April 18, 2011

TO: The Honorable Board of Police Commissioners

FROM: Jay Beeber, California Motorists Association, Safer Streets L.A.

SUBJECT: LAPD ANALYSIS OF JAY BEEBER'S REPORT ENTITLED SAFER STREETS INLOS ANGELES: WHY ENGINEERING COUNTERMEASURES ARE MORE EFFECTIVE THAN PHOTO ENFORCEMENT IN REDUCING RED LIGHT RELATED CRASHES (CITY COUNCIL MOTION 11-0125)

At the Police Commission meeting on April 19, 2011, the LAPD will present Report BPC #11-0158, relative to City Council Motion 11-0125 (Perry, Zine) requesting the Los Angeles Department of Transportation (LADOT), with the assistance of the Los Angeles Police Department (LAPD) and the Chief Legislative Analyst, to conduct an analysis of Jay Beeber's Report entitled “Safer Streets in Los Angeles: Why Engineering Countermeasures are More Effective than Photo Enforcement in Reducing Red Light Related Crashes”.

This report is in response to the LAPD report.

BACKGROUND

On January 26, 2011, Councilmembers Jan Perry and Dennis Zine introduced a motion (Council File {CF} No. 11-0125) requesting the Los Angeles Department of Transportation (LADOT), with the assistance of the Los Angeles Police Department (LAPD) and the Chief Legislative Analyst, to conduct an analysis of Jay Beeber's Report entitled "Safer Streets in Los Angeles: Why Engineering Countermeasures are More Effective Than Photo Enforcement in Reducing Red Light Related Crashes".

On or about March 24, 2011 the LAPD submitted Report BPC #11-0121, dated March 21, 2011, in response. On March 26, we alerted the Board of Police Commissioners that the department had responded to the wrong report. The department subsequently withdrew Report BPC #11-0121 and was directed to report back to the Board of Police Commissioners by April 12, 2011 with a response to the report referenced in Council Motion 11-0125. On April 14, 2011, the department submitted Report BPC #11-0158 in response.

THE REPORT’S AUTHORS

The California Motorists Association and Safer Streets L.A. are grassroots organizations dedicated to furthering the interests of the motoring public through the adoption of scientifically sound and sensible transportation and traffic laws. Safer Streets L.A. focuses on matters affecting the Los Angeles area while the California Motorists Association concentrates its efforts at the state level. There is often some overlap between the two groups. We believe that accurate information and critical thinking are crucial to implementing sound public policy. Towards that end, we strive to provide the public and our elected representatives with well researched and verifiable data. Our goal

is to counter long-held misconceptions and misinformation with solid facts in order to promote scientifically based solutions to motorist and pedestrian safety issues.

We wish to emphasize that while we are critical of the City of Los Angeles' Red-Light Camera Program, we are strong supporters of the LAPD in general. The police department regularly provides outstanding service to the citizens of Los Angeles and we wholeheartedly support their efforts in a number of areas. Recently, our report for the Sherman Oaks Neighborhood Council on potential countermeasures for improved pedestrian safety throughout the city won high praise from Captain Ivan Minsal of the Valley Traffic Division, as well as the LADOT and Councilmember Paul Krekorian.

GENERAL COMMENTS ON THE LAPD RESPONSE

According to the LAPD's response, Council Motion 11-0125 raised one area of concern:

> Are the City's Photo Red Light intersections the most efficient and cost effective in reducing overall serious injury and fatal traffic collisions from red light violations?

Although the response spends a great deal of time defending current LADOT practices at PRL intersections, the report fails to address this central question. The premise of the "Engineering Countermeasures" report is that at signalized intersections, photo enforcement is a less effective means of improving safety than providing a properly engineered intersection which includes sufficient yellow and all-red signal phases (and possibly a protected left turn phase among other engineering remedies). Stated another way, once a problem intersection is treated with the proper engineering countermeasures, red-light cameras should become unnecessary. In a phone conversation on November 9, 2010, we posed this assertion to John Fisher, Assistant General Manager of the LADOT. His response was, "I would generally agree with that". Regardless of whether or not Mr. Fisher or his staff currently stands by that response, numerous other qualified traffic engineers along with a preponderance of the available scientific evidence indicates that it is true. Attached to this report as Appendix A, is a copy of the testimony of Matt Gauntt, P.E. to the Illinois Senate. Mr. Gauntt is a traffic engineer with over 20 years experience in the field and author of numerous scientific studies on the subject. In his testimony, he states:

> After reviewing the technical literature and examining the advent of red light running cameras for myself, it is my opinion that the use of red light running cameras will not improve traffic safety and may very well result in a decrease in safety to the motoring public. At best, the evidence points to no significant improvement to safety based on their use. Instead of utilizing red light running cameras, there are numerous solutions (referring to the engineering countermeasures he discusses earlier in his testimony such as longer yellow timing) that will have a far greater likelihood of improving traffic safety.

Our criticism to the approach being taken to intersection safety improvements in the City of Los Angeles is that the decision to use red-light cameras, has been and is, the first step in the process. In contrast, the prevailing opinion of experts in the field of traffic safety is

that engineering countermeasures should first be implemented and evaluated prior to the consideration of photo enforcement. When the current PRL program was implemented, some engineering countermeasures were employed, but their success in improving intersection safety was not evaluated prior to the installation of the cameras. This is totally nonsensical. Safety seems to have improved at PRL intersections and this is most likely due to the lengthening of the yellow signal time and implementation of an all-red phase*. Unfortunately, we will never be 100% sure because photo enforcement was instituted at the same time. However, the available evidence which we presented in great detail in our previous report submitted to commission members entitled "*Response to LAPD Response to City Controller's Audit*" (excerpted in Appendix B) strongly suggests that red-light cameras cannot be credited with improving intersection safety in Los Angeles.

In the balance of this response, we follow the format of the LAPD response. Text from the LAPD response appears in bold italics. Our response follows.

DISCUSSION

In November 2010 and March 2011, Jay Beeber of the California Motorists Association and the Freedom Minute website…

While not material to the discussion at hand, it should be noted that while the Freedom Minute website is run by the author of the report being discussed, it is a wholly separate project and has nothing whatsoever to do with the "Engineering Countermeasures" report and is not referenced in any of the material submitted to the City Council, LADOT, or LAPD on this issue. It is unknown why the LAPD felt the need to reference that entity here in this response.

…released a report that indicates that the City has not appropriately incorporated effective countermeasures at its Photo Red Light (PRL) intersections.

This statement shows a fundamental misunderstanding of the nature of the "Engineering Countermeasures" report. The report does not indicate *"that the City has not appropriately incorporated effective countermeasures at its Photo Red Light (PRL) intersections"*. On the contrary, the report specifically states that the engineering countermeasures employed by the LADOT at PRL intersections when the cameras were installed (which included lengthening the yellow signal interval and adding an all-red signal phase) did increase safety. In fact, we maintain that this is the main reason that these intersections have experienced a decrease in red-light related collisions. The report does explain how and why a further lengthening of the yellow and all-red phases might be necessary at intersections where red-light running accidents continue to be over represented, but that is far different than the above statement made in the LAPD response.

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*Some additional lengthening of the yellow time may be warranted to eliminate residual unintentional violations, especially were red-light cameras are being employed.

This point was discussed at length during our meeting on March 31st where we again expressed that it was the signal timing changes made by DOT and not the red-light cameras that were responsible for any safety improvements seen at PRL intersections. This seemed to be a point of agreement as Sgt. MacWillie responded, "Yes, it was the signal changes, not the cameras". This issue was further clarified in a follow-up email to the two DOT representatives that attended that meeting, wherein I again made it clear that *"the 'Safer Streets' report was (not) a criticism of the LADOT (current practices at PRL intersections) but rather… a general explanation of the types of countermeasures that might be possible as a cost effective alternative to photo enforcement"*.

The "Engineering Countermeasures" report was prompted by the current approach being undertaken by the City in which the RFP process is being pursued prior to the implementation and evaluation of proper engineering countermeasures at signalized intersections where red-light related collisions are over represented. As such, it offers guidelines for future public policy regarding improving intersection safety, not a criticism of the effectiveness of current engineering countermeasures at PRL intersections.

The report claimed that 95 percent of red light violations occur within the first two seconds and that 80 percent of violations occur during the first second after the light has changed to red. The report further claimed that late into red violations only account for five percent of red light running.

This is not simply a "claim" but rather a fully documented description of the findings from a Texas Transportation Institute study conducted by highly qualified transportation researcher engineers. To call it a "claim" is to minimize its importance within the "Engineering Countermeasures" report and to denigrate the work of the Texas research scientists. Furthermore, understanding that the vast majority of red-light running occurs very early in the red cycle is critical to understanding how engineering countermeasures such as longer yellows and all-red phases can reduce or eliminate accidents at signalized intersections.

ANALYSIS

Mr. Beeber claims that yellow signal timing should be increased by up to one second beyond the minimum recommended time, and that the minimum should be based on the 85th percentile, rather than the posted speed limit.

The purpose of the yellow signal phase is to alert drivers that their right-of-way is about to end and, depending upon their relative proximity to the intersection, to permit them to come to a safe stop or allow them time to clear the limit line prior to the onset of the red phase. Therefore, in setting the proper yellow time, the actual speed of traffic must be used if the goal is to permit safe stopping or safe clearance of the limit line without violating the red. This is simply common sense. For decades, the standard that has been used for the actual speed of vehicles upon a roadway is the 85th percentile speed of free flow traffic. This is why the Institute of Transportation Engineers (ITE), not just Mr. Beeber, recommends using the 85th percentile speed of free flow traffic in their kinematic formula to calculate the minimum yellow time. As will be seen from a further discussion of this topic below, the California MUTCD also requires that the 85th percentile be used

to set the minimum yellow signal time because the 85th percentile and the posted speed limit are supposed to be one and the same.

As far as the recommendation to set the yellow time above this minimum, numerous studies have shown a safety benefit to increasing the yellow time slightly beyond the minimum. The "Engineering Countermeasures" report fully documents these studies with charts, graphs and references to the actual studies. It is unnecessary to duplicate that documentation here. It should be noted, however, that the recommendation contained in the "Engineering Countermeasures" report is for an increase ***up to*** one second and that recommendation is only necessary when the yellow phase based on the 85th percentile is insufficient to reduce violations or collisions to acceptable levels. In most cases, setting the yellow time at the 85th percentile should be adequate. As can be seen, this recommendation is entirely within accepted, even preferred, engineering practices.

In California, jurisdictions are legally required to operate traffic control devices according to the standards established by the California Manual of Uniform Traffic Control Devices (MUTCD).

Keep in mind that this is a legal requirement for the ***absolute minimum***. Nothing prevents a jurisdiction from going beyond this minimum in order to improve safety when necessary. In fact, the legislature felt it so important to point out that jurisdictions may exceed this minimum that they included the following in section 21455.7 (c) of the vehicle code: *"A yellow light change interval may exceed the minimum interval established pursuant to subdivision (a)"*. (Subdivision (a) establishes the minimum duration of the yellow signal at intersections equipped with photo enforcement.)

Clearly the LADOT understands that this minimum may be exceeded since it is their standard to exceed what they understand to be the minimum by .3 seconds at PRL intersections. As we have stated numerous times, this a commendable practice but may be insufficient when there remains significant red-light related collisions at the intersection or when a red-light camera is present generating high numbers of citations due to the "spread" between the DOT's current timing practices and what the light would be timed at using the true 85th percentile speed.

Hence, the minimum yellow change interval shall be set in accordance with the posted speed limit.

This requirement does not exist in a vacuum. Using the posted speed limit for signal timing is only valid if *all* the MUTCD standards are met which, when taken together, would require that the posted speed limit be set at the 85th percentile speed (with one exception*).

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*The MUTCD allows the posted speed limit to be reduced by 5 mph in limited circumstances based upon engineering judgment. This does not, however, change the actual 85th percentile speed. In these situations, using the actual 85th percentile speed (rather than the posted speed) in calculating the minimum yellow time would be necessary to ensure that motorists are presented with a sufficient yellow signal time.

Section 2B.13 on Page 2B-7 of the California 2010 MUTCD reads:

> "When a speed limit is to be posted, it **shall** be established at the nearest 10 km/h (5 mph) increment of the 85th-percentile speed of **free-flowing** traffic.

Page 278 from the Institute of Transportation Engineers Handbook states:

> "The definition of a free-flowing vehicle is one that is trailing the previous vehicle in the same lane by 3 seconds or more."

Therefore, the MUTCD standard for signal timing is only met when the posted speed limit is set at the 85th-percentile speed of free-flowing traffic. Unfortunately, this is rarely the case in Los Angeles. In many instances, especially on the types of roadways that are most often considered for photo enforcement, the 85th-percentile speed of free-flowing traffic exceeds the posted speed limit by 5 - 15 mph.

The following examples taken from City Council file records of speed surveys recently performed by the LADOT illustrate this point:

Chatsworth Drive between Golden State Freeway (5) and Chatsworth Street
Posted – 35 mph, Survey – 45 mph 3/2010

Paxton Street between Arleta Avenue and Foothill Boulevard
Posted – 30 mph, Survey – 40 mph 3/2010 (39 to 42 mph) 7/2009

Polk Street between Glenoaks Boulevard and San Fernando Road
Posted – 35 mph, Survey – 42 mph (between 40 and 44 mph) 11/08

Chandler Boulevard between Lankershim Boulevard and Coldwater' Canyon Avenue
Posted – 35 mph, Survey – 45 mph 2/2009

Hollywood Way between Glenoaks Boulevard and Burbank City Limit
Posted – 35 mph, Survey – 44 mph 8/2006

Burbank Boulevard between Clybourn Avenue and San Diego Freeway
Posted – 35 mph, Survey – 42 mph (between 39 and 45 mph) 8/2009

Laurel Canyon Boulevard between Chatsworth Drive and Osborne Street
Posted – 35 mph, Survey – 41.3 mph (between 39 and 43 mph)

Laurel Canyon Boulevard between Osborne Street and Sheldon Street
Posted – 35 mph, Survey – 44.8 mph (between 43 and 47 mph) 9/2009

Laurel Canyon Boulevard from Sheldon Street to Riverside Drive
Posted – 35 mph, Survey – 39.6 mph (between 37 and 41 mph)

Balboa Boulevard between Foothill Boulevard and Midwood Drive
Posted – 40 mph, Survey – 49 mph (between 48 and 52 mph) 2/2008

At PRL intersections, LADOT implemented the yellow time interval using a speed value that is five miles per hour higher than the posted speed limit. Hence, the yellow time interval used in the City exceeds the California MUTCD's standard for minimum yellow change interval.

First, keep in mind that while the practice described here may be true for the 32 PRL intersections, it may not (and often is not) true for the thousands of other signalized intersections in the City of Los Angeles. Some of those intersections may have an elevated accident rate which might prompt the LAPD to consider photo enforcement. However, an inexpensive yellow timing change (along with a sufficient all-red phase) would likely alleviate the problem.

Second, a response to the claim about exceeding the MUTCD standard is covered extensively in the "Engineering Countermeasures" report, yet rather than respond to that, the LAPD report ignores it completely and simply reiterates the same argument that was refuted. Therefore, we will once again attempt to explain the inherent flaw in the above claim.

---- Where the 85th-percentile speed of free-flowing traffic is more than 5 mph higher than the posted speed limit, the current LADOT practice of using the posted speed plus 5 mph (posted +5) to set the yellow time not only *fails to exceed* the MUTCD minimum requirements, it *fails to meet* them. --------

Perhaps a real-world example will best illustrate this point. The PRL enforced intersection of Sherman Way and Louise has the highest number of straight through red light violations of any of the 32 PRL intersections. The posted speed limit on Sherman Way (the camera monitored approach) is 35 mph. The LADOT has set the yellow signal at 3.9 seconds using the posted +5 formula. However, the actual 85th percentile speed of free flow traffic measured on March 27, 2011 is 48 mph. That 85th percentile speed would require a yellow signal time of 4.5 seconds, more than half a second longer than the current timing. If the posted speed limit were changed to 45 mph to comply with the requirements in the MUTCD and the DOT practice of using the posted speed plus 5 mph employed, the yellow time would be set at 4.7 seconds. This would likely eliminate the vast majority of violations at this intersection.

What's worse, the DOT has been aware of the discrepancy between the posted speed limit and the 85th percentile speed at this location and has not adjusted the speed limit or, more importantly, the signal timing. In May of 2008, LADOT performed a speed survey at this location and measured an 85th percentile speed of 40 mph. Had the posted speed limit been changed and, as a result, the signal timing adjusted using the stated DOT practice of posted +5, the yellow signal timing would have been adjusted upwards to 4.3 seconds. Undoubtedly, violations would have decreased due to this timing change. Yet for the past 3 years, the City has been issuing citations based on a yellow signal time they know is not in compliance with their own practices.

Generally, the actual approach speeds are reflected by the measured 85th percentile speeds may be slightly higher or lower than the posted speed limit.

The vast majority of 85th percentile speeds are higher than the posted speed limit, as we have shown above.

The upward adjustment of the speed value by five miles per hour accommodates the condition wherein the 85th percentile speed is slightly above the posted speed limit.

But as we have seen, it does not accommodate the very common situation on Los Angeles roadways where the 85th percentile speed of free-flowing traffic is more than 5 mph higher than the posted speed limit.

Further increasing the yellow change interval to accommodate the drivers driving beyond the 85th percentile speed would encourage disrespect for traffic signal control not just at one site but possibly at other traffic signals as well.

Further increasing the yellow change interval is not meant to accommodate drivers driving beyond the 85th percentile speed. It is meant to accommodate variations in human perception-reaction time and the slower deceleration of heavy vehicles such as city buses. Furthermore, the LADOT currently sets the yellow signal time at PRL intersections .3 seconds beyond what they claim is the MUTCD standard. Why are they not concerned that this will "*encourage disrespect for traffic signal control not just at one site but possibly at other traffic signals as well*"? The reason, of course, is that driver disrespect for traffic signal control does not occur until you lengthen the yellow signal significantly beyond driver expectation. The studies referenced in the "Engineering Countermeasures" report (and completely ignored in this LAPD response) show that yellow signal times under about 5.5 to 6 seconds do not cause drivers to willfully change their behavior. This is why the MUTCD states: "A yellow change interval should have a duration of approximately 3 to 6 seconds". The practice suggested in the "Engineering Countermeasures" report would rarely if ever result in yellow times much over 5 seconds.

In the Federal Highway Administration report (also cited by Mr. Beeber), Making Intersections Safer: A Toolbox of Engineering Countermeasures to Reduce Red-Light Running, it was noted that a yellow "interval that is too long could decrease the capacity of the intersection and increase the delay to motorists and pedestrians. Present thought is that longer intervals will cause drivers to enter the intersection later and it will breed disrespect for the traffic signal. The tendency for motorists to adjust to the longer interval and enter the intersection later is referred to as habituation."

A thorough reading of this section of the FHWA report makes is clear that the authors are referring to yellow times longer than 6 seconds. The section where the above quote appears concludes, "The Manual of Traffic Signal Design (45) cautions that change intervals greater than 6 sec. should be examined critically before being implemented. They cite loss in efficiency and capacity at the intersection and a tendency for local drivers to use more of the change interval when they know that it is longer than normal". Again, the "Engineering Countermeasures" report does not advocate yellow times greater than 6 seconds.

Furthermore, the cited studies which show significant benefit to lengthening the yellow change interval typically examined locations where the yellow change intervals were shorter than engineering guidelines, and thus were lengthened to meet those guidelines.

This is categorically untrue and the LAPD report provides no references to back up this claim. A careful reading of the cited studies, specifically the Texas Institute study by Bonneson (reference 1) shows that the difference in the yellow interval of +1 second which showed a 53% decrease in violation frequency (table 2-2 in the study) is the difference between the "observed" yellow interval and the "computed" yellow interval. The computed yellow interval is stated as being the value that would be computed using the ITE kinematic formula which calculates the minimum yellow interval (which is also the formula the DOT uses for calculating the yellow time using the posted +5 method). Therefore, the additional 1 second of yellow time is *in addition to* the yellow times calculated using engineering guidelines, not times shorter than engineering guidelines as claimed in the LAPD report.

At all PRL intersections, an all-red clearance interval is already implemented.

Yes, it was implemented when the cameras were installed and likely is a huge factor in the safety improvements seen at PRL intersections. This leads to the inevitable conclusion that at non-PRL intersections where the all-red phase is missing or insufficient, this countermeasure will improve safety, just as the "Engineering Countermeasures" report suggests, and red-light cameras will likely not be necessary. Remember, the criticism is not that the all-red phase isn't being employed at PRL intersections; the criticism is that when it was employed, the benefit of doing so was not evaluated prior to the decision to install the cameras.

As with other intersections, an all-red clearance time is implemented based on the width of the cross street and the posted speed limit plus five miles per hour.

Unfortunately, the DOT does not explain what formula it uses to calculate the all-red interval, only that it is "based on" the width of the cross street. We previously attempted to get a copy of the written guidelines for how this interval is calculated, but were told that no written guidelines exist. The ITE has a formula to determine the necessary all-red phase which takes into account the width of the intersection and vehicle approach speeds.

We did a spot study of the all-red times at a number of intersections throughout the city and found that they varied significantly from intersection to intersection and even between intersections of similar widths. We could find no consistency in the application of the all-red phase and therefore surmise that the ITE formula is not being used.

Further extending the all-red clearance interval would reduce the capacity of the intersection and exacerbate delays, especially in congested corridors.

If this is true, then why would the all-red phase vary so significantly between intersection approaches along the same corridor which would presumably have similar amounts of congestion? For example, the all-red phase on the Roscoe approach to the intersection of

Mason Ave., is a scant .47 seconds, but the Roscoe approach to the intersection of Lindley Ave., within the same corridor is 1.1 seconds. It is difficult to believe that the all-red at Roscoe and Mason is set so short because the DOT is concerned about intersection capacity or that lengthening the all-red to match the Roscoe/Lindley intersection would increase congestion to such a degree that it would be unfeasible.

Furthermore, according to Stein in "*Traffic Signal Change Intervals: Policies, Practices, and Safety*", studies have shown that "adding 1 or 2 seconds to the traffic signal change interval timing reduces traffic conflicts without significantly affecting traffic operations". A study by Findley, "*Evaluation of Increased Intergreen Time at Signal Sites Operating Close to Capacity*", concluded that an increase in change interval time did not increase intersection congestion, even at intersections operating near capacity. In any case, the all-red phase should be set to at least the minimum required based on the width of the intersection and the speed of traffic typical for that section of roadway. For most major intersections in Los Angeles, the all-red phase would need to be set at a minimum of 1.5 - 2 seconds in order to meet this requirement.

Protected left turn signals can reduce left turn opposing traffic collisions. However, they can also significantly reduce traffic flow and volume. The City installs protected left turn arrows at intersections if there is a documented collision history in accordance with the goals of balancing intersection safety with sufficient traffic flow.

We generally agree with this approach, which is why the "Engineering Countermeasures" report states that "at intersections where left-turn-opposed crashes are over represented, significant safety improvement can be achieved by implementing a protected left turn (red arrow) phase". However, we are concerned about the DOT statement on "balancing intersections safety with sufficient traffic flow". Broadside and angle collisions due to unprotected turns into oncoming traffic are among the most serious, and constitute many of the accidents that cause injury and death. One would hope that any balance between safety and traffic flow would be tipped in favor of improved safety.

Red light running results from a combination of factors. It would be inaccurate to classify red light running as either wholly "intentional" or "unintentional." Consider drivers who intentionally speed up in order to beat the red light but are "unintentionally" behind the limit line when the light turns red.

First, we would put this in the "intentional" category because in the example proposed, the driver would have made a willful attempt to "beat the light" knowing they could have stopped. That decision would have been the immediate cause of the violation. Second, the fact that you can find an example that is in the "grey area" of intentionality, doesn't negate the fact than most other types of violations easily fit into one category or another. Third, the distinction between intentional and unintentional violations is not our construction. Numerous researchers categorize red-light violations in this manner. We simply adopted their terminology. Finally, the behavior described above, whether you consider the violation intentional or unintentional, would not result in a broadside collision at a properly engineered intersection with a sufficient all-red phase. The driver in this example would violate the signal very early into the red phase, perhaps an eighth to a quarter second late. The all-red phase would protect cross traffic from entering the

intersection while this driver is traveling through it. Recognizing that some "rushing of the red" will occur at signalized intersections, and recognizing that violations that result will be very early in the red is critical in understanding why a sufficiently long all-red phase in necessary.

The response, however, completely skirts our main point which is that broadside collisions are generally the result of late-into-red violations which occur from impairment, distraction and fatigue. Red light cameras cannot prevent these accidents because if the driver is unaware of the red light, they will certainly be unaware of the cameras. This cannot be overstated. Red-light cameras cannot prevent accidents caused by impairment, distraction and fatigue and these are the primary factors involved in the vast majority of serious red-light related accidents.

Unintentional violations should also be considered for enforcement solutions. A major advantage of enforcement solutions is that they modify driver behavior and attitude.

Even if one could modify driver behavior to reduce certain types of unintentional violations, the question would then be whether *red-light cameras* are an efficient and cost effective method for achieving this goal. While the presence of police officers patrolling the city may modify driver behavior in this manner, red-light cameras are unlikely to have a similar effect. Unfortunately, the PRL program diverts officers from patrol duties where they can have a significant effect not only on modifying driver behavior, but on crime in general. Police officers on patrol have a widespread positive effect on safety throughout the city. Red-light cameras are no substitute for cops on the beat.

Engineering solutions may be appropriate as well, but engineering and enforcement are not mutually exclusive.

We have never suggested that they are mutually exclusive, only that when it comes to improving intersection safety, engineering solutions are much more effective than red-light cameras. Engineering countermeasures are *proactive*, as opposed to photo enforcement which is *reactive*. Proactive solutions are always better than reactive solutions. Engineering countermeasures can *directly* prevent two vehicles from occupying the same space at the same time. Any benefit from photo enforcement is *indirect* and often comes long after a violation or accident occurs. And even then, it can only modify the behavior of drivers who are prone to "rush the red". A sufficient all-red phase can *directly* prevent accidents caused by this behavior much more effectively than any *indirect* effect from photo enforcement.

Expert opinions indicate that a significant amount of red light running is intentional…

The LAPD response provides no documentation of the truth of this statement. In fact, the data suggests otherwise. If a significant amount of red-light running is intentional, then why do we see such huge reductions in violations when the yellow signal time is lengthened? In Loma Linda, CA violations decreased by 92 percent after the yellows were lengthened by one second. This means that 92% of the prior violations were *unintentional*. Similar results have occurred virtually everywhere yellow times have been

increased. See our charts on the results from San Diego and Virginia in Appendix C which show significant reductions in violations when the yellow time was lengthened.

…and that enforcement countermeasures can sometimes have a more dramatic impact than engineering countermeasures.

Again, no documentation.

Traffic violators often run red lights because they believe they can get away with it.

We recognize that police officers trained primarily in enforcement will perceive this to be true, but the data we have provided strongly suggests otherwise. Certainly, some drivers will occasionally run a red light for this reason, but it is not *often* the reason for red-light running, deficient engineering is.

In addition, PRL warning signs are posted far enough back from the intersection to give motorists ample opportunity to stop for the red light. The placement of warning signs is an effective countermeasure to alert drivers that they are approaching an automated enforced intersection which decreases the chance of sudden braking, resulting in rear end traffic collisions.

Signs warning that an intersection is enforced by red light cameras do not give motorists "ample time to stop", a yellow light timed at or slightly above the 85th percentile speed of traffic does. Furthermore, they *increase*, rather than *decrease* the chance of sudden braking. To suggest otherwise is unsupportable. Again, the statistics we studied at the intersection of Sherman Way and Louise bear this out. Please see Appendix D where we show that rear end collisions increased by as much as 90% after the cameras (and the warning signs) were installed.

In contrast, the City's traffic signals go through a comprehensive design process and are implemented to meet or exceed the California (CA) and National MUTCD standards for effective visibility, conspicuity, and redundancy.

We commend the DOT for their diligence in this area. However, that does not mean that there is nothing whatsoever that can be done at signalized intersections to improve conspicuity or the overall engineering of those intersections *where necessary*.

The chart that follows the above statement shows a number of excellent engineering practices currently employed by the LADOT. However, it does not include a number of countermeasures that have been shown to reduce red-light running collisions and which should be considered (if DOT is not already doing so) for any future intersections where a red-light running problem may exist. These include adding a high visibility yellow retro-reflective border to the face of the existing signal backplates, synchronizing signals to reduce the number of red lights encountered by motorists, increasing the signal cycle length, and providing green extension through advance detection loops to minimize the chance a vehicle will be in the dilemma zone when the light turns yellow. Bear in mind, though, that the countermeasures that have been proven to be most effective in reducing red-light running are also the least expensive – lengthening the yellow phase to at or

slightly above the time required using the 85th percentile of free flow traffic and employing a sufficient all-red phase.

Mr. Beeber and the City are in agreement that there were five fatal traffic collisions that occurred at PRL intersections, prior to the installation of the cameras.

No, we are not. As we have explained numerous times, at one of those intersections, a red-light camera was in operation when the fatality occurred, albeit by a previous vendor. It is not factual to claim that this fatality occurred "prior to the installation of the cameras" and we ask the LAPD (and the camera vendor) to stop making this inaccurate claim.

All reports that listed "red light" violation as the primary cause of the collision were considered, as well as violations that could reasonably have been caused by a red light violation, but were attributed to another violation. For example, consider the collision between a pedestrian and a garbage truck…

This depends on your definition of "reasonable". Apparently the LAPD's definition is "any possibility whatsoever". We hold ourselves to a higher standard where the proof should at least rise to the level of a strong possibility rather than pure speculation. We will not here reiterate our full reasoning why the garbage truck accident should never have been included in the "five fatalities" statistic other than to say that it is highly unlikely that a red-light violation occurred due to the fact that the pedestrian and the garbage truck were both initially traveling in the same direction and it is unlikely they both ignored a red signal. Our full analysis of the five fatal accidents appears in Appendix E.

Collisions where drivers claimed that they were "tired" or "distracted" were still included because a driver's own report as to their reason for running a red light is not considered reliable testimony.

But other evidence, such as how late into red the accident occurred, is reliable evidence as to whether this is the type of accident that can be prevented using red-light cameras. As we explained above and in the "Engineering Countermeasures" report, late-into-red accidents are generally caused by impairment, distraction and fatigue and red-light cameras have no effect on this. The LAPD is using these fatalities to try to show the effectiveness of the cameras. If the accidents were caused by factors which the cameras can't remedy, then it is improper to use the absence of these types of accidents as proof that the cameras were effective in preventing them.

Furthermore, inattention and other irresponsible driving habits are the kind of behavior that is best remedied through consistent enforcement.

Perhaps, but *photo enforcement* isn't a particularly effective form of enforcement to remedy this kind of behavior. The type of enforcement must be matched with the behavior one wishes to modify. Officers on patrol are the proper form of enforcement to remedy inattention. Notice that the argument in favor of photo enforcement has now shifted from "they will stop red-light running" to "they will remedy inattention and other

irresponsible driving habits". There is no data to show that this can be an expected result from the use of red-light cameras to any measurable extent and as such it is simply wishful thinking.

This collision is an example of the tremendous benefit of the PRL Program, since the apprehension and prosecution of the suspect in this case was aided by the use of the photographic evidence.

First, this collision is an example of how red-light cameras cannot stop the most dangerous kind of red-light running caused by impairment, distraction and fatigue. Second, the fact that the camera was an aid to apprehending this one individual is not a reasonable argument for the deployment of a multi-million dollar red-light camera program with its attendant negative consequences. Notice that now the argument in favor of photo enforcement has shifted again to "it will help catch hit and run drivers". Better to implement inexpensive engineering countermeasures to reduce the chance of an accident occurring, putting the police officers back on the streets to catch drunk drivers (before they cause an accident) and use the savings to purchase a city-run closed circuit monitoring system for intersections that provides video round the clock, rather than only when a violation occurs.

The goal of the City's PRL Program is to reduce serious injury and fatal traffic collisions caused by drivers who fail to stop for red lights through high profile enforcement and education as well as to maximize the effective use of police resources.

Unfortunately, police resources are being wasted by this program. Engineering solutions will make the intersections safer and the police officers' time can be put to better use than sitting at a computer monitor approving violations or appearing in court to testify to violations that need never have occurred or pose no threat to public safety.

In March 2011, the National Safety Council released a report that tracked fatal and non fatal traffic collisions over a five year period. It tracked crash trends at PRL intersections…

No it did not. The study did not track crashes at PRL intersections and, in fact, makes no mention of red-light cameras or photo enforcement. The study looked at red-light running trends at <u>*all*</u> intersections not ones with red-light cameras. Apparently, the author of this section of the LAPD response did not read or understand the study they referenced.

The study concluded that over this five year period, there were 256 less red light running fatal crashes which represented a 58 percent decrease.

Since this study had nothing whatsoever to do with red-light cameras, we won't spend much time on it other than to point out that the decrease was over a 5 year period across the entire U.S. which calculates out to 1 fatal crash in each state each year. Furthermore, no cause for this decrease is identified or suggested in the report.

Since the cameras were installed in 2006, red light related traffic collisions have decreased by 63 percent…

And as previously shown by us and by the City Controller, and admitted to by the LAPD at the end of this paragraph, it was the signal timing changes made by the LADOT that is responsible for this decrease (along with other factors such as traffic volume reduction caused by high gas prices and the recession).

…and there have been no red light related fatalities at PRL intersections.

And there have been no red-light related fatalities at 4536 other non-PRL signalized intersections throughout the city during this same time period as well. Red-light related fatalities are relatively rare in Los Angeles and almost never occur at the same intersections from year to year, they occur randomly. Using the above statistic to suggest that the cameras have had any effect on fatalities is unsupportable.

The engineering countermeasures and rigorous signal design standards implemented by LADOT at PRL intersections undoubtedly have an impact on public safety.

We wholeheartedly agree. We hope these same countermeasures will be employed at any other intersections that might have an elevated number of red-light related crashes. Safety will improve and spending millions of taxpayer dollars on a new red-light camera contract will be unnecessary.

We also believe that engineering countermeasures depends in large part on their ability to be consistently enforced.

This statement is nonsensical. One does not "enforce" engineering countermeasures. One implements them. They stand on their own as an effective means to improve safety.

Respect for traffic laws and reducing dangerous driver habits are essential to traffic safety…

Unfortunately, the PRL program has the opposite effect of breeding disrespect for traffic laws and those that enforce them. The public realizes that the program unfairly makes violators out of otherwise law-abiding and conscientious motorists by setting up a "gotcha" scenario. Yellow signal times that are too short for the actual speed of traffic create dilemma zones in which motorists may neither be able to stop safely nor legally enter the intersection before the onset of the red phase. Dilemma zones virtually assure that some percentage of drivers will be forced to violate the red resulting in a $466 ticket.

Additionally, citizens rightly question whether the millions of dollars worth of tickets being issued annually to Los Angeles motorists for rolling-right-turns, a driving maneuver that rarely result in any kind of accident, is a legitimate use of city and law enforcement resources. Their disrespect for our laws and government officials is bolstered through the knowledge that these types of tickets comprise 75% of all PRL citations and as much as 97% at some PRL intersection approaches.

Finally, their trust in government is further eroded as they witness a for-profit vendor lobbying government officials with spurious data and statistics in an attempt to mislead our decision makers and the public into supporting a program that lines their pockets at the expense of the taxpayers and encourages otherwise responsible engineers to resist lengthening yellow lights which would improve safety.

…therefore, a strong law enforcement component must always accompany even the most rigorous engineering program.

Always? What if the engineering component eliminates the problem? Should we still spend millions of dollars and divert precious resources enforcing something that doesn't need to be enforced?

RECOMMENDATIONS

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

We ask that the Board of Police Commissioners not approve the department's report and instead take a strong position that before any new photo enforcement contract is signed, intersections suspected of having an increased risk of red-light related crashes be evaluated to determine which engineering countermeasures would be most appropriately implemented to alleviate the problem. At the very least, at problem intersections, the yellow signal time should be increased to comply with ITE standards using the 85^{th} percentile of free flowing traffic and an all-red phase should be implemented or increased to allow late arriving vehicles to clear the intersection before cross traffic is released. The countermeasures employed must then be evaluated to see if the red-light related accident rate has been reduced to acceptable levels. Until that process is completed, no new PRL contract should be approved. For your consideration, we provide a template for this process in Appendix F.

Appendix A

Testimony of Matt Gauntt, P.E. to the Illinois Senate

I would like to thank the Chairman and the Committee for inviting me to share some thoughts today about this important topic.

I have been a traffic engineer for 20 years. During that time, I have reviewed thousands of crash reports and analyzed hundreds of intersections. I've served as an expert witness for DuPage County, Kane County and the City of Crystal Lake in the area of traffic engineering. I have also taught a course on the Manual on Uniform Traffic Control Devices for IDOT District One engineers.

One of the more pertinent assignments that I have completed during my career was a series of studies for the Illinois Department of Transportation to examine some of the most dangerous intersections in the suburban areas of District One. The studies were funded through a series of grants that the Department received from State Farm Insurance in 2002. I was the principal author of those studies for IDOT.

As a part of those studies, I reviewed the viability of red-light running cameras and their applicability to solve the traffic accident problems at those intersections. After careful consideration of the available technical literature, and the condition of the intersections that I studied, I recommended to the Department that red light running cameras were not a recommended solution to the problem. The data analysis revealed inconclusive evidence of any improvement to the motoring public from the utilization of red light running cameras.

To expound on that study, I would like to share some of the conclusions that I have developed regarding the issue of red-light running cameras through an analysis of the existing literature on the topic.

Let's start with the technical studies that have been completed regarding the issue.

VTRC Study, 2007

One of the most thorough studies of the use of red light running cameras was a study that was completed by the Virginia Transportation Research Council (VTRC) entitled "The Impact of Red Light Cameras (Photo Red Enforcement) on Crashes in Virginia", dated June 2007[1]. The study examined the impact of red light running camera installations at 29 intersections in six different jurisdictions. The results of that study were:

- When normalized for time (i.e the number of years each intersection was studied) the installation of red light running cameras resulted in an increase in rear-end accidents of 37%, a decrease in red-light running accidents by 29%, an increase in injury accidents of 17% and an increase in total accidents of 23% for all intersections[2]. [EXHIBIT 1] [EXHIBIT 2]

The results of the VTRC study showed that the installation of red light running cameras significantly increases both the total number of accidents and the total number of injury accidents.

North Carolina Study, 2004

The Urban Transit Institute, North Carolina Agricultural and Technical State University of Greensboro completed a study in July 2004 of 18 red light running camera installations in Greensboro, North Carolina[3]. In this study, they compared camera installations with a control group of signalized intersections. Their findings were:

- The total number of accidents for the camera installations were reduced by 2.5% for a normalized 10-month before and after period[4]. [EXHIBIT 3]

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[1] Virginia Transportation Research Council (VTRC), Final Report VTRC 07-R2, June 2007; Garber, Miller, et. al.
[2] VTRC Study, page 71, Table B12
[3] Mark Burkey and Kofi Obeng, Co-Principal Investigators; "A Detailed Investigation of Crash Risk Reduction Resulting from Red Light Cameras in Urban Areas"
[4] Burkey and Obeng, page 22, Table 4.1

- However, an examination of the camera installations versus the control group showed that the intersections without the cameras showed a higher reduction of accidents during the same period[5]. Thus the reduction in accidents most likely had more to do with an overall reduction for the entire community rather than the affect of installing red light running cameras, and those intersections with red light running cameras showed less of an improvement. [EXHIBIT 4]
- The author's cite a study completed by Joseph Milazzo, et. al. for the North Carolina Governor's Highway Safety Program in June 2001 which concluded that all of the crashes caused by red light running involved vehicles entering the intersection more than 1.0 seconds after the onset of red, and the large majority entered the intersection more than 3.0 seconds after the onset of red[6]. This shows that there is a distinction between the driver that is just rushing the red light, who may be stopped by red light running camera enforcement and the distracted or reckless driver that enters the intersection well after the light has turned red. The latter, would not typically be stopped by the use of red light running camera enforcement.

The conclusion of the North Carolina study was "At a minimum, we can say that *there is no evidence that the RLC {Red Light Camera} program is decreasing accidents.* Additionally, the data shows that the sites with RLC's are not benefiting from the overall decreasing trend in accidents in Greensboro. There appears to be an increase in most types of accidents that correlates with the placement of a RLC at an intersection"[7].

[5] Burkey and Obeng, page 23, Tables 4.2 and 4.3
[6] Burkey and Obeng, page 11, citing the study "A Recommended Policy for Automatic Electronic Enforcement of Red Light Running Violations in North Carolina", for the North Carolina Governor's Highway Safety Program, June 2001; Joseph Milazzo, Joseph Hummer, and Leanne Prothe.
[7] Burkey and Obeng, page 47

IIHS Study – Oxnard, CA - 2001

Perhaps the study that is referenced the most by red light running camera advocates is the Insurance Institute for Highway Safety (IIHS) completed by Richard Retting and Sergey Kyrychenko in 2001[8]. The authors cite a 29% reduction in injury crashes at signalized intersections in Oxnard, CA. However, many reviewers have pointed out serious problems with the study:

- The study did not look at a true before and after analysis of the intersections, but looked at a city-wide reduction over the study period and then compared those city-wide accident reductions to other cities in California with similar population and numbers of accidents. Thus, the study only looked at the overall growth rate of accidents citywide and not at the true effect of red-light running cameras.
- In comparison, the authors looked at the number of accidents in other, similar cities. However, in the late 1990's California's population grew at a very high rate. Looking at two cities cited in the study, Santa Barbara grew at a rate of 7.89%, whereas Bakersfield grew 41.32%[9]. This difference in population growth rates would affect the total number of accidents tremendously.

Alternative Improvements

The utilization of red-light running cameras was started out of a desire to decrease the number of red light running accidents. The intent of the effort should be applauded. However, there are a number of other methods, which are far more effective, which should be employed instead.

- A study completed by the Texas Transportation Institute in September 2004 found that an increase in the yellow time interval of 1.0 seconds would result in a decrease of 35-40% of red

[8] "Reductions in Injury Crashes Associated with Red Light Camera Enforcement in Oxnard, CA", Richard A. Retting and Sergey Kyrychenko, Insurance Institute for Highway Safety, 2001
[9] Burkey and Obeng, page 13

light running accidents[10]. This approach is perhaps the simplest and easiest intersection modification that can be made, and potentially has the greatest benefit. [EXHIBIT 5]

- According to the same study, adding backplates on traffic signal heads reduces the violation rate of red light running by 25%[11]. This issue is of particular importance to the City of Chicago, as the majority of signals in the City do not have backplates. Adding backplates to an intersection would cost only a couple of thousand dollars. [EXHIBITS 6 & 7]
- Detailed engineering studies can help to determine the real causes of accidents at an intersection. Through the studies that I worked on for IDOT, we discovered signal heads that were turned the wrong direction, signal heads that were covered by overhead power lines, poor illumination, driveways located within 50 feet of the intersection, poor pavement conditions, striping that had been completely worn off, signal controller cabinets that blocked visibility and heavy congestion problems.

The underlying problem with the use of red light running cameras is that the money that is collected in the form of fines could instead be used to fund real solutions that will solve greater problems.

Conclusion

After reviewing the technical literature and examining the advent of red light running cameras for myself, it is my opinion that the use of red light running cameras will not improve traffic safety and may very well result in a decrease in safety to the motoring public. At best, the evidence points to a no significant improvement to safety based on their use. Instead of utilizing red light running cameras, there are numerous solutions that will have a far greater likelihood of improving traffic safety.

[10] Texas Transportation Institute; "Development of Guidelines for Identifying and Treating Locations with a Red-Light Running Problems", September 2004, page 6-2, Table 6-1

[11] Texas Transportation Institute; "Development of Guidelines for Identifying and Treating Locations with a Red-Light Running Problems", September 2004, page 6-5, Table 6-2

APPENDIX B

WHY RED-LIGHT CAMERAS CANNOT BE CREDITED WITH IMPROVING INTERSECTION SAFETY IN LOS ANGELES

Although the LAPD claims that any reduction in accidents seen at PRL intersections is due to the presence of red light cameras, the facts suggest otherwise. As the City Controller's audit correctly points out, "LAPD does not consider all factors in reporting the program's results… attributing these results solely to automated enforcement is questionable".

Since a properly designed independent study employing scientific methods and controls was not performed at PRL intersections, the LAPD's claims of success cannot be supported. In fact, when other likely explanations for changes in accident totals are considered, the effectiveness of the PRL program becomes highly suspect.

Other Possible Causes for a Reduction in Accidents

A. Concurrent with the installation of the current photo red-light system, the yellow signal timing at all photo red-light intersections was increased to comply with the minimum requirements set out in California law. In addition, the LADOT instituted an all-red phase at PRL intersections as well. At intersections where these changes were implemented, one would expect to see a significant reduction in red light related accidents, exactly as the LAPD claims has occurred. Again, as noted in the Controller's audit, "That change alone (likely) made the intersections safer", not the installation of red light cameras. Increasing the yellow signal timing and implementing an all-red phase has reduced accidents at signalized intersections. An adjustment in the yellow and red phases to account for the actual speed of traffic approaching high risk intersections will further increase safety throughout the city and eliminate the need for costly photo enforcement.

B. As the Controller's audit also revealed,

> "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%. We also noted there was a 4.6% decline in statewide fuel consumption that year (2008), as well as a 2.6% decline in traffic volume on State highways in LA County."

The price of oil nearly tripled from $50 to $147 from early 2007 to 2008. Within months of fuel prices hitting record highs in the summer of 2008, the current financial crisis began to take hold, further reducing traffic volume. As the audit succinctly notes,

> "Fluctuations in traffic volume can directly influence the number of traffic collisions, but LAPD indicated they were not monitoring traffic volume - either citywide or at PRL intersections".

Experts in traffic collision analysis, including the LADOT Risk Management Division, use traffic volume to calculate accident *rates* (typically per million vehicles entering the intersection), as opposed to simply comparing raw numbers of accidents. Without adjusting for fluctuations in traffic volume, calculating changes in the absolute number or percentage of accidents tells us little about whether red light cameras have increased safety.

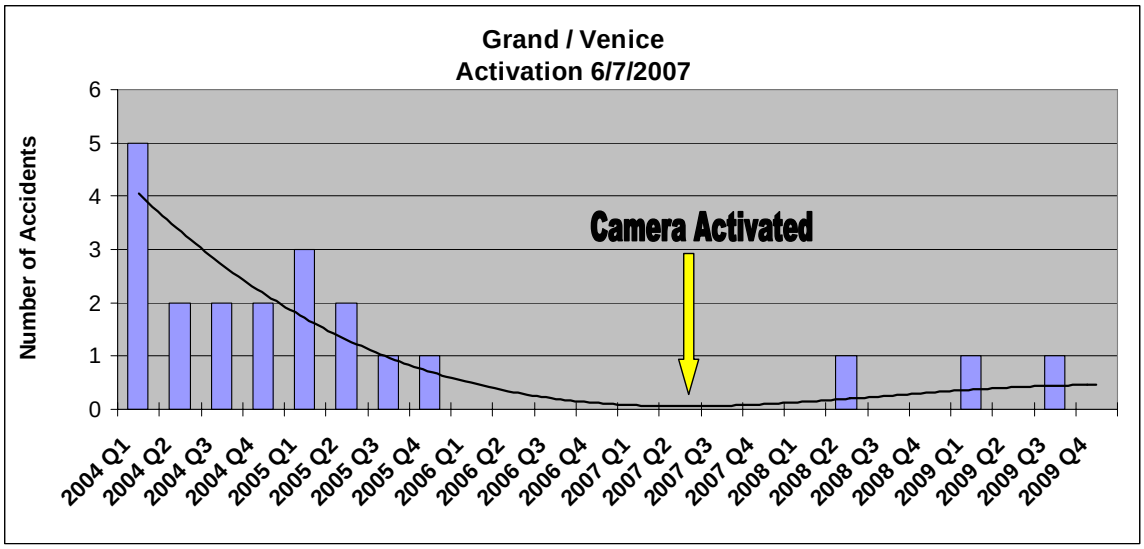
C. In the two years the LAPD chose for their "before" statistics, 2004 and 2005, the Los Angeles area experienced one of the harshest winters on record. The winter of 2004 - 2005 was the second worst "el Niño" winter in terms of severe weather with a total rainfall of approximately 38 inches, almost 22 inches above the average. Rainfall totals of this magnitude had not been seen in L.A. since the winter of 1883-1884. In contrast, the winters since 2005 have all witnessed lower than average rainfall. Any police officer or traffic safety expert will attest to the fact that increased rainfall leads to increased accidents, especially in Los Angeles where drivers are unaccustomed to these treacherous conditions. As an example, the following is an excerpt from a CBS2 news report from December 20, 2010:

> Rain continued to pelt the Southland on Monday, causing power outages and a significant rise in traffic collisions, along with breaking rainfall records for this date in several locations in Los Angeles County…. About 175 crashes were logged between 9 a.m. and 3 p.m… compared to 53 in the same period last Monday when roadways were dry (a 230% increase).

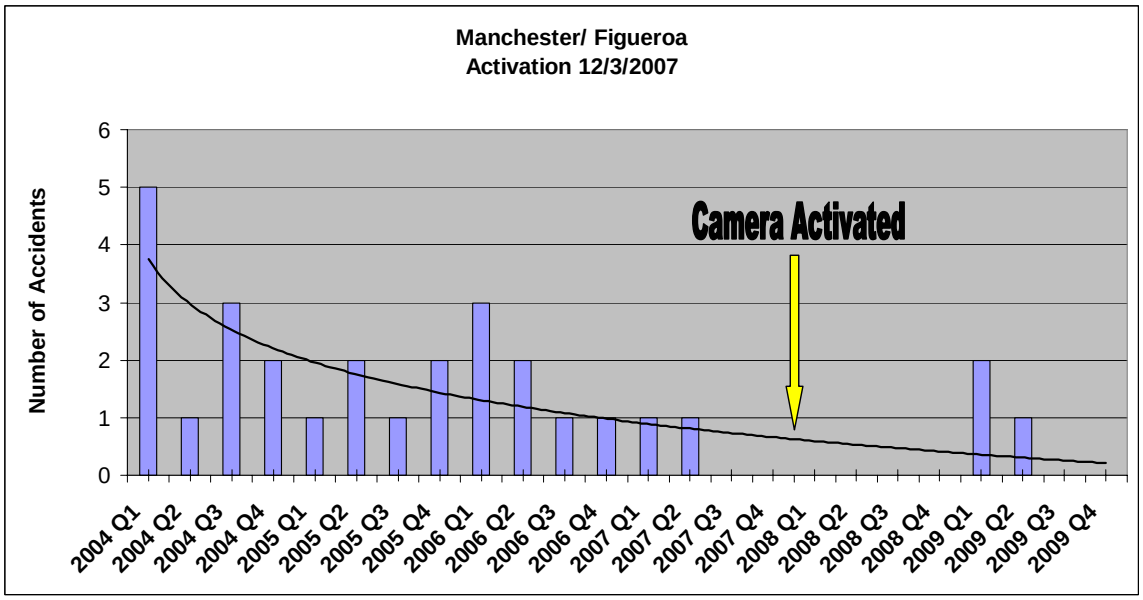
It is therefore no surprise that accident rates from one of the rainiest winters on record are higher than in subsequent years.

Alternative Analysis

While it is difficult to pinpoint exactly what may have caused any reduction in red-light related accidents at photo enforced intersections, a further analysis of accident data suggests that it is not due the installation of red-light cameras. We reviewed accident statistics for the years in question using data obtained from the California Highway Patrol's Statewide Integrated Traffic Records System (SWITRS) database. We found that although the years 2004 and 2005 generally showed what appeared to be a higher than average number of collisions at these intersections, by 2006 the accident rate had begun to decline. This is significant in light of the fact that photo enforcement at PRL intersections was rolled out in stages between mid-2006 and the end of 2007. For the years 2004 through 2009 (the same years the LAPD used for their statistics), we counted red-light related accidents in each quarter at the two intersections with the largest numbers of red-light related accidents prior to camera installation. The results appear below.



The intersection of Grand and Venice exhibited a cluster of accidents in 2004 and 2005, but by 2006 the accident rate had dropped to zero. Photo enforcement was activated on 6/7/2007, more than a year and a half after safety had improved at this location. Therefore, the reduction in accidents seen at this location cannot possibly be due to the installation of red-light cameras. Without further information from LADOT, we can't determine exactly what caused the reduction in accidents (we suspect it was a signal timing change or other engineering improvement) but, due to the timing involved, it is impossible to conclude that it resulted from photo enforcement. Using the same flawed methodology employed by the LAPD to obtain their 63% statistic (comparing 2004 and 2005 vs. 2008 and 2009), this intersection would show an 83.3% reduction in collisions. However, since this reduction occurred long before the cameras were installed and cannot possibly be the result of photo enforcement, we now know that using this comparison provides inaccurate and misleading results. This is a prime example of why using generalized statistics can lead to incorrect conclusions. The LAPD counts this intersection as one of its successes, but considering the data presented here, no principled argument can be made that photo enforcement caused any reduction in accidents seen at this location.



At the intersection of Manchester and Figueroa a similar trend can be seen. Slightly elevated numbers of accidents existed from 2004 through early 2006. But by mid-2006 accidents had begun to decline, diminishing to about one per quarter through mid 2007 with no accidents in the last half of the year. The cameras were activated at the end of 2007, again *after* the accident rate had dropped significantly and had continued trending downward for an extended period of time. While not as dramatic as the Venice/Grand example, it is still clear that cameras could not be the cause of the decrease in accidents at this location as they were activated after the decrease and downward trend had already occurred.

In summary, the LAPD is selectively reporting a 63% reduction in red light related accidents while ignoring other data which shows an increase in red light related collisions during the period when red light cameras were in place. Furthermore, the LAPD is willfully ignoring other factors that likely account for any reduction in accidents seen at photo enforced intersections such as changes to the signal timing, fluctuations in traffic volume and significant weather effects. The City Controller concurs, stating,

> "Without considering the context of citywide traffic collisions… 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".

APPENDIX C

SIGNIFICANT REDUCTIONS IN VIOLATIONS OCCUR WHEN THE YELLOW SIGNAL TIME IS LENGTHENED

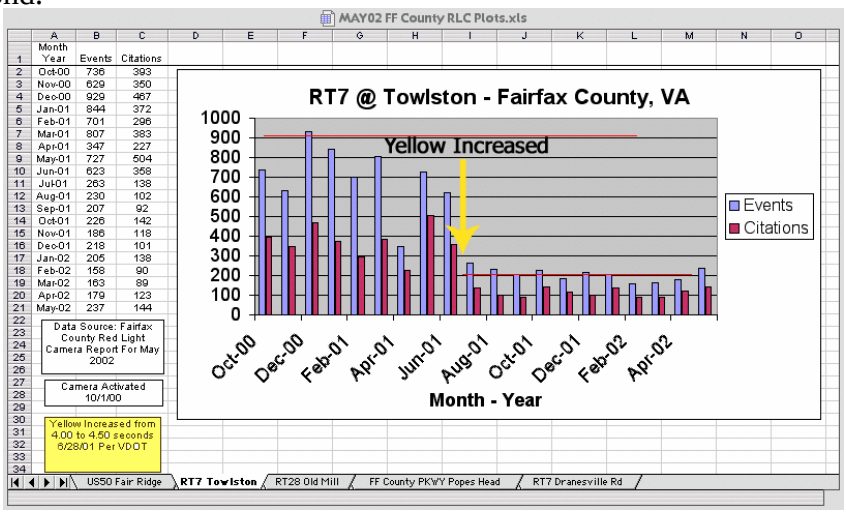
The chart below shows a 30% to 55% reduction in violations achieved at San Diego red-light camera sites when the yellow interval times were increased.

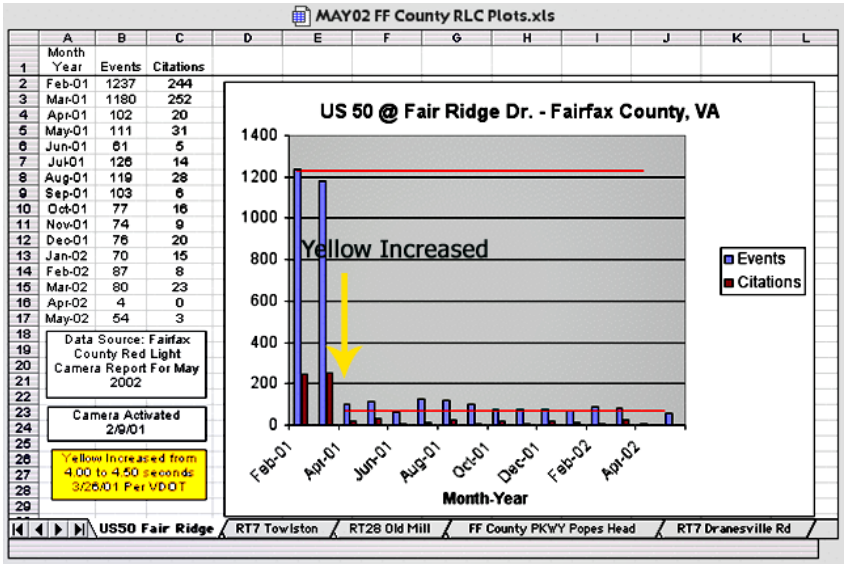
RESULTS FROM INCREASING YELLOW TIMES AT 6 of 19 SAN DIEGO RED LIGHT CAMERA SITES:

INT #	LOCATION	BEFORE YELLOW (seconds)	BEFORE VIOLATIONS (per 100 hrs)	AFTER YELLOW (seconds)	AFTER VIOLATIONS (per 100 hrs)	YELLOW INCREASE (seconds)	VIOLATION REDUCTION (percent)
1454	WB GARNET AVE @ INGRAHAM ST	3.00	98.8	3.20	55.9	0.20	-43.4%
1504	WB "F" ST @ 16TH ST	4.00	49.4	4.90	22.5	0.90	-54.5%
1534	WB MIRAMAR RD @ CAMINO RUIZ	4.40	42.5	4.80	29.8	0.40	-29.9%
1541	NB MISSION BAY DR TO WB GRAND AVE	3.10	363.4	4.70	42.2	1.60	-88.4%
1542	SB MISSION BLVD @ GARNET AVE	3.00	49.9	3.70	30.3	0.70	-39.3%
1553	EB MIRA MESA BLVD @ SCRANTON RD	3.90	98.7	4.30	52.7	0.40	-46.6%

SOURCE: San Diego Photo Enforcement System Review January 14, 2002

Likewise, the following two figures show how Fairfax County, VA achieved a significant, sustained reduction in violations when the yellow timing was increased by ½ second.





APPENDIX D

Rear End Collisions at Sherman Way and Louise

Camera Installed 5/14/2007

Year	# within 150 ft	Alcohol Related**	# within 75 ft	Alcohol Related**	# within 50 ft	Alcohol Related**
2002	3		2		2	
2003	3		2		2	
2004	3	2	3	2	3	2
2005	1		1		1	
2006	2	1	2	1	2	1
2007 BC	2	1	1		1	
2007 AC	1		1		1	
2008	9	1	8	1	7	1
2009	7	1	6	1	5	1

AVERAGE DAILY TRAFFIC		
SHERMAN WY AT FORBES AV	9/14/2004	44,784
SHERMAN WY AT BALBOA BL	7/24/2008	35,447
SHERMAN WY AT LINDLEY AV	7/22/2008	35,302
SHERMAN WY AT LOUISE AV	5/15/2008	32,722

Forbes and Balboa are one block apart and should have similar traffic counts. They are the closest locations to Louise (1/2 mile) with traffic counts both before and after the cameras were installed.

Results of Rear End Collision Analysis

Within 150 ft including alcohol related		
	Accident Rate	Accident Count
2004	0.00006698821	3
2008	0.0002539	9
% Change	74%	67%

Within 150 ft not including alcohol related		
	Accident Rate	Accident Count
2004	0.00002232940	1
2008	0.000225689	8
% Change	90%	88%

Within 75 ft* including alcohol related		
	Accident Rate	Accident Count
2004	0.00006698821	3
2008	0.000225689	8
% Change	70%	63%

Within 75 ft* not including alcohol related		
	Accident Rate	Accident Count
2004	0.00002232940	1
2008	0.000197478	7
% Change	89%	86%

*Rear end collisions within 75 ft of the intersection is the benchmark used by the LAPD in their various reports on the Photo Red Light Program.

**Alcohol related accidents are included in the accident numbers in the "# within" column. Alcohol related accident figures must be subtracted from the "# within" column to obtain figures "not including alcohol related".

APPENDIX E

FULL ANALYSIS OF THE FIVE FATAL ACCIDENTS AT PRL INTERSECTIONS CITED BY LAPD

At the invitation of Sgt. Matt MacWillie, head of the PRL Program, we reviewed the accident reports for the five fatality accidents cited by LAPD as proof of the efficacy of the red-light camera program. Upon examination it became clear that none of these accidents were of the type that could reasonably be expected to be prevented by photo red-light enforcement. In fact, two of the five accidents were clearly not even red-light related.

Details of the Five Fatal Accidents Used to Justify the LAPD Safety Claims

Accident #1 – 1/21/2004 Victory Blvd. and Laurel Canyon
Accident was caused by DUI, not a driver trying to beat the red light. Also, at the time of the accident, this intersection was being enforced with a photo red-light system administered by the previous vendor, ACS. This was not a fatality that occurred "prior to PRL enforcement", but rather a fatality that occurred during PRL enforcement with a *prior system*. Furthermore, as this type of accident makes clear, photo enforcement cannot prevent crashes caused by drunk drivers. Unquestionably, the red-light camera had no effect on whether this drunk driver ran the red light, as is the case with virtually all serious collisions that occur when drivers enter the intersection well into the red phase due to impairment, distraction or fatigue. This accident cannot be included in the "before" statistics as it was caused by a drunk driver and occurred at an intersection that was being photo enforced with a red-light camera.

Accident #2 – 2/9/2004 Western/MLK
Accident was caused by a pedestrian under the influence of drugs j-walking a bicycle across the street late at night. Furthermore, the accident occurred 33 feet beyond the intersection, not at the intersection itself. Witnesses stated the driver entered the intersection on yellow. This was not an accident caused by a red light runner. LAPD stated that they included this as "red-light related", because they believed that "*it was possible*" that the driver sped up to make it through the intersection before the light turned red, although they had no direct evidence for that assumption and the bicyclist was deemed at fault for the accident. Therefore, this accident cannot be included in the "before" statistics as it did not occur within the intersection and was not caused by red light running but rather by a pedestrian j-walking. Photo enforcement would have had no effect on preventing this accident.

Accident #3 – 6/23/2005 Beverly/Western
Pedestrian was struck in the crosswalk by a sanitation truck making a right turn from Beverly onto Western. The pedestrian was crossing Western. Witnesses claimed the truck had a green light. This is the logical conclusion as the pedestrian also would have had a green light to cross Western, accounting for his presence in the crosswalk. This accident was most likely caused by the truck driver failing to yield to the pedestrian possibly due to an obstructed view from the garbage truck. The truck driver was cited for failing to

yield to a pedestrian in a crosswalk, not a red light violation. This accident cannot be included in the "before" statistics as it was not caused by red light running. Photo enforcement would have made no difference in preventing this accident.

Accident #4 – 3/5/2005 Venice/Grand
A sixteen-year-old driver ran the light long after it was red. According to statements of those involved, this accident was caused by driver inattention. This accident cannot be included in the "before" statistics as it was caused primarily by a distracted, inexperienced driver, not intentional red light running. Photo enforcement has no effect on preventing this type of accident.

Accident #5 – 4/6/2006 Manchester/Figueroa
Accident occurred just after midnight. The driver claimed she was tired and didn't remember whether the light was red. This accident was most likely caused by driver fatigue. This accident cannot be included in the "before" statistics as it was caused by a fatigued driver, not intentional red light running. Photo enforcement has no effect on preventing this type of accident.

When the details of each accident are considered, it becomes clear to any impartial observer that using these five accidents to suggest that the City's photo red-light program has saved lives is not intellectually honest. For example, regardless of the fact that the LAPD was fully aware that the fatality at Victory and Laurel Canyon occurred at an intersection where a red-light camera was in use at the time of the collision, the LAPD chose to categorize this accident as a "before the cameras" fatality. It was not. It was a "before *the current set* of cameras" fatality. An unbiased study would never have included this accident in the "before" statistical group and no reasonable argument can be made for doing so since there was a red-light camera in operation and the accident was caused by a drunk driver.

In regards to the accident involving the sanitation truck, it's extremely unlikely that a red light violation occurred. The evidence in the accident report strongly suggests that the light was green at the time of the incident. The pedestrian and the garbage truck were both initially traveling in the same direction and it is unlikely they both ignored a red signal. Moreover, neither the driver nor the pedestrian was cited for violating the red. What most likely occurred was that the pedestrian stepped into the crosswalk on a green light and the truck driver began his right turn at approximately the same moment and just didn't see him. An unfortunate event, but not the type of accident that can be prevented using red light cameras. When we asked why the LAPD included this accident, the officer who compiled the statistics responded that, similar to the bicyclist accident at Western and MLK, he did so because "there was a chance the light *might have been red*". "Might have been" and "it was possible" aren't the proper criteria to use when deciding whether or not to include a particular data set in a before and after study. Since the LAPD knows that there is no evidence that a red light violation occurred, neither this accident nor the bicyclist accident should have been used to suggest that red-light cameras have prevented fatalities at photo enforced intersections, yet the LAPD continues to do so.

Finally, the two accidents caused by driver fatigue and distraction occurred well into the red phase, providing further evidence that the most dangerous red-light running accidents are not due to drivers trying to beat the light and thus can't be remedied by installing photo enforcement. The photo enforcement approach to curtailing the incidence of red-light running is solely intended to influence those drivers who willfully ignore or try to beat the red light. No one has ever suggested that red light cameras should be installed to prevent accidents caused by fatigued or distracted drivers. If the LAPD had intended to provide an honest analysis of the photo red light program, they certainly wouldn't have included accidents caused by distraction or fatigue.

APPENDIX F

Steps to Creating Safer Signalized Intersections

1. Collect data on intersections that have an elevated number of red-light related collisions listed in the database. Do not consider other types of accident such as speed related or left turn violations as these cannot be remedied by photo red-light enforcement.
2. Review the accident reports to eliminate all red-light related collisions that cannot be targeted by photo enforcement such as those caused by impairment, fatigue, distraction, etc.
3. For the remaining collisions, analyze the red light related accident rate to determine the expected crash frequency to determine if it is higher than a typical intersection.
4. If the intersection has a higher crash frequency than a typical intersection, conduct an engineering study to confirm the causes of the problem.
5. Match the cause to the solution. Identify and implement viable engineering countermeasures. These include but are not limited to:
    a) Increasing the yellow and all-red timing to conform with or slightly exceed the ITE standards using the actual speed of vehicles on the roadway (85^{th} percentile of free flow traffic) rather than the posted speed limit (least expensive).
    b) Implementing a protected left turn (red arrow).
6. Evaluate the effectiveness of the implemented countermeasures to see if the crash frequency is now representative of a typical intersection.
7. If the intersection still has a higher crash frequency than a typical intersection (unlikely), identify and implement additional engineering countermeasures.
8. Evaluate the effectiveness of the implemented countermeasures to see if the crash frequency is now representative of a typical intersection.
9. Repeat this procedure until the crash frequency is representative of a typical intersection or all viable engineering countermeasures have been exhausted.
10. If red-light related collisions are still excessive, consider enforcement countermeasures.

At all stages, document in detail all steps taken.