

DATE ISSUED: November 20, 2002 REPORT NO. 02-282

ATTENTION: Honorable Mayor and City Council
Docket of November 25, 2002

SUBJECT: Red Light Photo Safety Program Vendor Agreement

REFERENCE: Manager's Report Nos. 96-08, 96-136, 98-114, 02-203

SUMMARY

Issue - Should the City Council authorize the City Manager to execute a new agreement with Affiliated Computer Services for operating the Red Light Photo Safety Program?

MANAGERS RECOMMENDATION – Authorize the City Manager to execute the agreement.

OTHER RECOMMENDATION - None.

FISCAL IMPACT

Installation, equipment, and servicing costs to Affiliated Computer Services (ACS) are approximately \$81,000 per intersection, per year. This is a flat fee unrelated to the number of citations issued. Annual City staff costs are estimated at \$405,000 for the Transportation Department, \$1,000,000 for the Police Department, and \$211,000 for the City Attorney's Office. It is anticipated, although it cannot be guaranteed, that program revenues will offset expenditures.

BACKGROUND

In 1996, California enacted California Vehicle Code Section 21455.5, which authorized government entities to use automated photo enforcement systems at intersections. In 1998, San Diego began its own Red Light Photo Safety (RLPS) program. The program was suspended in June 2001 because of concerns raised by RLPS staff. Since then, there have been two

comprehensive, independent audits, a Superior Court decision, and extensive review and scrutiny of the program. These examinations produced numerous recommendations for implementing a successful RLPS program in San Diego. Both audits presented clear evidence that photo enforcement programs lower violation and right angle collision rates.

On September 17, 2002, the San Diego City Council discussed the City Manager’s recommendation to reinstate the RLPS program in San Diego with modifications. The Council directed the Manager (Council Resolution # R-297074, Attachment 1) to renegotiate the City’s existing contract with ACS. Additionally, the Council directed the Manager to: 1) resolve an issue with yellow light timing at photo-enforced intersections, suggesting an across the board minimum of 4.0 seconds; 2) post the location of any proposed photo enforced intersection on the City’s website for at least 30 days for public notice and comment; and 3) include sanctions in the new contract for ACS, such as employee termination and severe financial penalties for violations regarding access to Department of Motor Vehicle (DMV) records.

On September 30, 2002, Governor Davis signed Assembly Bill 3000 into law. Among the many aspects of this bill is the impact to the base fine for non-parking violations within the state. Although a complete analysis of the effect of this bill has yet to be completed it appears that the fine for any red light citation will increase from \$271.00 to \$324.00. This is due to a 20% increase in the base fine. It appears that the additional revenue collected will go to the State.

DISCUSSION

Re-negotiation of the agreement (Attachments 2 and 3) with ACS resulted in significant changes to the City’s RLPS program. These changes include a flat fee paid by the City to ACS, a dual camera system installed at intersections determined by the City, and sanctions against ACS for violating laws restricting access to DMV records. The Police Department has written a comprehensive operational procedure that ACS must follow in order to accomplish the City’s goals and objectives in photo enforcement. The Police Department will ensure compliance by conducting regular on-site inspections of ACS’s operation.

The contract states that the City shall pay ACS a fixed monthly fee of \$4,670.00 per approach, per month, for maintenance and service. The fixed monthly fees will be tiered based on the number of enforced approaches installed.

Number of Enforced Approaches	Monthly Fee Per Enforced Approach
1 – 19	\$4,670
20 – 29	\$4,470
30 – 39	\$4,270
40 – and greater	\$4,070

In addition to the maintenance and service fee the City shall pay ACS an installation cost per approach. The full installation cost will be discounted 20 percent if the City chooses to make an upfront payment upon certification of the installation. The installation cost will vary depending on the type of approach installed. The City has three different types of installations: 1) retrofit

one of the previously enforced intersections using a combination of new and existing hardware; 2) build out a new intersection using new and existing hardware relocated from a previously enforced intersection; or 3) build out a new intersection with all new equipment. At the City’s discretion, the full installation cost may be amortized over the remaining term of the contract in equal monthly payments and added to the monthly camera maintenance and service fee.

Number of Installed Approaches	Full Installation Cost	Discounted Installation Cost with Upfront Payment
1.) Retrofit Existing Intersection for Dual Camera Approach	\$100,000	\$80,000
2.) New Intersection with One New Camera and One of 19 Existing Cameras in service	\$125,000	\$100,000
3.) New Intersection with Two New Cameras	\$150,000	\$120,000

Any fees charged to ACS by the City during the permitting process will be itemized and charged back to the City in the next monthly invoice. Additional detail on the cost breakdown for the fixed monthly fee and construction payment is outlined as follows:

Fixed Monthly Fee

- Salaries and Benefits – This cost category includes project management, operations management, field service technicians, and processing staff. It also includes FICA, FUTA, health benefits, 401K, and pension plan contributions.
- Facilities and Administration – This cost category includes the monthly office rent in San Diego County, utilities, building maintenance fees, property taxes, telephone charges, and miscellaneous office supplies.
- Production Expense – This cost category includes printing and stuffing equipment costs, printing and stuffing supplies, postage expense, raw film costs, film development costs, film processing equipment costs and citation processing costs.
- Public Relations and Media Support – This cost category includes the internal and external professional fees associated with supporting the public outreach program as per the contract scope of services.
- Citation Application Support and Computer Hardware Service – This cost category includes the time and material support from ACS’ data center in Tarrytown, New York. It includes support for the application, system hardware, and Wide Area Network (WAN) communications link.

Construction Payment

- Camera, Pole, Housing and Flash – Includes one new unit of each with the assumption that the existing equipment will be used to complete the dual camera installation.
- Construction Payment – Estimated cost based on historical work of similar size and scope. This includes the engineering drawings and dual camera installation.

This price assumes the City will allow ACS to use existing conduit wherever possible.

- Construction Management and Oversight – Includes construction planning and drawings review, as well as site inspection during construction.

PAYMENT TERMS:

The City will be invoiced monthly for each installed approach, for both the outstanding installation fee and the fixed monthly fee. These fees will be prorated daily and will begin following final certification of the approach by the Department of Transportation and the Police Department. ACS shall submit invoices upon certification of each approach.

COMPARATIVE CONTRACTS

In order to provide a better understanding of the pricing provided and the typical pricing in the market, the following table compares three California contracts of similar scope and service. It is important to note that San Diego will be the first contract in California with a dual camera system.

	San Diego	LA County	West Hollywood	San Francisco
Construction Payment	\$80,000 – \$120,000	N/A	N/A	\$80,952
Fixed Monthly Fee	\$4,670	\$6,900	\$7,812 per enforced approach	\$6,428 per enforced approach*
Effective Monthly Fee Per Camera	\$6,750	\$6,900	\$7,812	\$7,778

* This pricing began 10/16/02 for the first option year.

As the chart highlights, ACS intends to provide San Diego with the most comprehensive program in California at a price that is competitive or better than other ACS programs of similar size and scope.

YELLOW LIGHT TIMING

The purpose of the yellow clearance interval is to warn vehicles that the green signal indication is being terminated and that a red indication will be exhibited immediately thereafter. This yellow interval is followed by an all-red interval where the all-red indication is displayed to all traffic. The all-red interval provides additional time before conflicting traffic movements are released.

The selection of the appropriate yellow interval length is important for both safety and capacity. A short yellow interval may cause potential traffic accidents with conflicting vehicular movements or pedestrians. This is attributed to drivers being trapped in what is known as the “Dilemma Zone.” The “Dilemma Zone” is an area in advance of the traffic signal where, if a yellow interval duration is not long enough, vehicles can neither stop safely before the

intersection nor continue through the intersection without accelerating before the onset of the red signal indication.

On the other hand, if the change interval is too long, it imposes undue delays to both vehicles and pedestrians. This in turn breeds disrespect to signals in general, and thereby increases red light violations.

Current Practice

The principal factors that are considered in determining the yellow interval include:

- Perception-reaction time of the motorist
- Comfortable deceleration rate of the vehicle
- Speed of the approaching vehicle

Through Traffic Movement - San Diego currently uses a minimum yellow clearance interval of 3 seconds and a maximum of 6 seconds. The yellow interval duration is calculated based on a standard driver perception/reaction time of 1 second, a deceleration rate of 10 f/sec², and the 85th percentile speed on the approach.

Left Turn Traffic Movement - The City of San Diego currently uses a standard 3 seconds for all left turn movements regardless of the speed on the approach. However, due to geometric features, at some intersections the yellow clearance interval has been increased.

Additionally, a 1 second all-red clearance interval is utilized after the yellow light phase.

Proposed Changes

Based upon a study of research of driver behavior and the practice of other jurisdictions, Traffic Engineering recommends that the minimum yellow clearance intervals will be increased for both left turns and through traffic movements.

Through Traffic Movement - The minimum yellow clearance interval will be increased from 3.0 seconds to 3.9 seconds.

Left turn Traffic Movement - The minimum yellow clearance interval will be increased from 3.0 seconds to 3.4 seconds.

Additionally, if a down slope exists at the intersection or actual speed data is available, a yellow clearance interval for either through or left turning traffic movements will be calculated using equations developed by the Institute of Transportation Engineers (ITE). If this value is higher than the yellow time calculated using the Caltrans methodology, the higher value will be used. If the ITE clearance interval is lower than that calculated using Caltrans procedures, the higher Caltrans value shall be used.

State and Federal Requirements

State - State requirements are reflected in the Caltrans Traffic Manual. The yellow change intervals are specified in the attached memorandum dated April 13, 1998. The Caltrans Traffic Manual suggests a minimum of 3.0 seconds and a maximum of 6.0 seconds for yellow clearance interval. The Caltrans' calculation of yellow clearance interval does not consider grade.

Federal - Federal requirements are contained in the Manual of Uniform Traffic Control Devices (MUTCD), Millennium Edition, published by the Federal Highway Administration (FHWA) and considered as an official guide throughout the United States. The MUTCD recommends yellow clearance interval times be within a range of minimum of 3.0 seconds to a maximum of 6.0 seconds. The MUTCD is silent to considering grade in the calculation of yellow clearance interval.

Agencies Consulted

Yellow clearance intervals used by other jurisdictions in San Diego County have been surveyed. These jurisdictions include City of Carlsbad, City of Chula Vista, City of El Cajon, City of National City, City of Escondido, City of La Mesa, City of San Marcos, City of Santee, and City of Oceanside as well as the County of San Diego and Caltrans. Traffic Engineers from City of San Francisco, City of Los Angeles, City of San Jose, and City of Anaheim were also contacted regarding the minimum yellow clearance intervals used in their respective jurisdictions. These jurisdictions used minimum yellow clearance intervals ranging from 3.0 to 3.5 seconds for left turns, and 3.0 to 4.0 seconds for through movements are being used in these jurisdictions.

Jurisdictions outside California were also surveyed. These include Fairfax County, Virginia; Broward County, Florida; and the Florida Department of Transportation. These agencies use a minimum of 4.0 seconds for both through movements and left turns.

Within the city, over a dozen registered traffic engineers were consulted on this subject, including two Ph D's in traffic engineering. Additionally, a literature review was conducted to examine existing best practices currently being utilized.

Literature Review

1) Uniform Yellow Interval

Frantzeskakis recommends using constant yellow intervals of three, four and five seconds for speeds of 50, 60, and 70 km/h (31, 37, and 43 mph), respectively, so that unfamiliar drivers will have a reasonable expectation of the yellow interval in order to decide whether or not to stop. (Source: Frantzeskakis, J.M., 1984. "Signal Change Intervals and Intersection Geometry," *Transportation Quarterly*, Vol. 38, No. 1, pp. 47-58.)

Wortman et al. recommend using a uniform yellow interval of four seconds. This is based on their findings that actual driver behavior is independent of the intersection conditions and conforms to a non-uniform deceleration model. Source: Wortman, R.H., J.M.

Witkowski, and T.C. Fox, 1985. "Optimization of Traffic Signal Change Intervals: Phase I Report," Report Number FHWA/AZ-85/191, Arizona Department of Transportation, Phoenix, Arizona.

Some jurisdictions use a 4 second minimum yellow time, including: Florida, Virginia, North Carolina, etc.

2) Perception/Reaction Time-

In the paper "Brake Reaction Times of Unalerted Drivers" on the March, 1989 issue of ITE Journal, Dr. George T. Taoka analyzed four experimental investigations on driver reaction times. He concluded that the 1.0-second perception/reaction time used in the ITE formula is the average, and a value of 1.8-second may be more representative for the reaction time of the 85th percentile driver.

3) Effect of Small Increases of Yellow Time on Potential Intersection Conflicts-

In the paper "The Influence of the Time Duration of Yellow Traffic Signals on Driver Response" in the November, 1980 issue of ITE Journal, William A. Stimpson et al, concluded that potential intersection conflicts could be virtually eliminated with small increases in the duration of the yellow phase. They also noted that an increase in yellow duration in such a magnitude does not have a significant effect on the potential of drivers crossing the intersection on yellow. Similar results have been observed at Fairfax County, Virginia, where vehicle conflict at a high accident location was virtually eliminated after the yellow time was increased.

Yellow clearance intervals should be long enough for a driver approaching a signal to make a decision whether to proceed or to stop when a yellow light is displayed; and then either continue into the intersection while the light is still yellow, or brake at a normal deceleration rate and come to a stop prior to entering the intersection. Studies on brake reaction time have indicated that about 85% of the drivers can react in about 1.8 seconds. Prior design formulas used a smaller value of 1.0 seconds for driver reaction time. The 85th percentile is used to set speed limits, in order to accommodate 85% of drivers.

Different vehicles decelerate (brake) at different rates due to factors such as the physical condition of the brakes, vehicle weight, brake design, etc. Increasing the minimum yellow time would allow more vehicles with less than optimum braking ability to come to a stop in the allotted distance.

Also, there can be variability in the speeds of vehicles approaching an intersection. Higher approach speeds require a longer yellow time in order to allow a driver enough distance to brake properly. Absent a speed survey to determine actual speeds, the minimum yellow time should be set to accommodate a wider range of approach speeds. For left turns, a minimum yellow time of 3.4 seconds would accommodate speeds up to 34 mph; for through moves, a minimum of 3.9 seconds would handle speeds up to 40 mph.

In light of all of the above information, it is the Traffic Engineering Division's professional recommendation that the aforementioned changes to the minimum yellow clearance interval for through and left turn traffic movements be made. These would be used unless actual speed and grade data suggests a longer yellow time, in which case the longer time would be used.

A one second all-red clearance interval will continue to be utilized after the yellow phase at all traffic signals. In unusual circumstances, this all-red interval may be slightly longer than one second.

Also, to further eliminate any possibility of error, the City of San Diego will use a minimum red light grace period of 0.5 seconds before a photo is taken of the offending vehicle, meaning the camera will not activate until the red light has been red for 0.5 second. The 0.5 second red light grace period before camera activation, ensures that any driver within the city of San Diego will have at a minimum nearly four full seconds in which to stop prior to receiving a photo red light citation. It should be noted that California Vehicle Code Sections 21453 (a) & (c) prohibits all vehicles from entering an intersection at any point during a red light phase. If officers witness a violation they are responsible to take appropriate action regardless of whether a camera would function.

INTERSECTION SELECTION

Another area of concern expressed at the September 17, 2002, Council meeting was identifying criteria (Attachment 4) for selecting photo-enforced intersections. Traffic safety is the primary reason for establishing the RLPS program; collision history and collision type will be key factors in evaluating proposed intersections. Other factors will include citation history, citizen complaints, traffic volume, pedestrian traffic, and site distribution throughout the community among others.

Before an intersection is selected for photo enforcement, Traffic Engineering will consider implementing engineering solutions such as yellow light timing, all red phasing, additional warning systems, and pavement markings to make the intersection safer. If engineering solutions are not possible or produce no improvement in safety, the proposed intersection will be posted on the City's website for at least 30 days. Posting proposed photo red light locations will build public trust and understanding in how locations are selected and will allow for community input. Community input will be documented and considered before the City decides that a proposed intersection warrants photo enforcement.

CONCLUSION

The contract with ACS was successfully re-negotiated taking into consideration all the recommendations made at the September 17, 2002, Council meeting. As a result, a comprehensive Red Light Safety Program has been developed for the City. This program includes a flat fee contract with ACS, significant oversight of the vendor, a complete review of our yellow light timing, and community involvement in the program's implementation. The criteria for selecting intersections for the photo safety program have been developed, and

minimum yellow light times have been established. These changes will ensure that the City's RLPS program will enhance the safety of citizens, operate accurately, and cite only those motorists who violate the law. Therefore, the Manager recommends authorizing the new agreement with ACS for operating the City's RLPS program.

ALTERNATIVE

Do not authorize the City Manager to execute the agreement.

Respectfully submitted,

David Bejarano
Chief of Police, Police Department

Approved: P. Lamont Ewell
Assistant City Manager

D. Cruz Gonzalez
Director, Transportation Department

UBERUAGA/WAM/AH

Note: The attachments are not available in electronic format. A copy is available for review in the Office of the City Clerk.

- Attachments:
1. Final Resolution # R-297074 Adopted on 9-17-02
 2. Red Light Camera License and Service Agreement (Contract No.C-08738)
 3. Renegotiated Agreement
 4. Criteria for Selecting Photo Red Light Locations