Collision Analysis of the Photo Enforced Intersection in Walnut, CA

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Executive Summary

A before and after analysis of collisions at the photo enforced intersection of Grand Ave. and Amar Rd./Temple Ave. in Walnut, CA was conducted using statistics compiled from the California Highway Patrol's Statewide Integrated Traffic Records System (SWITRS) database. Comparing collisions for the five year period before the red light camera system was installed with collisions for the five year period after the red light camera system was installed shows that all types of collisions, including red light running collisions significantly increased. Specifically, red light running collisions increased 400%, rear end collisions increased at least 71%, and broadside collisions doubled. No argument can be made that photo enforcement has improved safety at this intersection or within the City of Walnut. In fact, the use of red light cameras appears to have decreased safety and put roadway users at increased risk.

Background

Safer Streets L.A.'s mission is to further the public's interest through the adoption of scientifically sound and sensible transportation and traffic laws. Accurate information and critical thinking are crucial to implementing sound public policy. Towards that end, we strive to provide the public and elected representatives with well researched and verifiable data in order to promote scientifically based solutions to motorist and pedestrian safety issues. Safer Streets L.A. provides this information on a voluntary basis and is not paid to interact with elected officials.

Jay Beeber, Executive Director of Safer Streets L.A., is a research fellow with the Reason Foundation concentrating on traffic enforcement issues and serves on the City of Los Angeles' Pedestrian Advisory Committee. He is also an adjunct member of the Institute of Transportation Engineers and has written numerous scientific studies on traffic related safety issues (available at www.saferstreetsla.org/reports). Mr. Beeber recently served on a subcommittee of the California Traffic Control Devices Committee studying changes in the way traffic signals are timed in the state of California.

Our goal in forwarding you the following information is to provide you with a comprehensive overview of the Walnut photo enforcement program. We hope that this information proves useful in your deliberations as to whether or not to continue the red light camera program in Walnut.

Methodology

Safer Streets L.A. conducted a before and after analysis of collisions at the photo enforced intersection of Grand Ave. and Amar Rd./Temple Ave. in Walnut, CA. Collision statistics were compiled from the California Highway Patrol's Statewide Integrated Traffic Records System (SWITRS) database. The SWITRS database serves as a means to collect and process data gathered from collision scenes by multiple police agencies throughout the state. The most recent complete year for which data is available is 2011. Some limited data is available through this database for 2012, however data entry for years after 2011 are incomplete at this time.

Study Period

Photo enforcement "went live" in the beginning of January, 2007. Since the SWITRS database provides complete information through the end of calendar year 2011, we were able to compile five full years of collision data after the red light camera system began operation. For consistency, we therefore chose a similar five year period prior to the installation of the cameras for comparison. The study encompasses the following "before" and "after" time periods for comparison:
Before Period = 2002 - 2006; After Period = 2007 - 2011.

Location

The red light camera enforcement system is located at the intersection of Grand Avenue with Amar Road and Temple Avenue. East of the north/south roadway of Grand Avenue the intersecting roadway is designated as Temple Avenue, while west of Grand Ave. the intersecting roadway is designated as Amar Road. Although only two of the four roadway approaches to the intersection are enforced with red light cameras, all four approaches have signs warning of the presence of photo enforcement. Experience has shown that drivers who are aware of the presence of photo enforcement at a particular intersection will rarely recognize that not all approaches are being enforced or which specific approaches are equipped with cameras. Therefore, if the presence of a red light camera system has an effect on driver behavior, it will have that effect regardless of whether the direction the motorist is approaching from is enforced or not.

When compiling data from the SWITRS database, it is therefore necessary to include data from collisions designated as occurring at the intersection of Grand Avenue and Amar Road and collisions designated as occurring at the intersection of Grand Avenue and Temple Avenue. Failure to include data from collisions on both roadways will result in incomplete and inaccurate results. Data was also collected citywide for comparison purposes as noted below.

Types of Collisions

The proper criteria for the evaluation of the effectiveness of red light camera systems is whether collisions caused by red light running have increased, decreased, or remained the same. Red light running related collisions are those where the primary collision factor (PCF) is listed in the SWITRS database as a violation of CVC 21453 (running a red light). However, in some studies of this type, the category of "broadside collisions" is mistakenly used for the analysis. Since not all broadside collisions are caused by a red light violation and not all red light violations result in a broadside collision, using the general category of broadside collisions rather than the more specific category of collisions caused by red light running will provide erroneous results. This study evaluates the effectiveness of Walnut's photo enforcement program using the more accurate analysis of collisions caused by red light running (PCF = violation of CVC 21453). However, since the staff report provided for the City Council meeting on January 8th evaluated broadside collisions, data on those types of crashes were also evaluated.

A comparison of the increase or decrease in rear end collisions before and after implementation of photo enforcement may also be instructive as to the effect that red light cameras have on intersection safety. Most studies of the impact of red light cameras have shown an increase in rear end collisions as motorists overreact to the presence of the cameras by slamming on their brakes in order to avoid a citation, even though they could have safely continued into the intersection prior to the signal turning red. It is, however, often difficult to determine whether a rear end collision was caused by the presence

of camera enforcement. Therefore, it is most instructive to review rear end collision occurring nearest the intersection rather than collisions occurring hundreds of feet away. This study evaluated the effect that the threat of photo enforcement may have had on rear end collisions using two criteria, rear end collisions occurring within 75 feet of the intersection and rear end collisions occurring within 100 feet of the intersection as the effect of red light camera enforcement should be limited to these distances.

Studies of red light camera intersections may also include an analysis of all collisions occurring at or near the intersection. This type of evaluation provides little information as to the effect of red light cameras on intersection safety as many types of collisions within the database have no relation to the presence or absence of red light cameras. However, for completeness, we include an analysis of all collisions occurring at various distances from the subject intersection.

Results

The results of the analysis are shown in Table 1 below. A detailed discussion follows.

Grand Ave. at Amar Rd./Temple Ave. City of Walnut, CA										
	RLR Collisions (Violation of VC 21453)	Rear End Collisions w/in 75' of Intersection	Rear End Collisions w/in 100' of Intersection	Broadside Collisions at Any Distance	Broadside Collisions in Intersection	All Collisions w/in 500'	All Collisions w/in 1000'	All Collisions at Any Distance	RLR Collisions (Violation of VC 21453) Citywide	All Collisions Citywide
2002 - 2006	1	24	24	14	3	65	75	79	77	1083
2007 - 2011	5	41	43	16	6	77	92	93	78	1174
% Increase	400.00%	70.83%	79.17%	14.29%	100.00%	18.46%	22.67%	17.72%	1.30%	8.40%

Red Light Running Related Collisions

The data show that in the five year period prior to installation of the red light camera system there was only one red light running collision at the subject intersection. In contrast, during the five year period after installation of the red light camera system there were a total of five red light running collisions, an increase of 400%. By comparison, during the same ten year period, red light running collisions at all intersections throughout the city remained constant. It is unclear as to why this intersection was chosen for red light camera enforcement as there was no red light running collision problem occurring at this location prior to implementation of photo enforcement. In fact, a review of the database confirms that the one RLR collision which occurred in the five year period before camera installation resulted in only a minor “complaint of pain” injury with no visible injuries.

Rear End Collisions

In the five year period prior to installation of the red light camera system there were a total of 24 rear end collisions within 75 feet of the subject intersection. In contrast, during the five year period after installation of the red light camera system there were a total of 41 rear end collisions within 75 feet, an increase of 71%. Similarly, in the five year period prior to installation of the red light camera system there were a total of 24 rear end collisions within 100 feet of the subject intersection. In contrast, during the five year period after installation of the red light camera system there were a total of 43 rear end collisions within 100 feet, an increase of 79%. Prior to installation of the red light camera system in 2007, this intersection was experiencing a relatively high rate of rear end collisions. The

implementation of photo enforcement appears to have exacerbated that problem. As a result, red light camera enforcement likely decreased safety at this location putting a greater number of citizens at risk.

Broadside Collisions

As stated earlier, analysis of broadside collisions is a less accurate measurement of the effects of red light camera enforcement. However, an analysis of these types of collisions shows similar results to the analysis of red light running collisions. In the five year period prior to installation of the red light camera system there were a total of 3 broadside collisions which occurred within the subject intersection. In contrast, during the five year period after installation of the red light camera system the number of broadside collisions which occurred within the subject intersection doubled to a total of 6.

All Collisions

To provide a complete picture of the collision history of the subject intersection, we include an analysis of all collisions which occurred during the ten year study period. As with the other categories of collisions detailed above, collisions of all types increased in the period after the red light cameras were installed. The change in collisions ranged from approximately 18% to 23% depending on the distance from the intersection chosen for analysis. By comparison, during the same time period, all collisions in Walnut increased approximately 8½%. The greater increase in all collisions at the red light camera intersection compared to the city as a whole is likely due to the increase in rear end collisions at the red light camera intersection caused by the presence of photo enforcement.

Additional Analysis

The SWITRS database also provides additional information about collisions at the subject intersection:

- There have been no fatalities at the subject intersection going back to at least the year 2000.
- There have been no collisions involving a pedestrian at the subject intersection going back to at least the year 2000.
- Since 2000, there were 2 collisions involving bicyclists, both occurring after installation of the camera system. Neither involved a red light violation. In one instance the bicyclist was deemed at fault; in the other, fault was undetermined.
- Only 1 severe injury occurred 68 ft west of the subject intersection (in 2008, after installation of the cameras) due to unsafe speed, not red light running.
- 96% of the collisions which occurred at the subject intersection resulted in little or no injury (either complaint of pain only or property damage only).
- All collisions which occurred at the subject intersection due to a red light violation resulted in little or no injury (1 complaint of pain only, 5 property damage only)

Conclusions

Based on an analysis of collisions at the photo enforced intersection of Grand Ave. and Amar Rd/ Temple Ave. in Walnut, it cannot be asserted that red light cameras have improved safety for the city. All types of collisions, including red light running collisions increased significantly after installation of the cameras. In addition, red light running collisions throughout the city remained at a relatively constant level suggesting that the presence of the cameras had no beneficial “spillover” effect at other locations. Although the city is issuing approximately 5500 tickets per year at this one location costing the local economy as much as $3 million annually, no safety benefit has been seen. In contrast, safety appears to have been decreased due to the installation of the camera system.

Appendix A
Evaluation of Staff Report
RE: Photo Enforcement Program

This report is in response to the Staff Report dated January 8,2013 prepared by Rosalea Layman, Senior Management Analyst regarding the City of Walnut's Photo Enforcement Program.

Sheriff's Department and City Staff continue to promote the City of Walnut's Photo Enforcement Program regardless of the fact that collisions in all categories have increased at the photo enforced location and there are more effective and less costly solutions available to improve safety at signalized intersections. Specifically, the Staff Report makes certain claims and proffers conclusions about the Photo Enforcement Program that are highly questionable and/or unsupportable.

In this response, we follow the format of the Staff Report. Text from the report appears in bold italics. Our response follows.

Safety Review

The mission and focus of the Photo Enforcement Program is to improve vehicular and pedestrian safety, while improving traffic flow at the intersection at Grand Avenue/Amar Road.

Vehicular safety has decreased since implementation of the Photo Enforcement Program. As the above report shows, all categories of collisions have seen substantial increases. Further, no study has ever claimed or shown that the implementation of photo enforcement can or has improved traffic flow. On the contrary, traffic flow is impeded as more motorists overreact to the presence of the cameras and come to an abrupt stop even when they could safely continue into the intersection prior to the onset of the red signal.

Based on discussions with the Sheriff's Department, Staff believes that the Photo Enforcement Program provides for more efficient traffic flow at the intersection,

As explained above, the presence of red light cameras tends to decrease traffic flow.

and assists by alleviating deputies from having to spend additional patrol hours at this key intersection.

The intersection in question did not have a red light running collision problem prior to implementation of photo enforcement. It is therefore unnecessary for deputies to spend additional patrol hours at this location enforcing red light violations.

If the City were to remove the cameras, the Sheriff's Department believes an increase in police service levels would be needed, which would amount to an additional cost of $260,659 per year.

You can't compare the cost of a highly trained police officer with a red-light camera. Police officers on patrol perform many public safety functions, not only in terms of traffic safety but in terms of other crime reduction and prevention as well. The two are not equal and you can't compare the costs of each in this manner. The benefits of the presence of a live police officer far exceed any benefit from red light camera enforcement.

They also believe there would be an increase in congestion within the intersection which would impede traffic flow in all directions.

This claim is pure speculation and not backed by any evidence whatsoever. In fact, where red light cameras have been removed in approximately 60 jurisdictions throughout the state, no "increase in congestion" has been seen or claimed. In short, the presence of red light cameras may contribute to some additional congestion due to additional unnecessary stopping. Their removal would likely improve traffic flow, not impede it.

The Sheriff's Department has also indicated that the cameras have been a great tool in helping to identify suspects and vehicles wanted in non-traffic related crimes.

No evidence of this claim is presented. Further, it should be noted that state law prohibits the use of photos and video collected by red light camera systems from being used for any purpose other than prosecution of a red light violation [CVC 21455.5 (f) (1)]. Additionally, if this type of tool is desired, numerous traffic camera systems exist that can monitor intersections 24/7 for the purposes of identifying suspects and vehicles wanted in non-traffic related crimes and for other purposes. These systems can be employed at multiple intersections throughout Walnut at a far lower overall cost to the citizens of the city than the costs associated with the Photo Enforcement Program.

They have also indicated that due to the size and amount of traffic flow in the intersection, it is a very difficult intersection to conduct directed enforcement action near and around the vicinity.

This intersection is no different than many other intersections in the City of Walnut which do not have red light cameras. Police are apparently quite capable of enforcing the law at those intersections and this particular intersection should pose no greater difficulty than others of a similar type.

Overall, the Walnut Station Captain strongly supports the continuation of the program as an effective public safety tool to maintain vehicular and pedestrian safety at the Grand/Amar intersection.

With all due respect to the Walnut Station Captain, no objective evidence exists to show that the Photo Enforcement Program is an effective public safety tool. His support for the program is misguided.

Traffic Engineer Review

Photo Enforcement Programs will typically cause an increase in rear-end type collisions and cause a decrease in broadside type collisions.

Based on our independent review of ten years of collision statistics, <u>both rear-end and broadside collisions increased at the subject intersection.</u>

Broadside type accidents are considered to be more severe than rear-end type accidents because broadside accidents have a greater probability of the motorists sustaining injuries as well as increased property damage costs.

<u>Comparing the 5 years before and after installation of the cameras, rear-end and broadside collisions **both** increased at the subject intersection.</u>

For the seven (7) years leading up to the installation of the City's Photo Enforcement Program, there were an average of 5.7 rear-end type accidents per year and an average of 1.4 broadside type accidents per year. After the installation of the City's Photo Enforcement Program, the average for rear-end type accidents increased to 8.7 accidents per year and the average for the broadside type accidents decreased to 1.1 per year.

It is important to reiterate here that as explained in the report above, analysis of broadside collisions is not the proper way to evaluate the effectiveness of a red light camera program since not all broadside collisions are caused by a red light violation and not all red light violations result in a broadside collision. Regardless, we conducted an analysis of the above claims using the collision data provided in the Staff Report. As will be shown, the data analysis is incorrect and the claimed results are misleading.

Broadside Collisions - For the seven years leading up to the installation of the City's Photo Enforcement Program there was actually an average of 1.29 broadside collisions per year, not 1.4 (9 collisions / 7 years). After the installation of the City's Photo Enforcement Program, the average for broadside collisions was 1.16 (8 collisions / 6.875 years) (2013 data only provided through Nov. 15th). This represents a difference of 1 broadside collision for the entire 7 year period and an average difference of only 0.12 broadside collision per year. The difference is so tiny as to be statistically insignificant.

Rear End Collisions - For the seven years leading up to the installation of the City's Photo Enforcement Program there was an average of 5.71 rear end collisions per year as correctly noted in the Staff Report (40 collisions / 7 years). After the installation of the City's Photo Enforcement Program, the number of rear end collisions increased significantly to an average of 8.87 per year (61 collisions / 6.875 years) (2013 data only provided through Nov. 15th). This represents an increase of 21 rear end collisions for the total 7 year period and an average increase of 3.16 rear end collisions per year.

Using the data in the Staff Report, the city traded 1 broadside collision for 21 rear end collisions.

We also compared the number of injuries associated with each type of collision referenced in this section. At the subject intersection, there were a total of 110 rear end collisions listed in the SWITRS database resulting in 37 injuries. This represents an injury rate of 0.33 per collision. In comparison, there were a total of 35 broadside collisions listed in the SWITRS database resulting in 15 injuries. This represents an injury rate of 0.42 per collision. Using these injury rates and number of each type of collision which occurred at the subject intersection before and after installation of the cameras, we can calculate a total increase of 3.55 injuries due to the installation of the City's Photo Enforcement Program.

Using any reasonable criteria, there was clearly an increase in collisions and injuries and a decrease in safety at the photo enforced intersection.

Soon after the implementation of the Photo Enforcement Program, the City completed comprehensive improvements to the intersection including the construction of additional thru lanes and left-turn lanes as well as the installation of dedicated right-turn lanes. ...The motorists were no longer forced to wait through two (2) and three (3) cycles to negotiate the intersection; they were past the intersection on the first cycle. This improved efficiency increased the overall speed of the vehicles entering and exiting the intersection. This factor is the most likely scenario to explain the increase in rear-end type collisions rather than the implementation of the Photo Enforcement Program.

The above claim is pure speculation and is contrary to what would be expected with increased traffic flow. If motorists were not stopped in a cue at the intersection, there would be less chance for rear end collisions to occur. The claim that engineering improvements to the intersection resulted in an increase in rear end collisions sounds suspiciously like an attempt by self interested parties to deflect blame away from the red light camera program for an increase in rear end collisions which is often experienced after implementation of photo enforcement. If however, the above claim is true, then the City of Walnut has now opened itself up to litigation for the increase in collisions.

It should be noted that the broadside type accidents decreased in frequency after the completion of the intersection improvements, even though the traffic flows and the overall speeds increased. This improvement in the frequency of the broadside collisions can be directly attributable to the installation of the Photo Enforcement Program.

Staff conveniently blames the intersection improvements for any increase in rear end collisions while crediting the Photo Enforcement Program for the supposed decrease in broadside collisions. This claim is both speculative and self serving. Not only has Staff used an incorrect criteria for evaluating the effect of the cameras (evaluating numbers of broadside collisions rather than red light running collisions) but their own data shows a decrease in broadside collision so small as to be statistically insignificant. Therefore, any claims as to an improvement in safety due to the Photo Enforcement Program are completely unsupportable based on the data supplied in the Staff Report and in the SWITRS database.

FISCAL IMPACT:

The annual cost to operate the City's Photo Enforcement Program is $141,116. $140,016 is the annual cost to RedFlex and $1,100.00 is provided for annual training for the LET. The LET position is charged to the COPS Grant and does not come from General Fund sources.

While we cannot evaluate the accuracy of the above numbers, it is important to note that even if the LET position is charged to the COPS Grant, these are still funds that are being expended to run the Photo Enforcement Program. As such they must be included in the cost of the program. If the LET no longer performed duties related to the Photo Enforcement Program, either the LET would be available to perform other public safety duties or the funds would be available for other purposes.

Staff has ...concluded our annual revenue from the program, after all expenditures have been accounted for, to be approximately $130,000.

The duties of the LET related to the Photo Enforcement Program are not free and must be accounted for. Although the Staff Report does not indicate the amount of funds from the COPS Grant used to pay for the LET position, that amount would reduce the revenue amount estimated above perhaps by at least half. Regardless, the $130,000 in estimated revenue represents less than 1% of the city's total annual revenue.

While the program is intended to provide for a safer intersection for the Walnut community, if the program is eliminated, the City would realize a loss of associated revenue, in addition to potential increase cost for additional patrol deployment of $260,659 per year.

The Staff report does not explain how the additional cost of $260,659 per year for “additional patrol deployment” has been arrived at, but clearly this claim is unsupportable. To incur this additional yearly

cost, the city would have to contract for at least one or two officers to patrol this one intersection on a full time basis solely to enforce red light running violations. This is clearly nonsensical and something no reasonable jurisdiction would ever do. Comparing the cost of something you would never do to the cost of the Photo Enforcement Program is a bogus analogy. Again, this is obviously an attempt to compare the the duties of a highly trained police officer with the functions of a red-light camera and is a serious insult to the hard working men and women in uniform that dedicate themselves to keeping the public safe.

Further, Staff's inclusion of the financial impact of ending the program appears to violate California Law. California Vehicle Code 21455.5 (h) (3) states: *A governmental agency that proposes to install or operate an automated traffic enforcement system shall not consider revenue generation, beyond recovering its actual costs of operating the system, as a factor when considering whether or not to install or operate a system within its local jurisdiction.* Consideration of whether the city will lose revenue if the program is ended is not permitted under the laws of the State of California.

Additionally, as stated above, no additional patrol deployment should be necessary should the city end the Photo Enforcement Program as this intersection does not have an excessive red light running collision rate compared to other intersections within the city.

Finally, any evaluation of the fiscal impact of the Photo Enforcement Program must include the fiscal impact on the local economy of the roughly $3 million paid annually in fines and additional costs by the 5500 citizens that receive citations every year. Since the bulk of the fines paid do no accrue back to the city, the city is essentially sending $3 million out of the local economy in order to receive a revenue return of at best $130,000 (less if the cost of the LET is included). From an economic standpoint this is a terrible trade-off, specially considering that public safety has decreased as a result of the Photo Enforcement Program.

Unfortunately, the Photo Enforcement Program engenders disrespect for public officials and law enforcement. Most citizens realize that the vast majority of motorists who get photo red light tickets are cited for technical violations rather than dangerous behavior warranting a $500 fine. This is especially true in Walnut as **approximately 70% of tickets are issued for right turn violations** rather than the potentially more dangerous straight through violations that the program was intended to target. As the Appellate Court said in People vs. Goulet, *"Traffic rules account for most of the contact by average citizens with law enforcement and the courts. Enforcement of laws which are widely perceived as unreasonable and unfair generates disrespect and even contempt toward those who make and enforce those laws."*

There is no question that the overwhelming evidence is that the Photo Enforcement Program has not achieved the desired effects that were anticipated when the program was implemented. Further, it has resulted in direct economic harm to the city's residents and loss of good will towards the city. Council Members should recognize that while the Photo Enforcement Program was a noble attempt to increase public safety, that goal has not been realized. The city should end the program and concentrate on proven engineering countermeasures to improve roadway safety within the City of Walnut.