount of 3.2 percent per month over 12 to 34 months.
- Violations at 18 of the 19 intersections decreased by at least 2.1 percent per month.
- Violation trend decreases continued throughout the evaluation period, although with a declining rate (32

percent the first year and 54 percent cumulative for two years).[39]

The same evaluation supported confirmed the contention that extension of the yellow change interval will solve most of the red-light running problems; yellow intervals were extended by varying amounts up to about 1.6 seconds, with the result being that

- Violations decreased by 30 to 88 percent with an average of about 50 percent; and
- That still left 50 percent to be addressed by other means, such as enforcement.

Over the first five years of its program involving up to 30 camera locations, Howard County, Maryland, red-light camera citations for red-light running compared violations and found that

- Red-light running citations decreased by 18 to 67 percent.[40]
- Cameras at two locations were retired after daily violations decreased from 114 and 121 to less than three per day each.[41]

A two-year evaluation of red-light camera effectiveness in Seattle, Washington, covered six approaches at four intersections and found that red-light violations decreased by about 44 percent after one year and 59 percent after two years.[42]

A study of red-light camera enforcement in northeastern Virginia compared violation rates between the first and second three-month periods of implementation.[43] It found that red-light camera citations were 21 percent less in the second three months than they had been during the first three.

An international canvass of red-light camera evaluations included violation comparisons for 11 cities. Findings showed that violations declined by between 21 and 75 percent with an average of 46 percent.[44]

The city of Philadelphia implemented a two-phase program to reduce red-light running.[45] First they lengthened the yellow signal interval; then they added six red-light cameras. A study by IIHS found that

- Violations declined by 36 percent with the lengthened yellow interval.
- Red-light camera enforcement reduced the remaining violations by 96 percent.

An IIHS review of international red-light cameras studies revealed that the cameras reduced red-light running violations by 40 to 50 percent.[46] Another IIHS evaluation found that during the first four months of camera use in Oxnard, California, violations declined by about 42 percent.[47]

CONCLUSIONS

The findings described above are the results of many different evaluations performed on differing data of differing sample sizes for differing types of intersections using different evaluation methods. However, the trends are quite clear and undeniable, even if the numerical values may not be fully certain.

If installed at locations with significant red-light running crashes and/or violations, over a group of intersections, red-light cameras

- Substantially reduce red-light violation rates;
- Reduce crashes that result from red-light running;
- Usually reduce right-angle collisions;
- May result in an increase in rear-end collisions;
- May or may not reduce total crashes but rarely result in a substantial increase; and
- Usually reduce crash severity by virtue of reducing the more severe right-angle crashes while sometimes increasing the less severe rear-end collisions.

Red-light cameras are to aid enforcement and should not be considered a substitute for proper traffic engineering of signalized intersections. If a signalized intersection has been analyzed and all reasonably practical measures have been taken to help drivers see the signals, and if red-light running still persists, increased enforcement by red-light cameras or other means will likely be effective. ■

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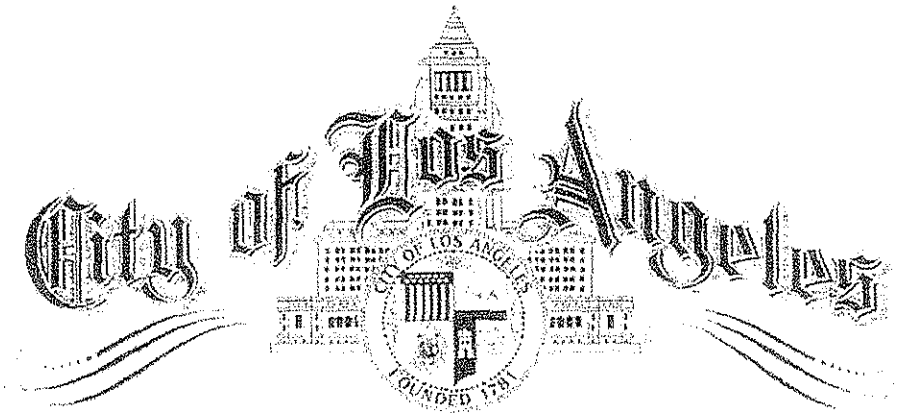


WENDY GREUEL
CONTROLLER

September 29, 2010

The Honorable Antonio Villaraigosa
The Honorable Carmen Trutanich
Honorable Members of the City Council

The City currently has 32 Photo Red Light cameras, which are designed to cite drivers who break the law by running red lights at intersections throughout Los Angeles. The program's stated primary objective is to improve public safety, by reducing accidents at the City's most dangerous intersections. The LAPD – which oversees the contract along with the City's Department of Transportation (DOT) - has reported that the cameras help to generate millions of dollars for the City, as photo red light violations cost drivers $446 per incident.

The attached audit of the City's Photo Red Light Program (PRLP) found that the program has not been able to document conclusively an increase in public safety due to incomplete data collection. In addition, over the past two years, the City has expended $2.6 million to support the PRLP without full cost recovery. Further, it appears that the red light cameras were not necessarily installed at the City's most dangerous intersections. In fact, the methodology used to select the intersections actually excluded some of the highest risk intersections. This included allowing for at least one red light camera per Council District, weak infrastructure at some locations and not wanting to conduct the additional analyses required for State controlled-locations.

For example the LAPD did not select two intersections – La Brea Avenue & 6th Street, and Hayvenhurst St. & Nordhoff Ave. – where there were a combined 24 accidents and 2 fatalities from 2003-2005. However, they did select Whittier Blvd. and Lorena Street where there were only 2 accidents and no fatalities. If public safety is the number one priority of the PRLP, then the LAPD should select only the most dangerous intersections.

It is important to note that, according to the LAPD, there have been some significant accomplishments of the program. Our audit found that for drivers who dispute their citation through a court trial, less than 1% of the trials end in a "not guilty" verdict. Further, there have been no fatalities at monitored intersections since the current contract was implemented in 2006.

Some of the specific audit findings include:

ATTACHMENT 3

- The PRLP has not conclusively shown to have increased public safety.
    - According to the LAPD's own statistics, 12 of the 32 intersections actually had more accidents after the cameras were activated, 4 had no change and 16 had fewer accidents. However the number of accidents that occurred over the time frame they examined was so small the differences were nearly insignificant.
    - Other factors may have also been responsible for the collisions at the 16 intersections, such as an overall reduction in accidents throughout Los Angeles due to fewer people driving during the economic downturn.

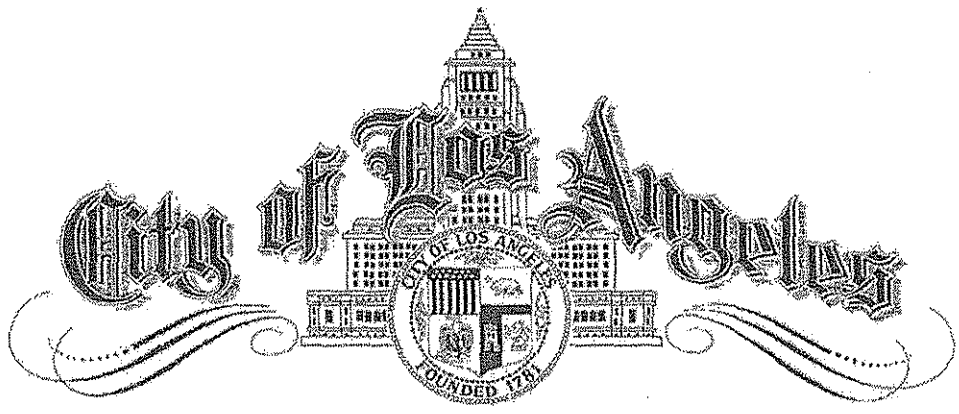
- Rather than choosing PRLP locations based on the highest number of accidents, it appears that other factors including the decision to place at least one camera in every Council District determined where cameras were placed.
    - LAPD and DOT agreed that several political issues were considered in the program implementation. LAPD stated that the City Council "strongly recommended that each {Council} district should have at least one PRL intersection."
    - For some locations, such as City streets that are also State highways (Santa Monica Blvd.), the State requires that an engineering analysis be performed prior to applying for approval of an automated enforcement system. The LAPD believes that the additional time and expense that would be necessary to get approval from the State was not justified for the PRLP. However the California State Auditor said in a July 2002 audit that cities should not omit intersections that require State approval when public safety would benefit.

- Currently the PRLP has cost the City more than $2.6 million to operate over the revenue received.
    - Even though the PRLP costs the City money, not having the cameras would require over 100 motor officers, with combined salaries of more than $10 million to monitor the 32 intersections constantly.

The current PRLP contract is in its final year, and the LAPD is about to issue an RFP to execute a new contract in 2011. It is critical that lessons are learned and improvements are made so that the new contract assures the City's financial interests are protected. In addition, LAPD should ensure effective use of program resources and monitor the program results to maximize public safety.

Sincerely,

Wendy Greuel
City Controller



WENDY GREUEL
CONTROLLER

September 29, 2010

Charlie Beck, Chief of Police
Los Angeles Police Department
100 West First Street, Suite 1072
Los Angeles, CA 90012

Dear Chief Beck:

Enclosed is a report entitled "Audit of the Photo Red Light Program." A draft of this report was provided to your Department on July 2, 2010. Comments provided by your Department and by the Department of Transportation at the July 30, 2010 exit conference were evaluated and considered prior to finalizing this report.

Please review the final report and advise the Controller's Office by October 29, 2010 on planned actions you will take to implement the recommendations. If you have any questions or comments, please contact me at (213) 978-7392.

Sincerely,

FARID SAFFAR, CPA
Director of Auditing

Enclosure

cc: Reverend Jeff Carr, Chief of Staff, Office of the Mayor
Eileen Decker, Deputy Mayor, Office of the Mayor
Richard A. Roupoli, Deputy Chief & CO, Special Operations Bureau, LAPD
Rita L. Robinson, General Manager, Department of Transportation
Miguel A. Santana, City Administrative Officer
June Lagmay, City Clerk
Gerry F. Miller, Chief Legislative Analyst
Independent City Auditors

City of Los Angeles
Office of the Controller

Audit of the
Photo Red Light Program

September 29, 2010

Wendy Greuel
City Controller

TABLE OF CONTENTS

Audit of the Photo Red Light Program

EXECUTIVE SUMMARY

The Office of the City Controller has completed an Audit of the City's Photo Red Light Program. This program automates the enforcement of traffic laws that require vehicles to stop at red signal lights, and is currently in effect at 32 intersections throughout the City of Los Angeles.

Background

The Photo Red Light Program (PRLP) is an enforcement approach to increasing traffic safety, which began as a pilot program in December 2000. The Los Angeles Police Department (LAPD) is the program sponsor and contract administrator, and works in partnership with the Los Angeles Department of Transportation (LADOT) in managing the program.

LAPD works closely with the contracted vendor, which was Nestor Traffic Solutions, Inc. until September 2009, at which time the current vendor, American Traffic Solutions, Inc., stepped in to fulfill contract requirements.

LAPD's stated goal of the Photo Red Light Program is "to increase intersection safety by reducing the number of serious injury and fatality traffic collisions caused by motorists who fail to stop for red lights and to maximize red light enforcement through efficient use of police resources."

LAPD has previously reported that the PRLP has had a significant impact on public safety, measured as a reduction in traffic collisions and fatalities, and has generated significant revenue.[1] During 2009 LAPD issued approximately 45,000 citations through the PRLP, which according to LAPD represented over 22% of the moving violations citywide. A red-light violation carried a fine of $446 as of fieldwork completion.

The overall objective of our review was to assess the efficiency and effectiveness of the City's management of the PRLP. We sought to determine how the City ensured adequate performance by the vendor, and how the City evaluates the status, problems or successes of the program. We also reviewed leading practices and those in use by other jurisdictions, and assessed whether the City achieves the program's goal of reducing traffic collisions. The audit was conducted in accordance with Generally Accepted Auditing Standards and covered the three-year period ended October 31, 2009, though we considered the conditions and some data through March 2010.

[1] Board of Police Commissioners report nos. 09-0304, 10-0067, & 10-0122, dated July 17, 2009, February 2, 2010, & March 23, 2010, respectively.

Summary of Audit Results

We found that the program cannot conclusively demonstrate that it has reduced traffic collisions, thereby increasing public safety. While the PRLP offers less expensive and less dangerous enforcement of red light violations than traditional field officer enforcement, the lack of specific metrics for reporting program success and the method by which program locations were selected, whereby some high risk intersections were eliminated, detract from its ability to clearly demonstrate a significant improvement to public safety.

In addition, we noted that the PRLP does not currently generate revenue in excess of costs for the City. Considering the actual PRLP citation revenue received compared to City resources dedicated to the program, the City actually incurred a net cost of more than $1.5 million in 2008 and $1 million in 2009 to operate the Photo Red Light Program. It is essential that before the City allocates additional resources to the program, it must define the specific outcomes that are expected to be achieved. Therefore, the City must clearly demonstrate how the PRLP will increase safety through enforcing drivers' compliance with traffic laws. By considering additional issues in determining when to issue a citation, and through legislative action, there may be opportunities to increase program revenue and more closely tie penalties to the relative danger of the violation.

We found that the current vendor is performing adequately and LAPD's oversight was generally appropriate. However, we noted certain shortcomings in the contract terms and program oversight that require management attention. For example, LAPD should consider additional controls to ensure completeness of all data maintained by the vendor. The City intends to release an RFP and issue a new contract, with potential for expansion to additional intersections. In selecting a vendor and negotiating a new contract, the City must ensure the City's financial interests are adequately protected.

Key Findings

- **The method used to select PRLP locations eliminated some high risk intersections.**

  LAPD initially identified intersections with the highest number of collisions for consideration in the program. However, other factors also played a role in final selection which may ultimately reduce the program's effectiveness. LAPD recommended a fairly even distribution of monitored enforcement citywide, so each Council District was allocated at least one PRL location. Also, due to funding constraints, locations that lacked the stronger steel poles necessary for installation of the PRLP equipment were not considered. Finally, locations that would have required State approval were also not considered. This resulted in the City not installing automated red-light cameras at some intersections with a higher and disproportionate number of collisions than others that were selected.

- **Location decisions did not involve engineering analyses to formally document the City's consideration of other, non-enforcement solutions that may have a more direct impact on public safety.**

  Although LADOT provided significant input to LAPD regarding which intersections to include in the PRLP, they did not document how other engineering solutions had been considered to support a conclusion that an enforcement solution would have the maximum impact on public safety. When considering new locations for an expanded PLRP, the City should consider utilizing a standardized engineering analysis template for this purpose.

- **As measured and reported by LAPD, the PRLP has not conclusively shown to have increased public safety.**

  LAPD has reported program results based on statistics tracked by their internal databases which were incomplete and did not include information such as collision type (e.g., broadside or rear-end), the direction and speed of vehicle, and time into red, which may impact reported program results.

  LAPD has focused their attention on reporting PRLP success by tracking collisions which were specifically caused by a red light violation, because those are the stated target of enforcement efforts. However, not all collisions result in a LAPD report, and the coded data within LAPD's traffic databases is insufficient to support a full analysis of all collisions that could be impacted by the program. A more comprehensive and systematic approach to evaluating the PRLP is needed. This could include tracking other information in addition to the cited violation considered as the primary collision factor, as well as measuring the change in both collision and violation rates over time.

- **The assessment of the program's effectiveness as reported by LAPD is questionable since LAPD did not consider other factors that may be responsible for a reduction in traffic collisions.**

  There has been a wide fluctuation in reported collisions at PRL intersections attributed to the program, starting from the high of 107 in 2004, gradually declining to a low of 30 in 2008, then rising again to 46 in 2009. While those figures should not be considered as the sole measure of the program's success, LAPD has also not considered or reported other factors that may have had an impact on the number of collisions. For example, citywide traffic collisions have declined by 14% over the past two years. At a minimum, variations in traffic volume should be considered when reporting the ratio of traffic collisions as well as violations.

- **The Program's operating costs exceed Program revenue.**

  Our audit disclosed that the PRLP has not provided additional revenue to the City. Because the City's share of citation revenue is only about one-third of the fine amount,[2] and many citations are either never paid or adjudicated without a payment due, we found the City received only $2.3 and $3 million from the PRLP during 2008 and 2009, respectively. When compared to a conservative estimate of the costs incurred by the City to implement the program, the PRLP actually cost the City approximately $1.5 million in 2008 and $1 million in 2009.

- **All PRLP violations were assessed a $446 fine regardless of the relative danger of the violation.**

  The PRLP is considered an enforcement solution to modifying risky driver behavior, thereby increasing traffic safety. However, all violations captured by the PRLP are cited under the same CVC that requires a significant monetary penalty. LAPD does not consider the relative danger of the violation, and its potential impact to safety, in assessing the citable offense. These include slower, right-turn violations and the elapsed time into red of the vehicle. Recent action by the State legislature will reduce the fine for right-turn on red violations.[3]

- **State law and recent legislative changes could significantly reduce City revenue related to the PRLP.**

  The State regulates traffic laws through the California Vehicle Code, and has additional limitations on the use of automated enforcement technology in assessing fines and penalties. Recent actions by the State legislature further limit cities' authority relative to PRLP. The City has no authority to cite violations under a municipal ordinance, and cannot use PRLP evidence to cite other moving/safety violations. In addition, the penalty amount for right-turn violations, which represent the majority of PRLP citations, has recently been reduced.

- **In anticipation of a new contract for the PRLP, the City must address key contract terms and ensure diligence in vendor selection to protect the City's financial interests.**

  The current contract is in its final year; LAPD just received approval to issue an RFP and execute a new PRLP contract in 2011. As the PRLP equipment is proprietary and the City intends to expand the program to additional locations, the new vendor will upgrade and replace all equipment, as well as design and install the needed infrastructure on City property. Based on lessons learned when the previous vendor (Nestor)

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[2] $157 of the $446 total fine, not including a $64 traffic school fee.
[3] AB 909 passed the Senate 8/12/10 and Assembly 8/25/10.

had financial difficulties and was subsequently acquired by a third-party (ATS), and the fact that the City plans to shift new construction responsibilities to the vendor, LAPD should work closely with the CAO and City Attorney to assure the City's financial interests are protected.

These issues and related recommendations are presented in more detail in the remainder of this report.

Review of Report

We discussed audit issues with LAPD, LADOT, and ATS during fieldwork, and provided a copy of our draft report to LAPD. We held an exit conference with representatives of LAPD and LADOT on July 30, 2010, and considered their extensive comments as we finalized this report.

LAPD disagrees with our emphasis on the need for better data and analysis to measure PRLP success. They cite reports in technical studies that generally identify public safety benefits from municipal PRL systems. They were concerned that the additional costs involved in gathering and analyzing data—even data generated by the PRLP—were unnecessary because PRLP in general improves public safety.

Our audit disclosed a need for improved understanding of how well the method of intersection selection worked and which aspects of PRL enforcement produce the most public safety value for the resources invested. There is also a need to better identify which collisions relate to PRL enforcement and how to interpret trends in PRL collision data.

LAPD also disagreed with the result of our financial analysis of the program. LAPD believes that potential future collections on outstanding citations should be considered.

Though some outstanding citations may eventually be paid, under the City's current accounting practices, related receipts would be considered in that period. In addition, our review of Court data noted that only 3% of payments were for citations issued beyond the prior 12-months; therefore, future collections of long-unresolved tickets cannot be assured or quantified. Also, the City's ability to collect on these citations is questionable, since unresolved PRL citations do not result in a DMV hold being placed on the defendant's driver's license or vehicle registration, as was assumed by LAPD until this audit. Thus, there is little leverage to compel a future payment, which would improve the longer-term collection rate of these citations. Until the issue of legal leverage or improved collection procedures by the Court is resolved, the actual citation payment history should be considered indicative of the program.

We would like to thank the staff of LADOT, LAPD, and ATS for fully cooperating and providing information relative to this review.

CONTROLLER'S ACCOUNTABILITY PLAN

RECOMMENDATIONS	PAGE	MAYOR ACTION REQUIRED	COUNCIL ACTION REQUIRED	DEPARTMENT ACTION REQUIRED
1. LAPD and LADOT should increase transparency for an expanded PRLP by publicizing how the location selection process will ensure that the highest risk intersections are selected for the program. In addition, LAPD and LADOT should list intersections that meet published criteria, on their websites.	21			LAPD LADOT
2. LAPD and LADOT should obtain CalTrans approval to automate enforcement of intersections that meet selection criteria.	21			LAPD LADOT
3. LAPD and LADOT should seek funding for necessary infrastructure modifications at intersections that meet selection criteria.	21			LAPD LADOT
4. For any new intersection recommended in an expanded PRLP, LADOT should complete an engineering analysis template to formally document consideration of all appropriate countermeasures, and to support the recommendation that automated enforcement would have the greatest impact to improving public safety at that location.	25			LADOT
5. LAPD should modify the method by which the PRLP is evaluated by ensuring complete and relevant data that supports the type of enforcement, i.e., right turns or straight-through violations.	30			LAPD

RECOMMENDATIONS	PAGE	MAYOR ACTION REQUIRED	COUNCIL ACTION REQUIRED	DEPARTMENT ACTION REQUIRED
6. Over the long term, LAPD should pursue the full implementation of the planned integrated system to electronically record all relevant collision information, making it more easily accessible for data analysis and program evaluation.	30			LAPD
7. In the short-term, LAPD should expand their data collection from collisions at PRLP intersections. Rather than relying solely on key data fields captured by division databases, consider the information included in written collision reports and video images of the collisions that may be captured by the PRLP system, for example: ▪ Collision type (broadside, rear-end, etc.) ▪ Time into red ▪ Speed of the vehicle ▪ Movement preceding collision ▪ Feet from the intersection	30			LAPD
8. Because the PRLP seeks to modify risky behavior by ensuring compliance with traffic laws, LAPD should also assess the program results in terms of the rate of violations or citations issued through the PRLP by intersection approach. An expected outcome for a successful program would show that violations at a given location decrease over time.	30			LAPD

RECOMMENDATIONS	PAGE	MAYOR ACTION REQUIRED	COUNCIL ACTION REQUIRED	DEPARTMENT ACTION REQUIRED
9. In coordination with LADOT, LAPD should consider, at a minimum, the effect of traffic volume in the comparative metric in reporting and measuring program results. Specifically: a. The number or ratio of traffic collisions at monitored intersections (considered through implementation of recommendations 6 and 7) compared to the number of vehicles transiting a single approach. A successful program outcome would note a decline in the adjusted ratio. b. The number or ratio of violations at monitored intersections (considered through implementation of recommendation 8) compared to the number of vehicles transiting a single approach. A successful program outcome would also note a decline in the ratio.	34 35			LAPD
10. LAPD and LADOT should consider departmental priorities along with the expected outcomes of the PRLP in allocating resources to the program.	41			LAPD LADOT
11. Council should direct LAPD and the CLA to promote legislative action at the State to amend the CVC so that fines for red light violations reflect current technology and are proportional the to the level of danger (e.g., graduated fines, etc.).	43		X	LAPD

RECOMMENDATIONS	PAGE	MAYOR ACTION REQUIRED	COUNCIL ACTION REQUIRED	DEPARTMENT ACTION REQUIRED
12. LAPD should include a requirement in a new PRL contract for the vendor to serially number events so that LAPD review can easily detect any missing event numbers.	49			LAPD
13. LAPD should continually store their own log of all citations approved for issuance and periodically compare that log with the vendor's notification to the Court of citations mailed to registered owners and entered into the Court system.	49			LAPD
14. LAPD should include a requirement in the new PRL contract for the vendor to produce a comprehensive quarterly status report on each citation processed. For example, based on citation number, the status report could show the judicial and payment status of all citations previously and newly issued, broken out by month and year, and reconciled with the prior report.	49			LAPD
15. In negotiating the new contract for the PRLP, LAPD should seek competent counsel to protect the City's interests. Ensure issues regarding asset ownership, construction costs, and any related program delays due to construction, are specifically included in the contract terms.	51			LAPD

RECOMMENDATIONS	PAGE	MAYOR ACTION REQUIRED	COUNCIL ACTION REQUIRED	DEPARTMENT ACTION REQUIRED
16. LAPD should work with the City Attorney and the CAO in ensuring the selection process and contract terms fully protect the City's financial interests.	52			LAPD City Att'y CAO

INTRODUCTION AND BACKGROUND

The City of Los Angeles Photo Red Light Program (PRLP) of automated enforcement is a cooperative effort between the Los Angeles Police Department (LAPD) and the Los Angeles Department of Transportation (LADOT), who together oversee the contracted provider of the system.

The City executed a PRLP contract with Nestor Traffic Systems, Inc. (Nestor) on February 6, 2006; however, in September 2009 American Traffic Solutions, Inc. (ATS) acquired Nestor and assumed all duties under the current contract. The automated enforcement system currently operates at 32 intersections distributed throughout the City.

Automated enforcement of red signal lights is a process of systematically detecting, photographing, identifying, and citing violators using electronic equipment provided and maintained by an outside vendor. A sworn officer issues each citation by reviewing video and photographic evidence on a computer monitor, using proprietary software provided by the vendor.

Once approved by LAPD, the vendor prints and mails each citation and electronically transmits the citations to the Los Angeles Superior Court. During this adjudication phase the vendor staffs a hotline to answer questions about the citation process and to afford citation recipients the opportunity to review photographic or video evidence of the violation.

Goal of the PRL Program

According to the LAPD, the goal of the PRLP is to increase intersection safety by reducing the number of serious injury and fatality traffic collisions caused by motorists who fail to stop for red lights and to maximize red light enforcement through efficient use of police resources. Drivers may fail to stop for red signal lights for a variety of reasons, including temporary distractions and aggressive driving behavior.

Theoretically, public safety improves as drivers who are aware that red light cameras monitor an intersection modify their behavior to avoid the negative consequences of a citation and the related photographic evidence. A sentinel effect from this awareness can also result in modified driving on approaches to the same intersection that are not monitored, and even for other intersections.

PRL enforcement is one tool to reduce red light violations and related traffic collisions. Other industry established methods include appropriate intersection design, enhanced signage or pavement markings, extended yellow or red light timing and other traffic engineering solutions, as well as public information campaigns.

From Violation to Collection: How the PRLP Works

The City's PRL camera system typically monitors two opposing approaches to an intersection, primarily for straight-through or right-turn traffic.

For each monitored approach, the PRL system digitally records video and photographic evidence of red light violations or "events." The system digitally transfers and stores this evidence on remote ATS servers for processing. ATS visually reviews each event and determines whether it meets preliminary violation criteria and, if so, uses the license plate number to obtain registration and driver information from the California Department of Motor Vehicles (DMV).

For events that meet stated criteria, ATS composes a tentative citation and forwards it, along with the supporting video evidence, to a dedicated computer at LAPD. The California Vehicle Code (CVC) requires a sworn officer to approve the citation before the vendor submits it to the Court or to the registered owner of the vehicle.[4]

The LAPD officer's responsibility is to evaluate the video evidence of a violation, the legibility of the license plate, and whether the images are adequate to identify the driver. If so, and if in the officer's discretion a violation occurred, then the officer electronically approves a citation and ATS notification is automatic. If the camera does not capture a legible image of a license plate or an identifiable image of the driver's face, the officer cannot issue a citation.

ATS processes approved citations by printing and mailing them to the registered owners and responding professionally to calls received. The citation provides instructions for mailing the bail or fine to the Los Angeles Superior Court, as well as procedures for contesting the citation, including reporting the identify of the driver of the vehicle at the time of the violation if it was not the registered owner, and when to appear in court.

The Court retains a portion of the citation revenue and distributes the remainder based on various statutes, paying portions to the City, the County, and the State.

The History of the PRLP in Los Angeles

The City initiated photo red light camera enforcement as a pilot program in December 2000. LADOT and contractor Lockheed Martin—who later transferred its interest to Affiliated Computer Services (ACS)—worked together to install cameras at 16 intersections.

In April 2004, due to the impending expiration of the contract with ACS to operate the pilot program, and due to a change in the law governing automated enforcement programs, the Police Department recommended issuing an RFP for

[4] CVC §21455.5(c)(2)(F) and §40518

a new contract. In an effort to maintain continuity of service, the contract with ACS was extended for an additional year, until June 14, 2005.

In May 2004 the Police Department issued an RFP with a July 7, 2004 deadline for receipt of proposals. Six proposals were received, and a committee consisting of personnel from LAPD and LADOT rated the proposals based on cost, past performance, technical requirements, vendor technical competence, and additional considerations. Nestor Traffic Systems was selected.

In January 2005 the Board of Police Commissioners authorized the Chief of Police to negotiate a contract with Nestor, and in August 2005 the Commission approved the contract for Mayor and Council consideration. Council approved the contract on November 18, 2005, and it was executed on February 6, 2006 for a 3-year term, with options to extend for two additional 1-year terms.

According to LAPD, on June 4, 2009, the City was notified that Nestor filed for an appointment of a receiver in Superior Court in Providence County, Rhode Island.[5]

After Nestor entered financial receivership, ATS acquired and dissolved Nestor as a separate company. ATS then stepped in to fulfill contract requirements while working closely with LAPD. On March 30, 2010, Council approved the contract's formal assignment to ATS, and extended the current term through June 30, 2010. A second action extended the term through April 2011.

LAPD received authorization to issue a new RFP in 2010, and execute a new contract in 2011. LAPD also plans to expand the program by increasing the number of PRLP intersections, and due to budgetary constraints at LADOT, the selected vendor would bid to design, construct and install all necessary infrastructure at the new intersections.

Site Readiness, Installation and Functionality of Equipment at Intersections

Installation of PRL cameras and related equipment at 32 intersections around the City required engineering design work for each location. Each selected site was unique, with differing street geometry, slopes, sub-surface objects, street and adjacent-property surface material, speed limits, and unique and active traffic control equipment and infrastructure.

LADOT worked with Nestor to modify existing engineering drawings that LADOT then used to modify each intersection. PRL camera angles and the positioning of strobe lights and the system controls required careful evaluation of the pre-existing infrastructure to ensure a successful outcome.

LADOT took responsibility to modify pre-existing infrastructure in order to provide Nestor with physical attachment points for cameras, flash units, and a control cabinet. LADOT also constructed improvements necessary to provide power for

[5] Board of Police Commissioners 09-0304.

the system and data interconnectivity among system components. It was Nestor's responsibility to install cameras, flash units, and the control cabinet, and to test, activate, and maintain the PRL system.

Once the construction process ended, activation of the PRL camera system required testing, adjustment, and re-testing. On an ongoing basis, an LAPD officer visits each PRL intersection to visually inspect the equipment. On an annual basis LAPD, LADOT, and ATS representatives visit each intersection and certify that the operation of the equipment complies with State law.

Continual remote electronic monitoring of camera performance and outputs ensures functionality. When a technician performs any maintenance of equipment at a PRL intersection, the technician makes a manual entry in a paper log kept separately in ATS control boxes at each intersection. LAPD, LADOT, and ATS meet each week to resolve issues and ensure peak system performance.

The Finances of the Photo Red Light Program

LAPD, as administrator and process-owner of the PRLP, strongly affirms that the primary purpose of the program is to improve public safety, not to increase City revenues. However, critics of PRLP generally frame the program as driven by cities' desire to generate revenue. Revenue is the City's share of fines and penalties paid to the Superior Court by violators. As of fieldwork completion, the bail or penalty for most red light violations was set at $446 by State law.

The citation amount is calculated first on a base fine, upon which additional fees and penalties are calculated, based on various statutes. The CVC empowers the California Judicial Council to publish a statewide penalty schedule, but allows local courts to make modifications.

NOTABLE ACCOMPLISHMENTS

LAPD reports no fatalities at monitored intersections since the implementation of the current contract in April 2006, compared to five red light related fatalities in the prior two-year period for the intersections selected for automated enforcement.

The Police and Transportation Departments have successfully worked with contracted PRLP vendor, both Nestor Traffic Solutions, Inc. and American Traffic Solutions, Inc., to meet the contractual evidence quality standard.

LAPD also reported that for drivers who chose to dispute their citation through a court trial, the high quality of photographic evidence resulted in less than 1% of court trials ending in a "not guilty" verdict.

PRLP evidence can also potentially be of assistance in solving crimes, or in determining fault when collisions occur. LAPD also uses photographic evidence to verify compliance by sworn officers with traffic policies and procedures. For example, officers who violate LAPD policy by not wearing a seat belt in their patrol car can face disciplinary action.

LAPD also reported a vibrant outreach to the community and to other agencies. This includes participation in community-police advisory board presentations, safety fairs, conducting training for sworn officers of other agencies, and publishing articles in trade journals or making presentations to trade groups.

OBJECTIVES, SCOPE AND METHODOLOGY

The primary objective of our audit was to determine the efficiency and effectiveness of the City's oversight and management of the automated Photo Red-Light Program (PRLP). Specifically:

- To determine how the City performs or otherwise ensures adequate oversight and monitoring of contractor performance.
- To assess whether the City efficiently and effectively evaluates the status, problems, failures, or success of the PRLP.
- To assess whether the City efficiently and effectively recommends necessary actions to achieve the PRLP's goal of reduction in traffic collision[s].
- To assess whether the City has implemented best practices found in other comparable governmental agencies with a PRLP.

The audit scope included the 3-year period ended October 31, 2009, but we also considered current conditions and some data through March 2010. We specifically focused on evaluating how LAPD and LADOT appropriately ensure vendor performance in accordance with the contract, and how program managers review, evaluate, and communicate the program's results; including making specific recommendations to maximize the City's goals and objectives for the program. Our fieldwork was conducted during the period November 2009 through May 2010.

This audit was conducted in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

In conducting our audit, we reviewed and analyzed applicable policies and procedures; reviewed and analyzed documentation and studies prepared and conducted by the City and by other jurisdictions; and interviewed management and staff at the Police and Transportation Departments and at American Traffic Solutions, Inc.

SECTION I:THE PROGRAM'S IMPACT ON PUBLIC SAFETY

Finding #1: The method used to select the 32 locations for camera enforcement eliminated some high risk intersections.

LAPD's stated goal of the PRLP is "to increase intersection safety by reducing the number of serious injury and fatality traffic collisions caused by motorists who fail to stop for red lights and to maximize red light enforcement through efficient use of police resources." To achieve the goal relative to intersection safety, after considering all other solutions, automated enforcement should focus on intersections based on the number and nature of traffic collisions per vehicle transiting an intersection.

LAPD's PRL intersection selection process started by examining major-intersection collision data for the years 2003-2005. LAPD considered those collisions that were caused by red light violations, excess speed, following too closely, inappropriate left-turn, and DUI. LAPD stated that based on traffic collisions, and working in conjunction with LADOT, they first narrowed that down to approximately 200 intersections for consideration.

LAPD indicated they further narrowed the list to 88 intersections—22 in each Bureau—by talking with traffic officers and their supervisors or other experienced LAPD or LADOT personnel. For each of those 88 intersections, LAPD or LADOT personnel visited each location and completed a Proposed Intersection Field Checklist that LAPD and LADOT then used to narrow the total number of PRL intersections down to 32.

Among the factors that influenced decision-making (not in any priority order) were: 1) the Council District, 2) whether existing poles supporting signal lights were of (weaker) concrete or (stronger) steel, and 3) whether an intersection required State approval for PRL enforcement. While the location (Council District) played a significant role in prioritizing locations, the other two simply eliminated some locations from consideration. These criteria demonstrate that issues other than strictly public safety played a role in determining the program locations.

Exclusions due to Perceived "Citywide" Program

LAPD emphasized the importance that the public perceive automated Photo Red Light enforcement as a citywide program. PRL cameras were to be located in all areas of the City, with the expected result of moderation of driver behavior citywide. Stating it was important to garner maximum Council support for the PRLP, LAPD used the Council District (CD) where an intersection was located as a criterion. Therefore, of the 32 intersection locations, each CD was apportioned at least one camera, which required the exclusion of some intersections with a

higher number of collisions or fatalities. Exhibit 1[6] presents the current PRL locations throughout the City.

LAPD stated that if safety alone, as measured by the number of collisions at each intersection, had been the deciding criteria, it would have resulted in an uneven distribution of PRL cameras throughout the City; which would have resulted in a very negative public perception of the program.

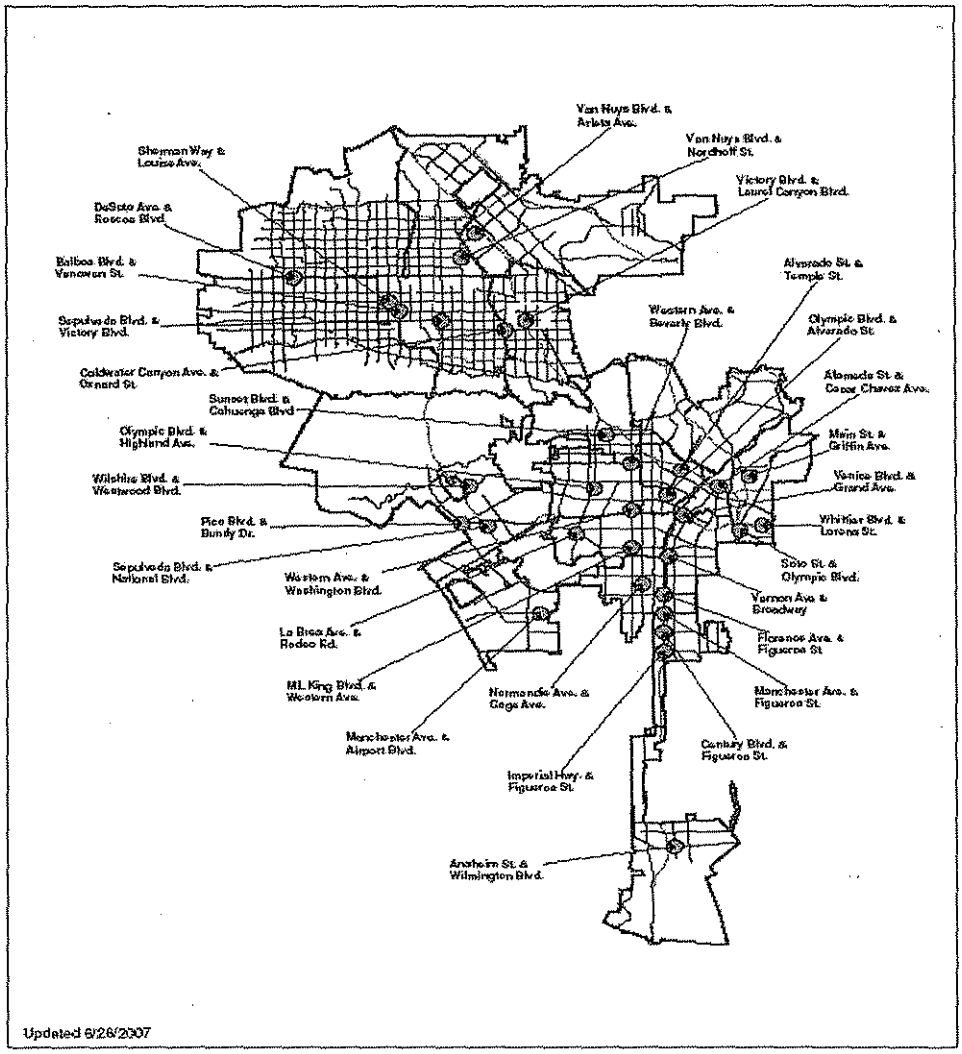
Both LAPD and LADOT agreed that several political issues were considered in the program implementation. LAPD stated the City Council "strongly recommended that each [Council] district should have at least one PRL intersection," but went on to explain that this was not a written directive or formal motion, rather, was LAPD's understanding of the full Council's intent.

LADOT added that as the City considers expansion of the PRLP, new locations could be added primarily based on safety concerns.

[6] http://www.lapdonline.org/search_results/content_basic_view/1022

Exhibit 1

City of Los Angeles
Photo Red Light Locations



Exclusions based on Limitations of Existing Infrastructure

The second factor limited the inclusion of some intersections due to funding constraints. LADOT recommended against selecting intersections with weaker concrete poles, rather than stronger steel poles, because of the high cost of replacing them. While LADOT agreed to fund some infrastructure internally, i.e., improvements that were required for the installation of the PRL equipment, LAPD and LADOT stated there was no funding available for any major infrastructure upgrade, which eliminated some intersections from consideration.

Exclusions based on Required Jurisdictional Approvals

LAPD also bypassed a strict public-safety approach to the selection of locations by not considering intersections in locations that required State approval, because of potential delays. For some locations, such as those adjacent to freeway ramps or where City streets are also noted as State highways, the State requires an engineering analysis[7] be performed prior to applying for approval of an automated enforcement system. Contradicting this approach, the California State Auditor recommended in a July 2002 audit that cities not omit intersections requiring State approval when public safety would benefit.

LAPD believes that the additional time and expense that would have been necessary to obtain an affirmative State opinion was not justified for the PRLP. Therefore, locations which would have required State approvals were eliminated from consideration.

LAPD described an example of their interaction with CalTrans relative to the PRLP, as discussions between a CalTrans Senior Engineer and the LADOT PRL Coordinator: CalTrans staff inquired about installing cameras on Santa Monica Boulevard at Gower Street to correct the existing collision history (Santa Monica Boulevard in this area is State Highway 2, subject to CalTrans authority). The LADOT representative stated they would consider this location only if the CalTrans Senior Engineer could get his supervisor, the CalTrans Deputy Director of Operations, to commit that if the City proposed PRL cameras at that location, then the proposal would be approved by CalTrans. No response was ever received from the CalTrans Senior Engineer.

This informal exchange does not reflect a determined approach to resolving issues of public safety. We would have expected to see high-level, formal correspondence between LAPD and CalTrans at this stage of a pilot program.

We discussed this issue with the Chief of the Permits section of CalTrans in Los Angeles who indicated that CalTrans is required to respond to "encroachment" requests for automated enforcement within 60 days. However, she stated that submissions routinely run into problems because applicants misjudge CalTrans requirements, leading to multiple 60-day response cycles. Nevertheless, the CalTrans Chief indicated that other municipalities have received permits for automated enforcement of State-controlled locations.

LADOT and LAPD considered a number of issues in selecting intersections for PRL enforcement. Though public safety was the primary goal of the program, LAPD stated they had to consider other logistical and practical factors, such as public perception, Council support, limited funding, and jurisdictional control. These considerations eliminated some locations from the program with higher numbers of collisions and injuries.

[7] This "engineering analysis" of an intersection is not to be confused with an "Engineering and Traffic Survey" described in the California Vehicle Code sections 627 and 40802.

For example, we noted that LAPD considered but did not select the intersection of La Brea Avenue and 6th Street for PRL enforcement. Between 2003 and 2005, that intersection had 11 traffic collisions where a red light violation was the Primary Collision Factor (PCF), and at least one fatality.

Another intersection not selected for automated enforcement was Havenhurst & Nordhoff, where LAPD reported thirteen traffic collisions with red light violations as the PCF, as well as one fatal and one serious injury collision.

Conversely, LAPD did select the intersection of Whittier Blvd. and Lorena Street, where there had been only two traffic collisions over the same time period where a red light violation was the PCF, and no fatalities or serious injuries.

These three locations are located in separate Council Districts. The exclusion of the first two resulted directly from ensuring a "citywide" coverage and the associated priority to install at least one, but generally two PRL systems in each Council District.

Recommendation:

1. **LAPD and LADOT should increase transparency for an expanded PRLP by publicizing how the location selection process will ensure that the highest risk intersections are selected for the program. In addition, LAPD and LADOT should list intersections that meet published criteria, on their websites.**

2. **LAPD and LADOT should obtain CalTrans approval to automate enforcement of intersections that meet selection criteria.**

3. **LAPD and LADOT should seek funding for necessary infrastructure modifications at intersections that meet selection criteria.**

Finding #2:Location decisions did not involve engineering analyses that formally documented the City's consideration of other solutions that could have a more direct effect on public safety than automated enforcement.

Both LAPD and LADOT seek to improve public safety, but they use different methods. LADOT works to reduce or avoid problems with better street design and traffic rules; while LAPD works to moderate driver behavior and increase driver compliance with traffic laws.

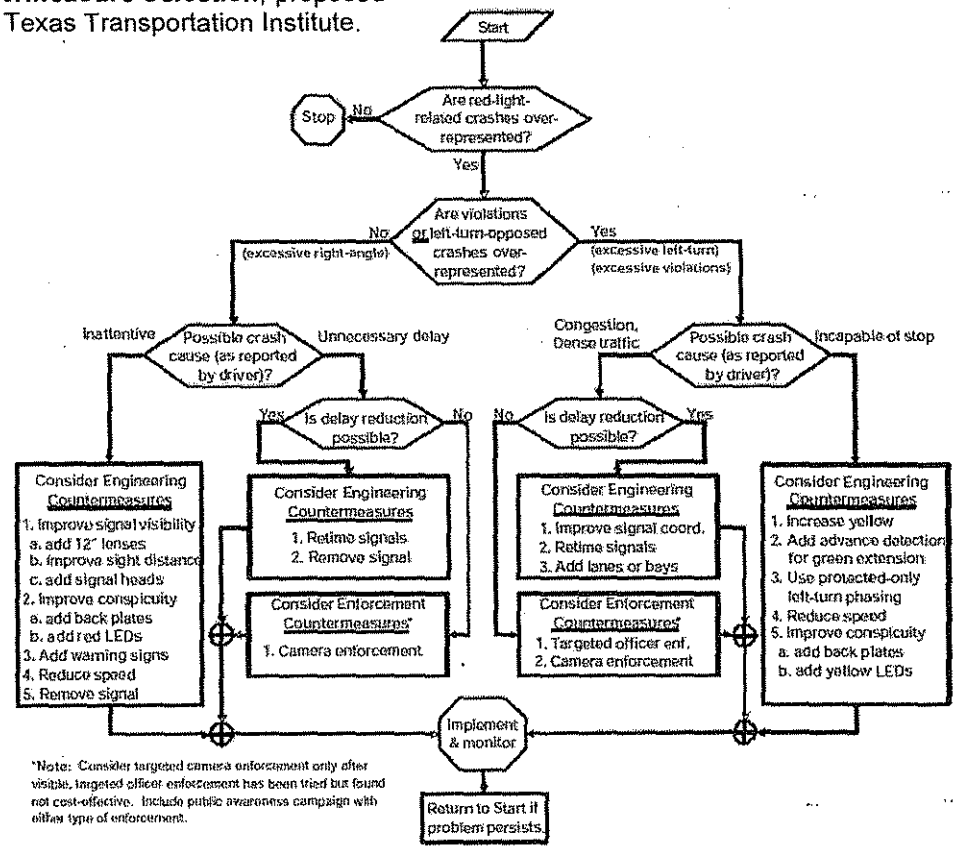
Best practices recommend that jurisdictions implementing a photo enforcement program consider first if other solutions would have a more direct impact to public safety, such as a change in approach speed, newer technology, or engineering redesign.

Traffic engineers who specialize in intersection design and signage should evaluate intersections for possible improvements and subsequently report continuing problems to law enforcement. Studies we reviewed suggest that a DOT engineering survey or evaluation should precede referring an intersection for automated enforcement. Any enforcement method should be the last resort for increasing public safety.

LAPD conducted field inspections of candidate intersections, and provided their preliminary ranking to LADOT for review. LADOT explained their role was to identify for deletion those intersections where PRL enforcement may not be appropriate, due to proposed engineering solutions and/or inherent physical site challenges. However, this process was informal and not documented. It should be noted that LADOT received no funding to participate in the intersection selection process.

A 2004 study sponsored by the Texas DOT and the Federal Highway Administration presented guidelines for identifying problem intersections and whether enforcement or engineering countermeasures are appropriate. The study stated that based on the data related to the violation's cause, either enforcement or engineering countermeasures would likely be of most benefit. The study also proposed a series of decision criteria, depicted by the flowchart in Exhibit 2, to determine when camera enforcement would be of most benefit.

Exhibit 2: ***Guidelines for Countermeasure Selection***, proposed by the Texas Transportation Institute.



The Texas Transportation Code states that a county, municipality, or other local entity authorized to enact traffic laws under the laws of the state (local authority) that wishes to install a red light camera system must take preliminary steps before the system can be installed for use. First, an engineering analysis of the approach to the intersection must be made to determine whether in addition to or as an alternative to the system, a design change to the approach or a change in signalization may reduce the number of red light violations. A completed Texas DOT engineering analysis template is specific for each location proposed for automated enforcement, and must detail:

- Intersection and Signal data (i.e., signal visibility; pavement and markings data, diagrams)
- Signal timing and traffic data (i.e., clearance intervals, controller settings, vehicle detection data, traffic volume data)
- Crash and enforcement data (i.e., specific type and severity of collision types, violation rates, enforcement and operational issues, etc.)

Engineering Safety Analysis Guidelines prepared by the Virginia Department of Transportation also require active involvement of traffic engineers and require completion of a similar engineering analysis template.

Virginia legislation also requires that localities submit a list of intersections for photo enforcement to VDOT for final approval. VDOT has established engineering safety analysis guidelines to assist jurisdictions in preparing photo enforcement request submittals. The engineering safety analysis should include a statement explaining why photo enforcement is proposed for a specific intersection, and also requires the engineering safety analysis to be stamped and signed by a licensed professional engineer.

As stated in Finding #1, the State of California also requires a formal engineering study be performed for State-owned intersections, prior to submission to Caltrans for approval of an automated enforcement system. Though a specific template is not provided, representatives directed auditors to a 2005 Institute of Transportation Engineers Field Guide for Inspecting Signalized Intersections to Reduce Red-Light Running, sponsored by the U.S. Department of Transportation.

LAPD and LADOT stated they worked together to identify and prioritize locations; however, neither could provide documentation noting the extent of LADOT's participation, or the outcome from the field visits to each proposed location. It should also be noted that LADOT resources dedicated to the PRLP are very low, namely 10% of one employee's time, versus the six full-time and two part-time LAPD employees.

A completed engineering analysis template provides a formal record that countermeasures have already been considered, and the jurisdiction has determined that there would be no additional benefit from implementing engineering solutions, and therefore concludes that an enforcement solution would have the maximum increase to traffic safety. Such potential countermeasures could include:

- Adding 'signal ahead' signs, with or without flashers; adding additional signal heads, e.g., one head over each lane; use LED lighting; 12-inch signal lamps and backplates, all designed to improve signal visibility

- Improving pavement markings and/ or pavement condition, including grade of approach.

- Ensuring appropriate clearance intervals (e.g., extended yellow light timing and all red intervals), evaluation of timing, phasing, and coordination with other intersections, an evaluation of loop detector locations, and intersection volume count for both the number of passenger cars and heavy vehicles.

LADOT representatives stated that they had not documented their meetings with LAPD or their internal processes during the intersection selection process, nor did they complete a written engineering safety analysis for each proposed intersection, citing a lack of funding for this endeavor.

LADOT asserts that they routinely incorporate proactive traffic engineering measures to maximize safety at intersections. LADOT stated that Los Angeles is at the forefront in implementing traffic signal upgrade programs and in responding to concerns at individual locations. In addition, LADOT stated their internally established rigorous traffic signal design guidelines meet or exceed requirements set forth in both the State and federal Manual on Uniform Traffic Control Devices, and therefore, many of the countermeasures recommended by the FHWA noted in Exhibit 2 have been the design standards used for years by LADOT.

Though LAPD led the process of selecting intersections for automated enforcement, LADOT's suggestions regarding which intersections to include (or exclude) were considered. For example, we noted that based on LADOT's recommendation, the intersection of Sunset Blvd. & Crescent Heights Blvd. was not included in the PRLP, despite a high number of collisions, because an engineering solution was being pursued. We observed the specific engineering drawings for that location dated October 2007 that showed signal improvements consistent with engineering countermeasures designed to improve intersection safety.

LADOT believes their current citywide procedures and their review of the proposed PRLP locations generally considered the applicability of possible countermeasures. Though LADOT's participation in the program is limited in terms of time and funding, a formal engineering analysis, or simply the completion of a standard recommended template for each location, would definitively document how engineering solutions were considered, and determined not to be more effective than photo enforcement in increasing safety at those locations. However, in considering new locations for an expanded PRLP, LAPD and LADOT should consider utilizing the template developed by Virginia and Texas for this purpose (sample template provided as Appendix D).

Recommendation:

4. **For any new intersection recommended in an expanded PRLP, LADOT should complete an engineering analysis template to formally document consideration of all appropriate countermeasures, and to support the recommendation that automated enforcement would have the greatest impact to improving public safety at that location.**

Finding #3: The data presented by LAPD in their evaluation of the Photo Red Light Program, is inadequate to show a significant increase in public safety.

LAPD has reported PRLP success by noting that no fatalities have occurred at intersections monitored in the PRLP since April 2006. LAPD also cites declining numbers of traffic collisions where a red light violation was the Primary Collision Factor (PCF) at PRLP intersections.

However, without a formal engineering survey, attributing these results solely to automated enforcement is questionable. For example, we learned that LADOT instituted an all-red phase at PRL intersections, along with the camera installation. That change alone could have made the intersection safer.

We noted other concerns regarding the completeness and type of data that is collected. Other factors that affect reported program results are not considered. Taken together, these issues cloud the value of reported outcomes.

Counting the number of traffic collisions (TC), fatalities, or severe injuries to measure progress towards LAPD's goal of increasing safety requires data. The information underlying collision data is gathered manually on paper forms, and the quality and comprehensiveness of information varies.

Officers record available details of traffic collisions on written collision reports. Information is obtained either at the scene of the collision, through later interviews, or by examination of written or physical evidence. The process is labor intensive, and includes multiple levels of review to help minimize errors.

The forms LAPD officers use for this purpose are primarily California Highway Patrol forms that provide a standardized way to record extensive information, when that data is available. After manual completion, LAPD enters some of the data into an LAPD database accessible citywide. LAPD also scans the hardcopy forms into a separate image database.

In addition, personnel at each of the four traffic divisions enter some of the data into different databases designed and maintained separately at each of the four traffic divisions. Although some divisions enter additional fields, the data collected is not standardized beyond the mandatory information required by the State. LAPD has historically reported PRLP results by summarizing collision data from these four separate ad hoc databases.

LAPD does not copy the Type of Collision from these forms into their databases. Collision types include head-on, broadside, and rear end, among others. Broadside collisions, also known as angle or t-bone collisions, are considered the most dangerous result of a red light violation, because of a side impact occurring between vehicles traveling at high speed. Ready access to this information would improve reporting on the outcomes of the PRLP.

Risk of Incomplete Data - Unreported Collisions

LAPD officers are unlikely to witness a traffic collision, though they will respond when or if they are called to the scene. However, even when responding they may not file a collision report.

Collisions are only included in the LAPD databases if a report is completed. Collisions where there is property damage only, and there is no crime involved (i.e., hit and run), do not meet LAPD reporting criteria. Although LAPD may be dispatched to such an incident, a report will generally not be taken. Also, motorists, passengers, or bystanders who are witnesses may not immediately inform LAPD of a collision, and therefore, no officer would be dispatched. Some individuals may instead report the collision to the California Department of Motor Vehicles or to the California Highway Patrol.

Even for those collisions reported to LAPD, patrol officers who do not specialize in traffic enforcement may arrive at the scene after parties to the collision or other witnesses have left or were transported for treatment of injuries. Therefore, an officer may lack adequate information for a complete report.

Risk of Not Measuring the Right Data

Historically, LAPD considers the following data, when assessing PRLP results:

- Location, i.e., if the collision occurred at an intersection with automated red light enforcement (*Note: all traffic collisions are assigned to the nearest intersection, regardless of the specific location along the block, on public street or private property, or the cause).*
- Primary Collision Factor. This is the California Vehicle Code (CVC) section a driver violated that was considered by the officer as the primary cause of the collision. Typically, in reporting program results, LAPD has reported collisions where the PCF is either 1) CVC 21453(a), running a red light; 2) 21801(a) Unsafe Left Turn; 3) 22350 Unsafe Speed; 4) 22107 Unsafe Turning Movement; 5) 21658(a) Unsafe Lane Change; 6) 23152(a) Driving Under the Influence; or 7) Following Too Close.

However, this method is also limited, since other PCFs that may have been relevant to the program, and the type and severity of the collision are not considered.

We noted that LAPD does not currently measure or report the number of right-angle or "broadside" collisions. Generally, studies we reviewed indicated that the prevention of right-angle collisions is regarded as the prime target in photo red-light programs, as other crashes (i.e. rear-end collisions) carry a lower risk of causing serious injury.

Another consideration is the ratio of late straight-through violations compared to violations that occur within the first second after the change from yellow to red.

PRL cameras measure violations to the thirtieth of a second, and make it possible to consider this criterion in evaluating intersections in the PRLP.

A newer, automated system for documenting traffic collisions has been in development for more than a year and is currently piloted in the Central Traffic Division. When fully implemented, this system could facilitate more precise analysis of collisions that involve red light violations at PRLP intersections. However, full implementation of that system is not assured.

The State of Texas noted similar data difficulties in a report on automated enforcement: *Development of Guidelines For Identifying And Treating Locations With A Red-Light-Running Problem*. That report states:

> There are several challenges to the accurate identification of red-light-related crashes. Such crashes are not explicitly identified on the crash report forms used by most states. As a result, the identification of red-light-related crashes requires a thorough review of the crash report with consideration given to the following crash attributes: contributing cause, crash type, traffic control, and offense charged. The officer narrative and crash diagram also provide important clues to the cause of the crash.
>
> Unfortunately, the narrative and diagram are rarely available in a coded crash database. This sole use of a coded database can lead to errors.

This accurately describes LAPD's coded traffic collision databases. Because much of the raw data is not available in a searchable format, obtaining comprehensive and quality information on traffic collisions at PRLP sites is difficult to produce.

We reviewed information provided by LAPD on traffic collisions at PRLP intersections over calendar years 2004 to 2009. We compared the summary results by intersection to the detailed collision data that we independently obtained from the four traffic divisions' databases. Exhibit 3 presents a summary of that data. Though we found no significant discrepancies in what LAPD had reported, based on concerns regarding the completeness and relevance of the data collected, the success of the PRLP cannot be judged solely on these reported statistics.

Exhibit 3

LAPD Traffic Collision Statistics related to the Automated Photo Red Light Program
Citywide Totals, based on the 32 Program Intersections

			LAPD Primary Collision Factor, considered "cause" of the Collision							
Year	Total T/C	% Change	Red Light 21453A	% Change	Left Turn 21801A	% Change	Speed 22350	% Change	FTC 21703	% Change
2004	376	N/A	107	N/A	122	N/A	107	N/A	40	N/A
2005	351	-6.6%	99	-7.5%	113	-7.4%	112	4.7%	27	-32.5%
2006	297	-15.4%	69	-30.3%	98	-13.3%	110	-1.8%	20	-25.9%
2007	302	1.7%	50	-27.5%	104	6.1%	111	0.9%	37	85.0%
2008	338	11.9%	30	-40.0%	130	25.0%	135	21.6%	43	16.2%
2009	322	-4.7%	46	53.3%	116	-10.8%	119	-11.9%	41	-4.7%
Total	**1,986**	**-9.2%**	**401**	**-63.1%**	**683**	**4.7%**	**694**	**16.0%**	**208**	**25.4%**

Note: % Change by year compares T/C counts to those in the prior year. The Total % Change over the five year period was calculated as the sum of T/Cs in 2004 and 2005, compared to sum of T/Cs in 2008 and 2009.

Media Report Prompted a More Detailed Analysis

In November 2009, an investigative reporter challenged LAPD statistics on PRLP results. LAPD disputed the reporter's findings and invested significant time and effort to conduct a more comprehensive analysis of traffic collisions than they had ever done before.

Specifically, an experienced traffic officer reviewed in detail images of the paper forms for all collisions of record that were classified at or near every PRLP intersection over the specified period. This new LAPD analysis showed mixed results: 12 out of 32 intersections had worse collision results in the six months after activation of PRL equipment compared to the six months before activation. Four had no change, and the remaining 16 noted a reduction in collisions. Exhibit 4 provides a summary of LAPD's more detailed analysis.

We reviewed the process and methodology LAPD used in their analysis, and found it would provide more comprehensive program information than had previously been reported.

However, it should be noted that since the total number of collisions was so small at most intersections, the results may be rendered meaningless. Most intersections had fewer than five collisions before or after activation of PRL equipment. Therefore, a difference of one collision either way could make an intersection look much better or much worse. Also, since some locations included in the program were not those with the greatest potential impact for improved public safety (as noted in Finding #1), the reduction in total collisions would not have been maximized.

LAPD intentionally limited this more comprehensive review of collisions at the 32 locations to a six-month before and after timeframe, in order to produce comparative results to the media report. Both LAPD and LADOT agreed with the auditors that these outcome results may not be reflective of the program as a whole. LAPD stated they would like to perform a full 2-year study; however, the additional efforts involved in that analysis would be significant.

Recommendations:

5. **LAPD should modify the method by which the PRLP is evaluated by ensuring complete and relevant data that supports the type of enforcement, i.e., right turns or straight-through violations.**

6. **Over the long term, LAPD should pursue the full implementation of the planned integrated system to electronically record all relevant collision information, making it more easily accessible for data analysis and program evaluation.**

7. **In the short-term, LAPD should expand their data collection from collisions at PRLP intersections. Rather than relying solely on key data fields captured by division databases, consider the information included in written collision reports and video images of the collisions that may be captured by the PRLP system, for example:**

   - **Collision type (broadside, rear-end, etc.)**
   - **Time into red**
   - **Speed of the vehicle**
   - **Movement preceding collision**
   - **Feet from the intersection**

8. **Because the PRLP seeks to modify risky behavior by ensuring compliance with traffic laws, LAPD should also assess the program results in terms of the rate of violations or citations issued through the PRLP by intersection approach. An expected outcome for a successful program would show that violations at a given location decrease over time.**

Exhibit 4

Los Angeles Police Department
Photo Red Light Collision Data
(+/-) 6 months from Activation Date

Source: Summarized results of LAPD detailed analysis, included in report to LAPD Commission dated March 9, 2010.

Intersection	Activation Date	Prior	After	Diff	% Change
La Brea / Rodeo	2006 Apr 04	6	4	-2	-33%
Victory / Laurel Canyon	2006 Jun 08	9	8	-1	-11%
DeSoto / Roscoe	2006 Aug 07	4	2	-2	-50%
Sepulveda / National	2006 Aug 15	0	2	2	200%
Van Nuys / Nordhoff	2006 Sep 28	5	6	1	20%
Main / Griffin	2006 Nov 20	1	1	0	0%
Vernon / Broadway	2007 Feb 07	9	4	-5	-56%
Balboa / Vanowen	2007 Mar 08	5	5	0	0%
Western / Washington	2007 Mar 29	3	7	4	133%
Pico / Bundy	2007 May 02	4	3	-1	-25%
Sepulveda / Victory	2007 May 10	4	4	0	0%
Sherman Way / Louise	2007 May 14	5	6	1	20%
Whittier / Lorena	2007 May 23	0	2	2	200%
Coldwater Cyn / Oxnard	2007 Jun 25	4	6	2	50%
Manchester / Airport	2007 Aug 09	2	4	2	100%
Sunset / Cahuenga	2007 Aug 09	4	3	-1	-25%
Van Nuys / Arleta	2007 Aug 17	2	1	-1	-50%
Normandie / Gage	2007 Sep 26	1	6	5	500%
Manchester / Figueroa	2007 Dec 05	5	4	-1	-20%
Wilshire / Westwood	2007 Dec 12	2	0	-2	-100%
Western / Beverly	2006 Oct 10	4	6	2	50%
Grand / Venice	2007 Jun 07	1	2	1	100%
Alvarado / Temple	2007 Nov 29	5	3	-2	-40%
Soto / Olympic	2006 Sep 01	8	4	-4	-50%
Imperial / Figueroa	2006 Oct 19	6	5	-1	-17%
Florence / Figueroa	2006 Nov 20	2	4	2	100%
Olympic / Highland	2007 Jun 18	5	1	-4	-80%
M.L. King / Western Ave	2007 Jul 09	10	8	-2	-20%
Olympic / Alvarado	2007 Jul 19	1	1	0	0%
Century / Figueroa	2007 Oct 16	11	5	-6	-55%
Alameda / Cesar Chavez	2007 Nov 02	4	1	-3	-75%
Anaheim / Wilmington	2007 Nov 19	1	3	2	200%
	TOTAL:	133	121	-12	-9%

Finding #4: Other factors that may be responsible for a reduction in Traffic Collisions have not been considered in reporting program results.

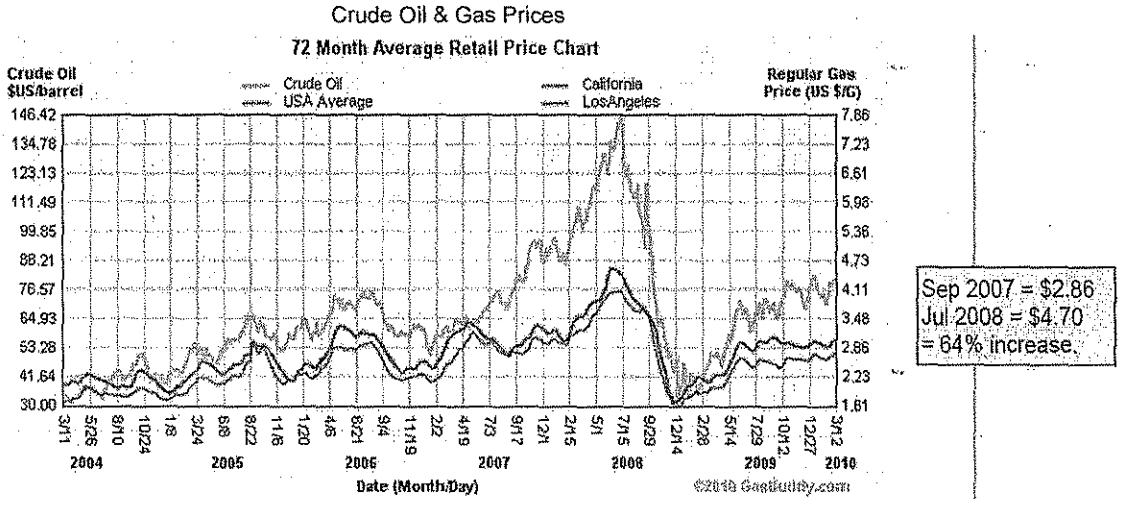
LAPD reported that traffic collisions at PRL intersections declined from 107 in 2004 to 30 in 2008—a 72% decline—but then increased 53% to 46 collisions between 2008 and 2009 (as previously noted in Exhibit 3). Our review disclosed that LAPD does not consider all factors in reporting the program's results. For example, LAPD does not include the relative changes in overall number of citywide collisions.

Citywide Traffic Collisions Have Declined

LAPD reported that citywide traffic collisions of all types declined from 48,958 collisions in 2008 to 44,307 collisions in 2009.[8] While trends in citywide collisions cannot be directly adjusted to those related to the PRLP, such trends should be considered in any comparative analysis.

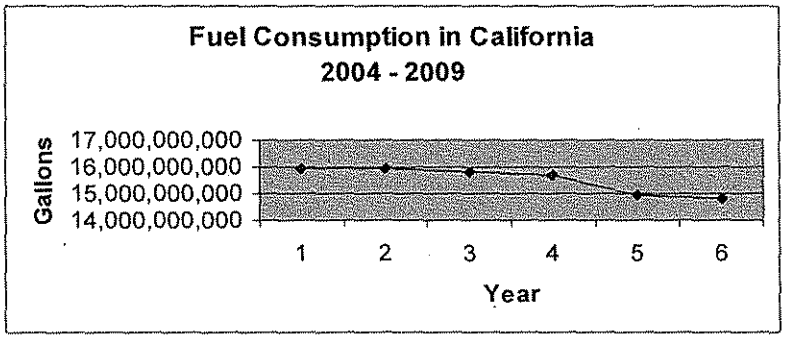
A general reduction in collisions could have been the result of there being fewer cars on the road, due to a significant increase in fuel prices. We noted over a ten-month period, average gas prices rose by 64% (Exhibit 5). We also noted there was a 4.6% decline in statewide fuel consumption that year (Exhibit 6), as well as a 2.6% decline in traffic volume on State highways in LA County.

Exhibit 5



[8] COMPSTAT Report for the week ending December 19, 2009.

Exhibit 6



LAPD has not historically reported fluctuations in traffic collisions at photo red light intersections in the context of trends in citywide traffic collisions. For example, an LAPD CompStat Report issued in late December 2009 shows a 9% decline in 2009 traffic collisions from the prior year, and a 14% decline in traffic collisions over the prior two years. Failure to report PRL results in context with broader citywide results could be misleading.

Weather patterns also affect collision trends over time. Precipitation affects visibility and traction, increasing hazardous driving conditions. Therefore, fluctuations in the number of rainy days in a given year can also affect the number of collisions. LAPD and LADOT stated that due to the moderate and mostly dry climate in Los Angeles, they do not believe weather should be considered a cause for any fluctuations in the number or severity of traffic collisions.

Without considering the context of citywide traffic collisions (including citywide collisions involving a red light violation), or other factors such as changes in traffic volume or weather conditions, the reported program results measured as the change in the number of traffic collisions at PRL intersections may not be adequately attributed to the program. At a minimum, traffic volume should be considered as a common denominator when comparing relative numbers of violations and collisions.

Variations in Traffic Volume Should be Considered

LAPD does not measure traffic collisions in relation to traffic volume, i.e., collisions per 10,000 vehicles. Fluctuations in traffic volume can directly influence the number of citywide traffic collisions, but LAPD indicated they were not monitoring traffic volume—either citywide or at PRL intersections.

A Texas study emphasized that traffic volume data are needed to represent exposure. The study noted that annual average daily traffic (AADT) and the volume-to-capacity ratio (level of congestion) are important considerations in analyzing intersection safety. Again, up until now, LAPD has not incorporated traffic volume or relative congestion data in reporting the program's results.

A study reported in a 2007 Status Report of the Insurance Institute of Highway Safety (IIHS) also refers to collisions per 10,000 vehicles as a key metric.

The Center for Transportation Research and Education at the Iowa DOT reports on violations per 1,000 vehicles entering an intersection, the number of violations per hour, and the seconds into the red for violations.

According to the Virginia DOT, the primary measures for assessing the automated enforcement program are the number of red light violations per 1,000 vehicles on an approach, and the collision rates measured per million vehicles entering at an intersection, with an additional measure that considers a reduction in broadside collisions.

In another report the Virginia DOT further stated:

> Traffic count data are also important to highway safety personnel, as they are frequently used in conjunction with accident statistics to .produce traffic accident rates. These rates are important indicators of accident probabilities and are frequently used to identify hazardous locations. It is, therefore, imperative that the traffic counts be accurate indications of traffic volumes and VMT [Vehicle Miles of Travel].[9]

LADOT provided some historical data on traffic volume at PRL intersections, but the data could not be used for comparative or trending purposes, since it was not gathered in a statistically useful manner. That is, traffic volume counts were noted on single dates ranging from November 2003 through November 2009, with no more than two days counted for each location. Although LADOT monitors citywide traffic volume to adjust signal timing each day, that data is not permanently stored.

Current technology used by LADOT for congestion management allows the measurement of lane-by-lane traffic counts almost continuously, though the data is retained only for a brief time. Traffic volume can be estimated based on a systematic method of automated counts for a given period. The PRLP equipment itself could also be used to measure traffic volume at program intersections. Therefore, the City may have more extensive traffic volume information available, though it is not considered in evaluating the PRLP.

Recommendation:

9. **In coordination with LADOT, LAPD should consider, at a minimum, the effect of traffic volume in the comparative metric in reporting and measuring program results. Specifically:**

   a.) **The number or ratio of traffic collisions at monitored intersections (considered through implementation of recommendations 6 and 7) compared to the number of**

[9] Garber, N.J., Bayat-Mokhtari, Faramarz. *"Optimizing Traffic Counting Procedures."*

vehicles transiting a single approach. A successful program outcome would note a decline in the adjusted ratio.

b.) The number or ratio of violations at monitored intersections (considered through implementation of recommendation 8) compared to the number of vehicles transiting a single approach. A successful program outcome would also note a decline in the ratio.

SECTION II: THE PROGRAM'S IMPACT ON CITY FINANCES

Finding #5: The Program has not covered its operational costs nor generated additional revenue for the City.

LAPD has reported that the PRLP generates millions of dollars of net revenue for the City. In addition, there is a public perception that the program brings in additional funds for the City, and critics have alleged that this revenue aspect of the program, rather than public safety, is the primary objective of automated enforcement. LAPD expressly rejected this allegation, stating that traffic safety is the ultimate goal and highest priority of the PRLP.

Our audit found that previous reports by LAPD on the revenue impact of the program were overstated. In some reports, LAPD considered actual citations paid by violators (as reported by the Court) as revenue. However, these figures were misleading, since the majority of fines paid to the Court for red light violations are not received by the City. In fact, of the $446 fine amount, the City was entitled to receive only $157, or 35% of that amount. Exhibit 7 below presents the fine amounts for a red light violation over a four year period, and the proportionate allocation of the fee.

Exhibit 7

Los Angeles Police Department
Automated Photo Red Light Enforcement Program

City Share of Citation Fine Revenue

Citation Info	2006		2007		2008		2009		
CVC Sections Cited	21453(a)CVC	21453(b)CVC	21453(a)CVC	21453(b)CVC	21453(a)CVC	21453(b)CVC	21453(a)CVC		
Total Cost Fine	$361.00	$151.00	$381.00	$159.00	$381.00	$159.00	$436.00	$446.00	$446.00
City Share	$151.31	$55.90	$157.19	$58.25	$157.19	$58.25	$148.37	$148.37	$157.19
County Share	$54.51	$22.13	$68.23	$27.62	$68.23	$27.62	$68.23	$67.23	$74.11
State Share	$155.18	$72.97	$155.58	$73.13	$155.58	$73.13	$219.40	$229.40	$214.70
Traffic School Fee	$39.00		$39.00		$39.00		$64.00		

NOTE 1: During the years 2006 to 2008, LAPD cited straight-through red light violations under section 21453(a) of the California Vehicle Code (CVC), and right-turn red light violations under CVC section 21453(b). Starting 1 Aug 2008, LAPD cited all red light violations under CVC section 21453(a).

NOTE 2: Changes to State law resulted in changing amounts and allocations of fines in 2009.

LAPD has also reported the City's PRLP fine revenue by multiplying the total number of citations issued by the City's share of fine revenue. However, this method would also overstate revenue because it ignores Court records of dismissing or otherwise receiving no payment for 24% of citations adjudicated in 2009. In addition, many citations are sent for collection by the Court, but may never be paid. The Court may also adjust fine amounts or assign community service, based on a defendant's economic circumstances.

Fine Revenue

The Superior Court collects bail or fines from traffic citations issued by cities within the Court's jurisdiction. The Court distributes this revenue to the State, the County, the cities, the Court, and any other recipients designated by statute.

Every month, the Los Angeles Superior Court deposits the City's portion of Court fines into a City account. In 2009, the Controller's Office conducted an assessment of the procedures used by the Court to allocate fine revenue to the City. Our review noted no exceptions. However, documentation the Court provides does not break out photo red light citation fines from the total traffic fine revenue paid to the City.

In lieu of a deposit breakdown, the Court provides the City with a monthly report titled "Estimated & Unadjusted Red Light Camera Revenue & Payment Transaction Counts." The Court labels this report "Estimated & Unadjusted" because of timing issues in assigning revenue to a specific period. However, this report provides the most accurate information available relative to payments made for PRLP citations issued, and is considered a reliable source for the total PRLP amounts due to the City, after one final adjustment.

Per Government Code §72712, for the three jurisdictions that formerly comprised the Los Angeles Judicial District,[10] the Superior Court deducts an additional proportionate amount for the Reporters' Salary Fund, which is maintained by the Court. This final adjustment reduced the City's receipts from the Court by an average of 18% during both 2008 and 2009.

Our revenue calculations are derived from the payments to the Court, and the Court's subsequent transfer to the City. LAPD believes this understates program results because they learned during the course of our audit that a significant number of citations from prior years are not yet resolved or "adjudicated" by the Court. LAPD stated that those unresolved citations could eventually bring in additional revenue.

For example, LAPD stated that 39% of citations issued in 2008 had not yet been resolved over one year later; and 52% of citations issued in 2009 remain unresolved in early 2010. However, we noted that based on 2009 data provided by the Superior Court, only $307,000 (2.7%) and $21,000 (0.2%) of Court revenue were from violations more than one and two years prior to the adjudication date, respectively.

During the course of our audit, LAPD also became aware that the Court does not ask DMV to place a hold on the vehicle registration or the driver's license of PRL citation recipients who do not respond to a PRL Notice to Appear. Instead, the Court sends these citations to a collection agency. Therefore, future collectability

[10] City of Los Angeles; City of San Fernando and the County of Los Angeles.

of delinquent PRL citations is even less certain, which may explain the large number of outstanding citations.

We do not agree that unresolved or unpaid citations issued in prior years should be considered as collectible revenue in the year they were issued. Any significant timing delays between when a citation is issued and when it is paid would be reflected during the year it was paid, and the timing difference would smooth out over time. Also, the number of citations that will never be paid, and are therefore "uncollectible," is unknown.

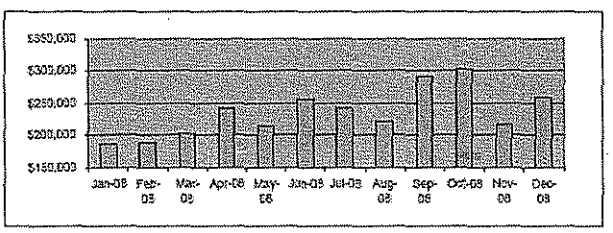
From a cash-basis accounting perspective, which is consistent with the method by which the City recognizes revenue, the Court's monthly revenue reports, adjusted by an 18% deduction for the Reporters' Salary Fund, are considered a reliable source for recognizing the amount of actual cash received by the City.

Exhibits 8 and 9 present a summary of the City's allocated share of Court revenue for 2008 and 2009. These amounts do not include a further 18% deduction for the Reporters' Salary Fund as required by GC §*72712*.

Superior Court Payments to the City of Los Angeles
Allocated Share of Photo Red Light Revenue
2008

Exhibit 8

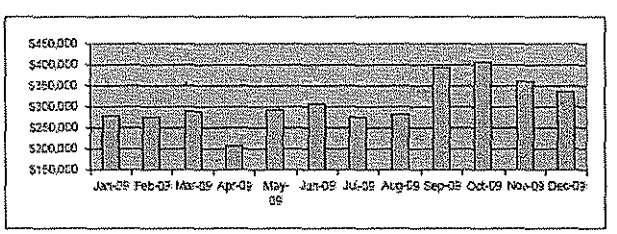
Date	Revenue	% Avg	Transx	% Avg
Jan-08	$ 187,753	79%	2,486	89%
Feb-08	189,095	80%	2,311	83%
Mar-08	204,424	87%	2,488	89%
Apr-08	243,494	103%	2,834	101%
May-08	215,958	91%	3,004	107%
Jun-08	255,653	108%	3,212	115%
Jul-08	243,933	103%	3,207	115%
Aug-08	222,078	94%	2,899	104%
Sep-08	292,248	124%	3,405	122%
Oct-08	303,394	128%	3,109	111%
Nov-08	217,890	92%	2,188	78%
Dec-08	259,370	110%	2,442	87%
Total	$ 2,835,276		35,586	
Average	$ 236,273	100%	2,800	100%
Max	$ 303,394		3,405	
Min	$ 187,753		2,188	



Superior Court Payments to the City of Los Angeles
Allocated Share of Photo Red Light Revenue
2009

Exhibit 9

Date	Revenue	% Avg	Transx	% Avg
Jan-09	$ 277,995	90%	2,517	96%
Feb-09	275,503	89%	2,375	90%
Mar-09	290,875	94%	2,593	98%
Apr-09	208,589	68%	2,012	76%
May-09	292,058	95%	2,481	94%
Jun-09	306,300	99%	2,613	99%
Jul-09	275,535	89%	2,381	90%
Aug-09	283,760	92%	2,380	90%
Sep-09	392,173	127%	3,152	120%
Oct-09	405,849	131%	3,281	125%
Nov-09	361,575	117%	2,971	113%
Dec-09	334,347	108%	2,856	108%
Total	$ 3,704,549		31,612	
Average	$ 308,712	100%	2,634	100%
Max	$ 405,849		3,281	
Min	$ 208,589		2,012	



City Costs for the Photo Red Light Program

As part of our overall program evaluation, we also assessed the City resources dedicated to the program. Those include payments to the vendor and the costs of dedicated LAPD and LADOT staff who install, monitor, and manage the program. The table below presents the estimated annual costs incurred by the City to implement the current PRL program:

Contract Costs	Based on current maximum payments to the vendor to monitor 32 intersections (63 approaches at $4,062.50 each, assuming a 80% CIR)	$3,071,250
Labor Costs	Salaries and fringe benefits for six full-time LAPD sworn employees assigned to program.	$791,335
	Salaries and fringe benefits for two LAPD employees assigned part-time to the program.	$32,180
	Salaries and fringe benefits for one LADOT employee who indicated he spends about 10% of his time on the program.	$17,865
Infrastructure	Amortized amount of LADOT costs related to required infrastructure improvements at 32 locations ($1.57 million, based on 4 year schedule)	$392,500
	TOTAL: City's Annual Cost of PRLP	$4,305,130

The cost figures used in this analysis are approximate. However, we consider the total amount of $4.3 million to be a conservative estimate of total annual City costs of the PRLP.

While the actual contract payments in prior years were reduced from the maximum allowable due to performance issues[11], the labor costs are based on salary ordinance amounts for the positions indicated, overtime was not considered. In addition, we did not consider the effect of LAPD management supervision or Division-, Departmental- or citywide overhead. These costs are generally included for the purpose of full cost recovery.

By comparing the City's share of citation fine revenue received to a conservative estimate of the City resources dedicated to the program, our review found that for the first two full years of PRL operations at all 32 intersections, the financial result for the City was a net loss.

[11] Some PRL intersections do not currently achieve an 80% Citation Issuance Rate (CIR) required for full compensation to the contractor for a given intersection. For 2008 this issue resulted in reduced vendor payments of $393,255, and for 2009 the reduction was $212,631. LAPD and ATS have achieved an 80% CIR if they average all 32 PRL intersections together; however, some intersections exceed that rate and some do not. LAPD and ATS continue to work towards achieving that rate for every intersection.

	2008	2009
Fine Revenue Received		
Receipts due from Superior Court	$2,835,275	$3,704,548
Adjustment for 18% deducted, per GC 72712	(510,350)	(666,819)
Estimated Revenue Received from PRLP	*$2,324,925*	*$3,037,729*
City Costs Incurred		
Vendor Cost[12]	$2,627,219	$2,857,806
Labor (LADOT & LAPD Direct)	841,380	841,380
LADOT Infrastructure Cost (4-year amortization)	392,500	392,500
Estimated Costs Incurred for the PRLP	*$3,861,099*	*$4,091,686*
Net Result (Loss):	($1,536,174)	($1,053,957)

Our analysis shows that the PRLP has not been a "money maker" for the City. It should also be noted that this issue had not been acknowledged by management or policymakers until audit fieldwork noted the significantly lower revenue figures received by the City. Our audit conclusions are also supported by other recent analyses by the CAO and CLA using the same source data.

LAPD has argued that the fine revenue reported above is understated, since there may be a significant lag between citation issuance and collection, and that most receipts in 2008 may be attributed to citations issued during 2007, when the program was not yet fully implemented. However, it should be noted that the Court's revenue figures relate to roughly the same number of transactions, as noted in Exhibits 8 and 9. Therefore, the significant increase in receipts in 2009 may be due to the higher fines imposed for "rolling right-turns," which began in 2008, and is discussed in Finding #6.

Even at a net City cost, automated enforcement could be considered a viable alternative to fielding more traffic police. PRLP is a round-the-clock enforcement effort. Comparable enforcement efforts by traffic officers posted at those intersections would be far more expensive. LAPD reports that the citations issued through the PRLP equate to over 22% of the moving violations citywide, and that it would require over 100 motor officers, with salaries alone over $10 million, to monitor the 32 PRLP intersections.

However, the decision to allocate resources to any program, either through technology or staff, should be based on an expectation that it will achieve a specific outcome. Both automated and officer enforcement efforts seek to modify driver behavior by increasing compliance with traffic laws. Such enforcement actions (or threat of enforcement) are considered most effective in cases where drivers violate the red light within one second of the change from yellow to red.

[12] Maximum vendor contract cost of $3,071,250 contractually reduced because of the low Citation Issuance Rate (CIR).

In addition, as presented in section I, the PRLP cannot conclusively show a significant impact to safety, as measured by a reduction in collisions.

Recommendation:

10. LAPD and LADOT should consider departmental priorities along with the expected outcomes of the PRLP in allocating resources to the program.

Finding #6: All PRLP violations are cited under the same CVC were assessed a $446 fine, regardless of the relative danger of the violation.

Straight-Through versus Right-Turn Violations

A California driver who fails to stop for a red light violates CVC 21453. Although that section of the code has several subsections with different penalty amounts that are set by State law, the City issues all PRL citations under subdivision (a), whether for a straight-through violation, or a right-turn violation.

The PRLP resulted in 41,224 and 44,542 citations issued in 2008 and 2009, with approximately two-thirds of the citations issued for red light violations during right turns. In August 2008, based on advice from the City Attorney, LAPD began citing all red light violations under CVC 21453(a). Previously, right turn violations at PRLP locations were cited under CVC 21453(b), which requires a driver to yield "after stopping as required by subdivision (a)." Violations that were cited under subdivision (b) had a maximum fine amount of $159, which was significantly lower than the fine amount under subdivision (a), which was $381 in 2008 but has risen to $446 as of the end of 2009 (refer to Exhibit 7).

This action nearly tripled the City's share of potential payments for two-thirds of citations issued. Several media reports and advocacy groups have called this practice of using cameras to issue citations for right-turn violations, which carries the same penalty as the more dangerous straight-through violation, as driven solely by the opportunity for increasing revenue.

Subsequent to our audit fieldwork, on September 3, 2010, the State Legislature sent AB 909 to the Governor for his signature. This bill would amend section 21453 of the Vehicle Code to re-assign turning violations to a lower fine amount.

Due to the slower speed of the vehicle during right-turns, drivers generally have control of their vehicle and if they see another vehicle or pedestrian, they are able to react and stop in time. Therefore, right-turn red light violations are generally considered less dangerous than straight-through violations. LAPD points out that collisions occurring from a rolling right-turn violation could have a greater risk of involving a pedestrian, which would be very serious.

Several California cities that cite right-turn violators say that these infractions increase hazards, especially for pedestrians. A 2006 LADOT report that analyzed traffic collisions in Los Angeles over a seven-year period reported 22,350 pedestrian collisions (or about 3,000 annually), which accounted for 7% of all traffic collisions citywide. About one-fourth of the pedestrian collisions occurred at signalized intersections, but just 4% occurred when there was a "circular red or red arrow" noted as the cited violation. There was no distinction, however, of what proportion of those collisions were caused by a right-turning vehicle. LADOT has previously stated that improper right turns had not caused a major [collision] problem, rather they reflect bad driver habits. Therefore, while PRLP right-turning violators could hit a pedestrian, Los Angeles has been "lucky in this respect."

Though enforcement against drivers who do not stop at all has the potential to make intersections safer, some jurisdictions opt not to target right turns, or record the illegal right turn only when a vehicle is going 15 mph or faster.

Timing of the Violation, and Speed of the Vehicle

Advances in video technology now make it routine to determine to the thirtieth of a second when a violation occurred and how fast a vehicle was travelling. We reviewed studies showing that 75% of straight-through red light violations occur within the first second after a signal light changes from yellow to red.

An Iowa study found that vehicles entering the intersection a second or less after the onset of the red phase may pose less of a hazard to serious crashes because of the perception, reaction, and start-up time of possible conflicting vehicles that are currently stopped at the intersection. The most dangerous violations are generally those that occur several seconds after the signal light changes to red, when deadly broadside collisions are more likely.[13]

As an enforcement tool that seeks to change risky driver behavior, the City of Los Angeles makes no distinction between straight-through or right-turn violations, nor considers the speed of the vehicle or "time into red," when issuing citations. LAPD stated the City intentionally lengthened the time for the yellow signal phase from the legally required 3.6 seconds to 3.9 seconds or higher in deference to potential violators. They estimate this effectively reduced by one-third the number of citations that would have otherwise been issued.

Furthermore, LAPD does not summarize collisions and injuries by straight-through or right-turn red light violations (previously noted in Finding #3). Without this data, the difference between the high-speed, straight-through violation and the slower, right-turn violation tends to indicate that the former are more dangerous and deserve more enforcement attention, and a more severe penalty.

[13] However, right-turn violations with a longer time into red may not be as dangerous, as these could be "rolling" right turns, as drivers slow down to view and prepare to yield the right of way.

PRLP Does Not Generally Cite Left-Turn Violations

The existing PRLP equipment installed at 32 City intersections does not adequately detect or record left-turn violations; therefore, the City does not generally issue citations for red light violations by left-turning vehicles.

Significant attention to camera placement and adjustment is typically necessary to record images of left-turning vehicles; and the design will vary based on the specific intersection's layout. LAPD stated that in some instances, when a driver crosses the limit line on red and then negotiates a left turn, the event is captured by the cameras. They also stated that if an unobstructed photograph of the drivers' face is obtained, those violations are cited.

The City chose not to install the equipment necessary to detect all left-turn red light violations, as it was decided that illegal left turns were not a significant enough problem to justify the expense.

Recommendation:

11. **Council should direct LAPD and the CLA to promote legislative action at the State to amend the CVC so that fines for red light violations reflect current technology and are proportional the to the level of danger (e.g., graduated fines, etc.).**

Finding #7: Existing Law and Recent Legislative Changes Could Significantly Decrease Program Revenue.

The PRLP has not covered its operational costs nor generated additional revenue for the City. Recent legislative changes at the state level could also significantly decrease the amounts received by the City.

PRLP Violations Cannot Be Cited as Municipal Code Violations

An inquiry by the City Council proposed that automated enforcement of red light violations be cited as Los Angeles Municipal Code (LAMC) violations, which would lead to civil fines, similar to parking tickets.

This change would significantly increase the City's share of the paid citations, while reducing the fine amount for the violator and eliminating most of the payroll costs for sworn officers dedicated to the program.

The City sets the penalty amounts related to LAMC violations. Civil citations, unlike those assessed through the California Vehicle Code, do not require that a sworn officer review video evidence of the violation prior to ATS issuing the citation.

LAPD stated they have researched this issue, and that the City Attorney concurred with their analysis that this practice is "of questionable legality," citing

the State constitution that forbids municipalities from enacting legislation that duplicates or conflicts with State law. Although questionable, some localities have reportedly enacted local ordinances for traffic violations. As a result, recent legislation (SB 949), if signed by the Governor, prohibits a local authority from enacting an ordinance that establishes a violation or related penalty fee for matters covered by the State vehicle code, unless expressly authorized.

Amended Vehicle Code Reduces the Penalty for Right-Turn Violations

As stated in the previous section, since August of 2008 LAPD has cited all red light violations, both straight-through and right-turn, under the same section of the California Vehicle Code, which carried a $446 fine as of the end of 2009. During our audit, a proposal was introduced in the State Assembly (AB 909) to significantly reduce the fine for "rolling right turns." The League of California Cities strongly opposed the bill on monetary grounds, stating that it would negatively affect cities' ability to use automated traffic enforcement tools and potentially cost the state millions of dollars in lost revenue. The California Police Chiefs Association also opposed the bill. Nevertheless, both houses of the legislature passed AB 909 by substantial majorities in late August 2010, and it will become law with the Governor's signature.

Our audit noted that approximately 67% of PRLP citations issued during 2008 and 2009 were issued for right-turns on red. Therefore, this recent legislation would have a significant effect on PRLP costs recovered by the City.

State Law Limits Photo Enforcement Safety Impact and Financial Results

Reports during our audit fieldwork indicated the Governor may work to change the State law that currently prohibits speed cameras in California. Though PRLP video cameras already detect vehicle speed, it is not with the precision required by the Court. Speed enforcement, as a supplement to the PRLP, would require additional equipment at an added cost.

It appears the State would receive the majority of additional fee revenue from citations issued by speed cameras, though the City would also retain a portion. However, it is unknown if a projected increase in City revenue related to speed cameras would be sufficient to offset additional vendor costs. The City has also not taken a position to support this proposal.

The use of speed cameras is highly unpopular among some citizen groups. Though the State of Arizona has used camera enforcement to ticket speeding motorists on highways, it plans to end the practice soon.

LAPD also stated that the existing PRLP equipment currently detects numerous other violations that impact driver safety and if cited, would result in additional penalties or fines. For example:

Moving/Safety Violations:
23123 Cell Phone (extremely common)
27315 Seatbelt not worn (very common)
22100 Turning from improper lane / position (fairly common)
22108 Turning without signaling (last 100 feet) (extremely common)
27360 Child Restraints
14601 Driving on a suspended license
23103 Reckless Driving
27400 Headset in both ears
21658 Lane straddling
21700 Obstructed View by passengers or load
21950 Failure to yield to pedestrian in crosswalk
12500 Unlicensed Driver
23109 Speed contest

Equipment Violations:
5200 License plate not attached (either front or rear)
4000a Expired Registration

Others:
21712 Unlawful riding (e.g., passenger in pickup bed)
21806 Failure to Yield to Emergency Vehicle

Current State law[14] prohibits the use of photographic records made by an automated enforcement system for any purpose other than as evidence supporting a red-light violation. Therefore, a change to State law would be required to allow automated enforcement of these violations.

[14] CVC 21455.5 (e)

SECTION III: CONTRACT OVERSIGHT AND MONITORING

Finding # 8: The City relies on the vendor to ensure a complete reporting of all photo red light events, potential and LAPD approved violations, and actual citations mailed to violators, without ensuring completeness of the data.

For each vehicle entering a monitored approach, the PRL system detects vehicle speed and position and compares that information to the signal light timing to predict whether the vehicle will likely enter the intersection on a red light. When the system predicts such a violation, it triggers an "event." Video cameras feed video recorders for several seconds, and still cameras and flash units activate in sequence to record the event, which may indicate a violation and ultimately result in a citation.

There is a low risk that potential violations are not captured by PRL system. While our audit did not assess the functionality of the PRL equipment, we assessed controls in place to ensure that the installed systems did work as intended. Though the vendor provided no formal study to support the ability of the system to comprehensively capture all violations, we noted that LAPD did some "ground-truthing" upon system installation, and we reviewed evidence that the City complies with required periodic certification that PRL equipment functionality conforms to State requirements.

LAPD is of the opinion that the equipment does not miss violations. However, there remains a risk that some events captured by the system may not be reported to the City, or that officer-approved citations are not timely mailed to violators.

The City lacks assurance that events, once captured by PRLP cameras, are transferred and remain in the vendor's database, and that all such events are reported to LAPD.

An impending red light violation activates the equipment monitoring a particular approach to record a date- and time-stamped "event," which is unique for that approach. Events are then digitally transferred and stored on remote ATS servers for initial review by ATS. ATS reviews each event to determine whether the photographic evidence meets preliminary violation criteria and, if so, uses the license plate number to obtain registration information from the California Department of Motor Vehicles (DMV).

If ATS determines the event would not support a citation, they note the exemption reason and store these events as "discards," which are not sent to LAPD for review, but remain available for an LAPD quarterly audit.

While LAPD maintains overall control and supervision of the process, the PRLP data is stored on ATS computers. ATS personnel have system-level access to event data from the moment of capture by the cameras through inclusion of the images in the ATS database and submission of the images to LAPD for approval.

If all events captured by the cameras are not included in ATS' database, there is a risk that some valid violations would never result in citations, or, conversely, invalid violations would not be counted appropriately as discards, which would misstate the Citation Issuance Rate (CIR), and affect the payment to the vendor.

For example, ATS reported that event numbering occurs after their system transfers event data to a central server. Without traceable event numbering in the roadside equipment, a roadside computer failure could result in the loss of un-numbered event data.

Without a verifiable reconciliation that all events captured by cameras are in the database, LAPD lacks assurance that all events are considered for either potential citation or as a discard. Since the vendor suffers a financial penalty when data cannot support citations, there is a reasonable expectation that the vendor should provide information to support this type of reconciliation.

The City lacks assurance that all LAPD-approved violations result in citations mailed to registered owners.

For events that meet stated criteria, ATS uploads the images onto a dedicated computer at LAPD on a daily basis. There, an officer reviews each event and determines whether to cite the driver. State law requires a sworn officer to sign off on a citation before submission to the Court.

The officer's responsibility is to evaluate the video evidence of the violation, the legibility of the license plate, and whether the images are adequate to identify the driver. If so, and if in the officer's discretion a violation occurred, the officer electronically approves the citation and ATS notification is automatic. Events disapproved for citations are categorized for monthly reporting purposes.

For efficiency, ATS determines the mailing address of the alleged violator before submitting data to the LAPD for review and approval. ATS does this by accessing DMV databases and matching the registered owner of the vehicle with a driver by the same name that lives at the same address.

ATS processes officer-approved citations by generating citation numbers and printing citations in a specified format (see example at Exhibit 10). That format includes four color images:

- *A close up of the driver.*
- *The front or rear of the vehicle and license plate.*
- *The vehicle behind the limit line with the signal light in red phase.*
- *The vehicle within the intersection with the signal in red phase.*

Exhibit 10

CITY OF LOS ANGELES
NOTICE OF VIOLATION
Automated Red Light Enforcement System

Citation Number	SA12345

Citation Information

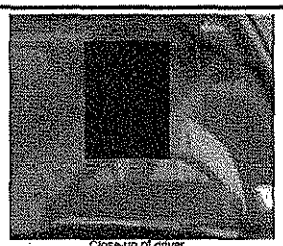
PAYMENT DUE: 01/19/2010

AMOUNT DUE >> $446.00

Payable to: Los Angeles Superior Court
P.O. Box 77388
Los Angeles, CA 90007

FIRST NAME LAST NAME
123 MAIN STREET
HUNTINGTON BH, CA 92648

https://www.viewyourticket.com/TicketViewerCA_LA


Close-up of driver

VIOLATION
Red light

CODE AND SECTION
CVC 21453(a)
Fail to Stop On Red

LOCATION OF VIOLATION
Imperial WB @ Figueroa

CITY OF OCCURRENCE
Los Agneles, CA

DATE OF VIOLATION
01/14/2010

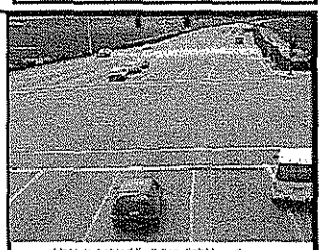
TIME OF VIOLATION
09:58:08 AM

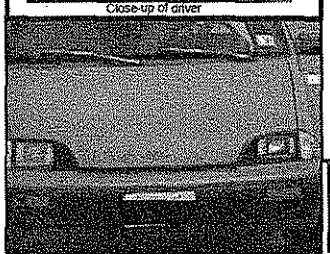
YELLOW TIME:
4.0

RED TIME:
0.83

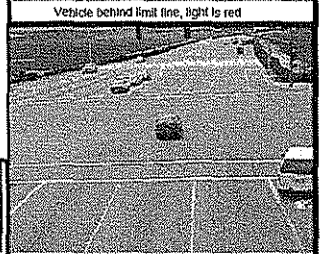
VEHICLE LICENSE
4XXX123

VEHICLE STATE
CA


Vehicle behind limit line, light is red


Front or rear of vehicle, with license plate


Close-up of license plate


Vehicle within intersection, light is red

If you are filing an Affidavit of Non-Liability, complete the affidavit, separate here and mail using the enclosed envelope

Citation Number	SA12345

TO FILE AN AFFIDAVIT OF NON-LIABILITY, please complete the information requested on the reverse side of this notice, and mail the affidavit portion of this notice in the envelope that has been provided.

Respond By: 06/29/2001

AUTOMATED RED LIGHT ENFORCEMENT
P O BOX 3997
BURBANK, CA 91508-3997

Driver filing Affidavit of Non-Liability:

FIRST NAME LAST NAME
123 MAIN STREET
HUNTINGTON BH, CA 92648

LOS ANGELES POLICE DEPARTMENT
NOTICE TO APPEAR
Automated Traffic Enforcement

Date: 01/14/2010 | Time: 09:58:08 | Day of Week: Friday | Case No.: SA12346

Name(Last, Middle, First)
FIRST NAME LAST NAME

Address: 123 MAIN STREET
City: HUNTINGTON BH | State: CA | ZIP Code: 92648

Driver Lic. No.: 8340182 | State: CA | Class: F | COMMERCIAL: Yes ☐ No ☒ | Age: 28 | Birth Date: 9/05/1973

Sex: M | Hair: Brown | Eyes: Brown | Height: 5' 2" | Weight: 190 | Race: W

Veh. Lic. No.: 4XXX123 | State: CA | Commercial vehicle (see CVC 15210) | Hazardous vehicle (see CVC 353)

Yr. of Veh.: 1998 | Make: GEO | Model: | Body Style: 2H | Color:

Registered Owner or Lessee:
FIRST NAME LAST NAME

Address: 123 MAIN STREET
City: HUNTINGTON BH | State: CA | ZIP Code: 93721

Code and Section: 21453(a) CVC | Description: Fail to stop on red

Location of Violation: IMPERIAL WB @ FIGUEROA | City of Occurrence: LOS ANGELES

Date Issued | Declarant | ID No.

YOU MUST RESPOND TO THE COURT ON OR BEFORE:

WHEN: Date: 06/16/2008

WHAT TO DO: Follow instructions on the reverse.

WHERE: Superior Court of California
County of Los Angeles
Metropolitan Courthouse
1945 S. Hill Street
Los Angeles, CA 90007
Telephone: (213) 742-1634

Clerk's Office Hours:
8:00AM - 4:30 PM
Monday - Friday
except legal holidays

The citation also includes the fine or bail amount and court instructions. ATS makes a final check of content and image quality, then mails these citations to the alleged violator.

When ATS mails the citations, they take a list of the individual envelopes to the post office, where postal clerks check and hand date-stamp the list, creating a Certificate of Mailing. The Certificate of Mailing is required by law and provides evidence of compliance with the legal requirement to mail citations within 15 days of the alleged violation. Periodically, ATS electronically transfers a batch of issued citations to the Los Angeles Superior Court.

LAPD does not reconcile the total number of citations they approve with the total number of citations that ATS both mails to registered owners, and electronically submits to the Court. Currently, LAPD relies on ATS and its software to consistently print, mail and submit to the Court only those events approved by LAPD as citations.

In July 2002 the California State Auditor recommended tighter control of this issue. The report states: "A periodic reconciliation of the number of citations the local government authorized and approved with those the vendor mailed during the same period would detect any unauthorized or unapproved citations. This reconciliation would allow the local government to promptly follow up with the vendor on any differences."

When ATS electronically submits citations to the Court, ATS also emails the Court a list of the citations submitted. The Court does not immediately respond electronically with a report or even a tally of citations submitted. Rather, the Court provides ATS with a CD each month that lists all the citations paid or dismissed during the prior month. ATS loads this data into their system.

However, the data provided by the Court is a record of payments received and citations dismissed, regardless of when the citation was issued. Therefore, this information is not comparable to citations issued and approved by LAPD or mailed by ATS during that month.

Recommendations:

12. **LAPD should include a requirement in a new PRL contract for the vendor to serially number all events within their database so that LAPD review can easily detect any missing event numbers.**

13. **LAPD should continually store their own log of all citations approved for issuance and periodically compare that log with the vendor's notification to the Court of citations mailed to registered owners and entered into the Court system.**

14. **LAPD should include a requirement in the new PRL contract for the vendor to produce a comprehensive quarterly status report on**

each citation processed. For example, based on citation number, the status report could show the judicial and payment status of all citations previously and newly issued, broken out by month and year, and reconciled with the prior report.

Finding # 9: Anticipated expansion of the program will shift responsibility for infrastructure construction to the Vendor. To preserve the City's financial interests, LAPD must consider payment alternatives and asset ownership in negotiating a future contract.

LAPD indicated its plans to expand the number of PRL intersections beyond the current 32. LAPD stated that under the terms of a new RFP, the City also plans to shift the burden of all site preparation costs to the contractor. Under the previous contract, LADOT constructed the infrastructure improvements with design assistance from Nestor. This new approach, of making the vendor responsible for all necessary construction, requires consideration of increased monthly payments for each intersection, or a separate method of compensating the vendor for the construction component of the contract.

We also noted that the current draft RFP is silent on the subject of who would own the infrastructure after construction—or even after termination of the contract. There is also no mention of whether construction deadlines would apply or how to allocate costs arising from unforeseen construction delays.

Installation of Nestor's PRL cameras and related equipment at 32 City locations required engineering design work for each intersection. Each selected site was unique, with differing street geometry, slopes, sub-surface objects, surface material issues for the street and adjacent property, speed limits, and unique and active traffic control equipment and related supporting infrastructure.

LADOT worked with Nestor to modify existing engineering drawings that LADOT then used to construct necessary improvements at each intersection. PRL camera angles, the positioning of strobe lights, and the system controls required careful evaluation of the pre-existing infrastructure to ensure a successful outcome.

LADOT modified pre-existing infrastructure and provided Nestor with physical attachment points for cameras, flash units, and a control cabinet. LADOT also constructed the improvements that were necessary to provide adequate power for the automated system, as well as data interconnectivity among system components. It was Nestor's responsibility to install cameras, flash units, and the control cabinet, and to test, activate, and maintain the PRL system. The CAO reported LADOT costs of $1.6 million for their part of this process, or about $50,000 per intersection.

Given the City's budget constraints and the specific pre-installation infrastructure requirements demanded by an upgraded replacement system, it appears appropriate to assign these requirements to the vendor. However, LAPD should

seek competent counsel to price the additional construction responsibilities competitively, and to structure the payment process accordingly in order to avoid overpayment. For example, if the necessary capital costs are amortized over a stated contract term, they may effectively raise the monthly payment amount per intersection. In that case, once the infrastructure costs are fully amortized, the monthly payment should be reduced. In addition, as the City compensates the vendor for infrastructure improvements, those improvements could incrementally become the property of the City.

LAPD can avoid paying an unnecessary premium by anticipating additional up-front costs the vendor will incur, by considering the payback period for capital costs, by clearly specifying who owns what at each stage of the process, and by anticipating the problems that frequently arise in construction projects.

Recommendation:

15. In negotiating the new contract for the PRLP, LAPD should seek competent counsel to protect the City's interests. Ensure issues regarding asset ownership, construction costs, and any related program delays due to construction, are specifically included in the contract terms.

Finding #10: The Program is highly dependent on vendor viability; therefore, the City must ensure appropriate due diligence in contractor selection and clarity of contract terms.

The PRLP demands a strong partnership between the City and a well-performing contracted vendor. Without a viable private partner, the program cannot function.

From 2000 to 2004, the City piloted automated enforcement of traffic signal lights. When the pilot concluded PRL enforcement ended and was dark for more than a year.

After a year-long selection process, the City selected Nestor Traffic Systems, Inc. to provide PRL services, starting in 2006. The contract included provisions for two one-year extensions that could feasibly extend the contract until April 2011.

During the third year of the contract, Nestor failed financially and entered into receivership. Since the cameras and related equipment are proprietary and were owned by the failed company, the City risked program interruption a second time.

In addition, the City had initially invested $1.6 million in public (LADOT) resources to design and build out the infrastructure to accommodate Nestor's proprietary equipment. With the failure of the vendor and the program at risk of shutting down, the opportunity to benefit from this investment for the remaining two-year option period appeared lost.

In September 2009, ATS, a Nestor competitor, stepped in to purchase Nestor out of receivership, which resulted in the continued operation of the PRLP for the City. This was despite concerns that LAPD had no contractual authority to pay ATS for ongoing services, since LAPD's contract was with Nestor, and ATS dissolved Nestor during the acquisition process, essentially voiding the contract.

The agreement was eventually amended in April 2010 to formally assign the contract to ATS, which gave LAPD the authority to pay ATS for services incurred since September 2009. The contract has also been extended through April, 2011, to provide for continued service while the City seeks proposals for a new contract.

The current language of the RFP requires the vendor to provide "documentation on the organizational and financial status of the proposer," but does not specifically address the effects of a possible interruption or cessation of business by the contractor.

A common imperative in selection decisions is that the vendor must demonstrate current and long-term financial viability. In addition, the City must include provisions in its contract to reduce its financial risk.

The situation with Nestor could have been mitigated with additional contract provisions. Based on LADOT's $1.6 million investment in PRLP infrastructure, the contract could have specified that complete failure of the vendor to fulfill contract terms would have defaulted the vendor's equipment to the City. That would have put the City in a better negotiating position to seek an interim solution.

The current contract allows only for LAPD to terminate the contract. To avoid a system shutdown or an interruption in payments, the contract could have included a provision for temporary substitution of a cooperating competitor.

Considering the potential loss of infrastructure investment and the detrimental impact to enforcement efforts by interrupting the PRLP, the total City cost of Nestor's failure could have been substantial. LAPD's contract could have better anticipated downside risks.

Recommendation:

16. LAPD should work with the City Attorney and the CAO in ensuring the selection process and contract terms fully protect the City's financial interests.

Respectfully Submitted,

T. William Newman, CPA, CFE
Internal Auditor III

Siri A. Khalsa, CPA
Deputy Director of Auditing

Farid Saffar, CPA
Director of Auditing

May 26, 2010

APPENDIX A

OFFICE OF THE CONTROLLER

Review of the Photo Red Light Program

Ranking of Recommendations

Description of Finding	Ranking Code	Recommendations
Section I: The Program's Impact on Public Safety		
Finding #1: ***The method used to select the 32 locations for camera enforcement eliminated some high risk intersections.***	N	1. LAPD and LADOT should increase transparency for an expanded PRLP by publicizing how the location selection process will ensure that the highest risk intersections are selected for the program. In addition, LAPD and LADOT should list intersections that meet published criteria, on their websites.
	N	2. LAPD and LADOT should obtain CalTrans approval to automate enforcement of intersections that meet selection criteria.
	N	3. LAPD and LADOT should seek funding for necessary infrastructure modifications at intersections that meet selection criteria.
Finding #2:Location decisions did not involve engineering analyses that formally documented the City's consideration of other solutions that could have a more direct effect on public safety than automated enforcement.	N	4. For any new intersection recommended in an expanded PRLP, LADOT should complete an engineering analysis template to formally document consideration of all appropriate countermeasures, and to support the recommendation that automated enforcement would have the greatest impact to improving public safety at that location.

Description of Finding	Ranking Code	Recommendations
Finding #3: ***The data presented by LAPD in their evaluation of the Photo Red Light Program, is inadequate to show a significant increase in public safety.***	U	5. LAPD should modify the method by which the PRLP is evaluated by ensuring complete and relevant data that supports the type of enforcement, i.e., right turns or straight-through violations.
	D	6. Over the long term, LAPD should pursue the full implementation of the planned integrated system to electronically record all relevant collision information, making it more easily accessible for data analysis and program evaluation.
	N	7. In the short-term, LAPD should expand their data collection from collisions at PRLP intersections. Rather than relying solely on key data fields captured by division databases, consider the information included in written collision reports and video images of the collisions that may be captured by the PRLP system, for example: ▪ Collision type (broadside, rear-end, etc.) ▪ Time into red ▪ Speed of the vehicle ▪ Movement preceding collision ▪ Feet from the intersection

Description of Finding	Ranking Code	Recommendations
	N	8. Because the PRLP seeks to modify risky behavior by ensuring compliance with traffic laws, LAPD should also assess the program results in terms of the rate of violations or citations issued through the PRLP by intersection approach. An expected outcome for a successful program would show that violations at a given location decrease over time.
Finding #4: Other factors that may be responsible for a reduction in Traffic Collisions have not been considered in reporting program results.	N	9. In coordination with LADOT, LAPD should consider, at a minimum, the effect of traffic volume in the comparative metric in reporting and measuring program results. Specifically: a. The number or ratio of traffic collisions at monitored intersections (considered through implementation of recommendations 6 and 7) compared to the number of vehicles transiting a single approach. A successful program outcome would note a decline in the adjusted ratio. b. The number or ratio of violations at monitored intersections (considered through implementation of recommendation 8) compared to the number of vehicles transiting a single approach. A successful program outcome would also note a decline in the ratio.

Section II: The Program's Impact on City Finances		
Finding #5: ***The Program has not covered its operational costs nor generated additional revenue for the City.***	U	10. LAPD and LADOT should consider departmental priorities along with the expected outcomes of the PRLP in allocating resources to the program.
Finding #6: ***All PRLP violations are cited under the same CVC and were assessed a $446 fine, regardless of the relative danger of the violation.***	N	11. Council should direct LAPD and the CLA to promote legislative action at the State to amend the CVC so that fines for red light violations reflect current technology and are proportional the to the level of danger (e.g., graduated fines, etc.).
Finding #7: ***Existing law and recent Legislative Changes Could Significantly Decrease Program Revenue.***		

Section III: Contract Oversight and Monitoring		
Finding # 8: The City relies on the vendor to ensure a complete reporting of all photo red light events, potential and LAPD approved violations, and actual citations mailed to violators, without ensuring completeness of the data.	N	12. LAPD should include a requirement in a new PRL contract for the vendor to serially number events so that LAPD review can easily detect any missing event numbers.
	N	13. LAPD should continually store their own log of all citations approved for issuance and periodically compare that log with the vendor's notification to the Court of citations mailed to registered owners and entered into the Court system.
	D	14. LAPD should include a requirement in the new PRL contract for the vendor to produce a comprehensive quarterly status report on each citation processed. For example, based on citation number, the status report could show the judicial and payment status of all citations previously and newly issued, broken out by month and year, and reconciled with the prior report.

Finding # 9: ***Anticipated expansion of the program will shift responsibility for infrastructure construction to the Vendor. To preserve the City's financial interests, LAPD must consider payment alternatives and asset ownership in negotiating a future contract.***	N	15. In negotiating the new contract for the PRLP, LAPD should seek competent counsel to protect the City's interests. Ensure issues regarding asset ownership, construction costs, and any related program delays due to construction, are specifically included in the contract terms.
Finding #10: The Program is highly dependent on vendor viability; therefore, the City must ensure appropriate due diligence in contractor selection and clarity of contract terms	N	16. LAPD should work with the City Attorney and the CAO in ensuring the selection process and contract terms fully protect the City's financial interests.

Description of Recommendation Ranking Codes

U- Urgent-The recommendation pertains to a serious or materially significant audit finding or control weakness. Due to the seriousness or significance of the matter, immediate management attention and appropriate corrective action is warranted.

N- Necessary- The recommendation pertains to a moderately significant or potentially serious audit finding or control weakness. Reasonably prompt corrective action should be taken by management to address the matter. The recommendation should be implemented within six months.

D- Desirable- The recommendation pertains to an audit finding or control weakness of relatively minor significance or concern. The timing of any corrective action is left to management's discretion.

N/A- Not Applicable

Appendix B

References Reviewed for this Report

1. Walden, T.D., Ph.D. *"Analysis On The Effectiveness Of Photographic Traffic Signal Enforcement Systems In Texas."* Crash Analysis Program of the Center for Transportation Safety, Texas Transportation Institute, Texas A&M University. Prepared for the Traffic Operations Division, Texas Department of Transportation. November 2008. [http://www.burlesontx.com/Acrobat/final_report_rlc_1008.pdf Accessed 9 Jul 2010.]

2. Bonneson, J., K. Zimmerman, and C. Quiroga. "*Review and Evaluation of Enforcement Issues and Safety Statistics Related to Red-Light-Running."* Report No. FHWA/TX-04/4196-1. Texas Department of Transportation, Austin, Texas, September 2003. [http://tti.tamu.edu/documents/4196-1.pdf Accessed 7 Jul 2010.]

3. Bonneson, J. and Zimmerman, K. *"Development of Guidelines for Identifying and Treating Locations with a Red-light Running Problem."* Report No. FHWA/TX-05/0-4196-2 College Station, Tex.: Texas Transportation Institute, The Texas A & M University. September 2004. [http://tti.tamu.edu/documents/0-4196-2.pdf Accessed 7 Jul 2010.]

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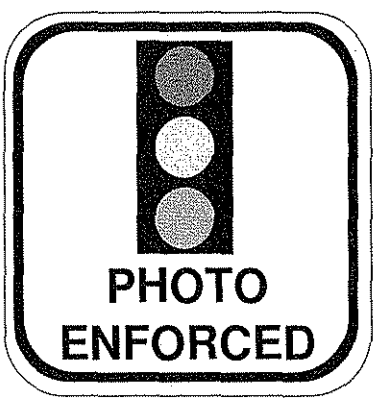
Appendix C

VDOT
Virginia Department of Transportation

Red Light Running Camera (Photo Enforcement) Engineering Safety Analysis Template



Highway Operations Section
Traffic Engineering Division
Virginia Department of Transportation
1401 East Broad Street
Richmond, Virginia 23219

February 19, 2008

February 19, 2008

VDOT
Traffic Signal Photo Enforcement
Engineering Analysis Template

Local Jurisdiction: _____ VDOT District: _____
(County/City/Town)

Intersection: _____
Street Name (Route #) at Street Name (Route #)

This Study performed under the direction of _____
(licensed professional engineer)

A. INTERSECTION & SIGNAL DATA

1. Signal Visibility

a. Minimum Sight Distance to Signal

Approach	Grade	Speed Limit (mph)	Measure (ft)	Required (ft)*

*See attached table of minimum sight distance requirements from the MUTCD.

b. Are "SIGNAL AHEAD" signs present? ☐ Yes ☐ No
Are "SIGNAL AHEAD" signs needed? ☐ Yes ☐ No
Are other warning signs present in the vicinity of the intersection? ☐ Yes ☐ No
Explain: _____
_____

c. Information on Signal Heads

Approach	Lens Size	Lens Type (LED or Bulb)	Back Plates (Yes or No)

2. Pavement and Markings Data

a. Stop bars in "good" condition? ☐ Yes ☐ No
Explain: _____
_____

b. Lane lines "clearly" visible? ☐ Yes ☐ No
Explain: _____
_____

c. Crosswalks "clearly" marked? ☐ Yes ☐ No
Explain: _____
_____

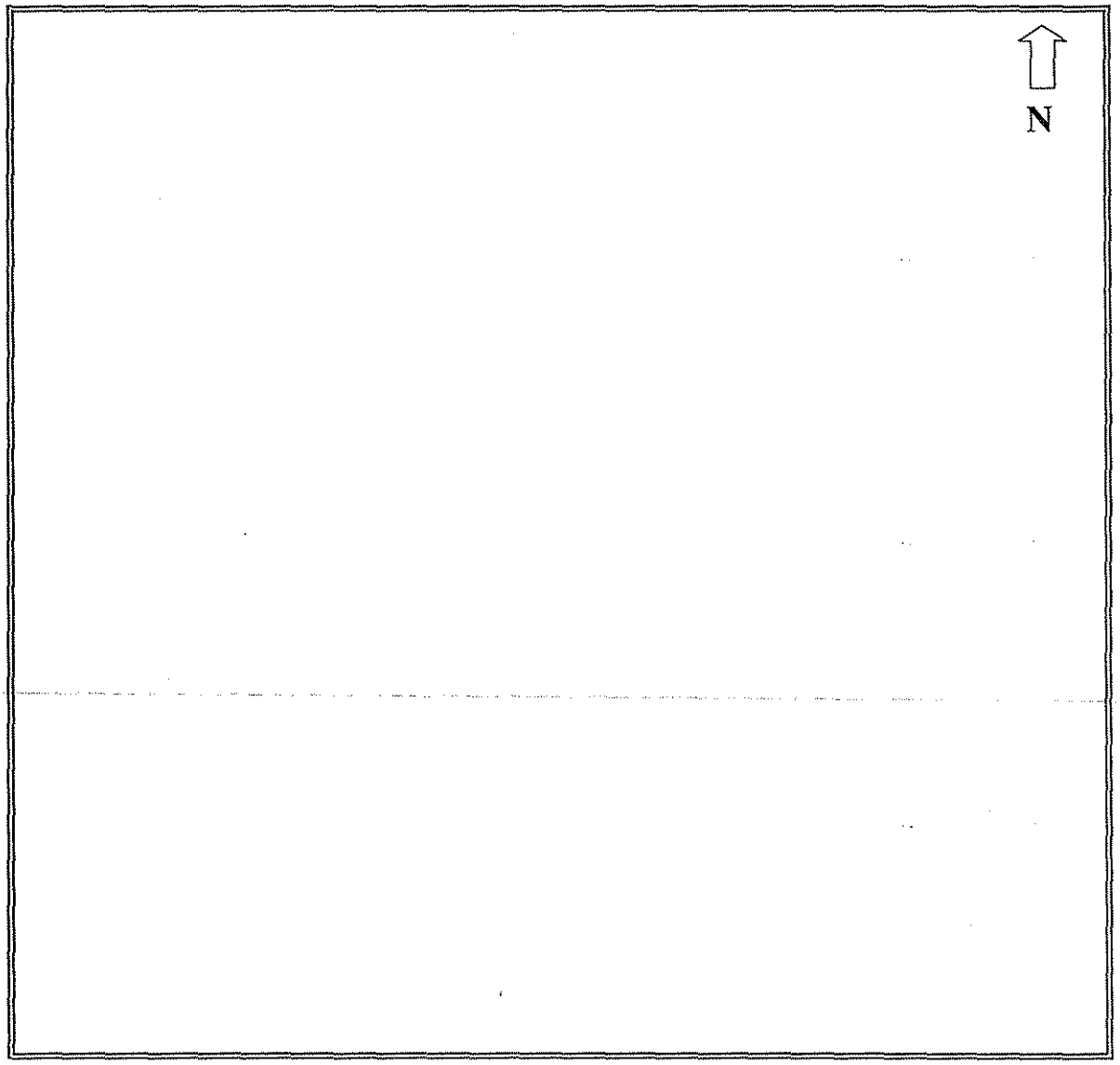
d. Pavement conditions (ruts, potholes, cracking, etc.)?

- ☐ Good Explain: _____
- ☐ Fair Explain: _____
- ☐ Poor Explain: _____

e. Pavement surface treatments exist? (rumble strips, texturing, pavers, etc.)

- ☐ Yes Explain: _____
  _____
- ☐ No

3. Provide diagram of intersection including: pavement markings, width of lanes and medians, location of signal heads and signs, locations of loops/detectors, and grades.



B. SIGNAL TIMING & TRAFFIC DATA

1. Clearance Intervals

Approach	Posted Speed Limit	Grade	Width of Intersection	Yellow Interval		All Red Interval	
				Existing	Calculated*	Existing	Calculated*

*Reference TE Memo 306 provided in Appendix E for calculation of Clearance Intervals

2. Include existing controller settings for each phase and each time-of-day. Information should include applicable settings such as minimum green, max 1 & 2, passage, minimum gap/ext, protected-permissive, lead-lag, yellow and all red, walk and ped clearance time, recall settings, offsets, cycle length, etc. Include analysis of peak hour conditions and a determination of whether signal timings are contributing to red-light running problem.

a. Does signal timing or phasing factor in as a possible contributor to RLR at this intersection?

☐ Yes Explain: _____

_____

☐ No

b. List comments or recommendations on potential signal timing or phasing changes:

_____

_____

_____

3. Vehicle Detection Data

Approach	Detection Type (loop, video, etc.)	Detector Location (measured from stop bar)

4. Traffic Volume Data

Approach	Daily Volumes		Peak Hour Volumes	
	Total	Heavy Vehicles	Total	Heavy Vehicles

C. CRASH & ENFORCEMENT DATA

1. Three-Year Crash Data

Collision Type	3-year Total	Number of Injury Crashes	Number of Fatal Crashes	Crashes Associated With Red-Light-Running
Angle				
Rear End				
Head On				
Sidewsipe				
Pedestrian				
Bicyclist				
TOTAL				

2. Crash Rate
   a. Number of crashes per million entering vehicles: _____
   b. Locality rate for comparison (if available): _____

3. Violation Rate
   a. Number of red light running citations per year issued by law enforcement at the evaluated intersection, if available.
   Number: _____ Year: _____

   b. Observed Violations
   Date: _____
   Time Period: _____

Approach	Traffic Volume	Number of Violations

4. Enforcement and Operational Issues
   a. Describe the difficulty experienced by law enforcement officers in patrol cars or on foot in apprehending violators.
   _____
   _____

   b. Describe the ability of law enforcement officers to apprehend violators safely within a reasonable distance from the violation.
   _____
   _____

   c. Are pedestrians at risk due to violations? ☐ Yes ☐ No
   Explain: _____
   _____

   Number of pedestrians per hour? _____
   Pedestrian crosswalk provided? ☐ Yes ☐ No

   d. Have there been any changes to the operations of the intersection (signal timing, restriping, or increased enforcement) within the past three years? ☐ Yes ☐ No
   Explain: _____
   _____

Minimum Sight Distance

85th Percentile Speed (mph)	Minimum Sight Distance (ft)
20	175
25	215
30	270
35	325
40	390
45	460
50	540
55	625
60	715

Table 4D-1 *Manual on Uniform Traffic Control Devices,* (Revision 1, Nov 2004) Transportation Research Board (TRB), Washington, DC, 2003