

Determining the Collision Effectiveness of Red Light Running Cameras  
A Unique Opportunity in Chapel Hill  
ITRE, June 19, 2003

One of the primary causes of crashes at intersections across the state of North Carolina and across the United States is when a vehicle enters an intersection during the red interval. Red light camera (RLC) photographic enforcement has been used in the United States since 1992, and has been used in North Carolina in the past five years, to try to address those crashes. However, to this point there has not been valid research completed to prove their safety benefits. In a recent *ITE Journal* article, Hugh McGee and Kimberly Eccles stated the following about red light cameras:

“One concern relates to the lack of convincing evidence that RLC systems improve safety, not only at the signalized intersection where they are used but throughout the jurisdictions.”

Such a concern warrants an investigation to find the answer to whether red light cameras show positive impacts on safety. The research project we wish to work with the Town of Chapel Hill on to address that concern is described below.

#### PURPOSE

The purpose of our effort is to conduct a before and after with control study of collisions at intersections that are to be photographically enforced with red light cameras to determine scientifically their safety benefits.

This project will be a ONE-OF-A-KIND project in this field of research that yields more precise indications of the effects of photographic enforcement cameras in reducing collisions. Previous research on the benefits in crash reduction brought on by red light running cameras has not adequately reflected the true safety benefits. Red light running cameras are almost always installed at locations where the two following characteristics prevail:

- Where high numbers of collisions have been recorded recently.
- Where video validation has found a high enough number of violations to warrant a camera being installed by the vendor.

Previous studies therefore only show what is happening at intersections that are considered to be the worst in their respective areas. Based on these criteria, it is nearly impossible for an intersection to NOT have any statistical increase in safety.

By contrast, the study we are proposing will use camera and non-camera (control) sites selected randomly from the pool of qualifying intersections. We will compare the change in collisions from before to after camera installation at the camera sites to the change in collisions during the same time periods at the control sites. Changes in collisions apart from the effects of cameras

should cancel out between the two groups, leaving us, the Town, and the world at large with a clear look at the effects of the cameras.

### **WHAT WE NEED FROM CHAPEL HILL**

The most important thing we need from the Town is the assurance that cameras will be installed at intersections selected at random from the pool of qualifying sites, leaving the members of the pool not selected to be the control sites. Whether ITRE or the Town does the actual selecting does not matter, as long as the random nature of the selection is preserved. Without the random aspect, the study is not worth conducting.

We have obtained collision data for the pool of possible intersection sites from NCDOT at this time, which could serve for the "before" time period. NCDOT can undoubtedly supply collision data again following the "after" time period. If we rely on NCDOT, we will not need collision data from the Town. However, for easy follow-up by the Town in later years, it may be better to use Town collision records from the onset. We would at least like to explore this with the Town, before making a decision to use NCDOT collision data.

We would like periodic traffic volume information for the camera and control sites from the Town. These could be in the form of link (tube) counts or intersection (turning movement) counts. Annual counts going back four years or so and extending through the duration of the analysis would be best, but we will use whatever is available.

We would like information from Town staff on the construction histories of the camera and collision intersections during the study period. In other words, we would like to know whether any major projects (adding signal phases, turn lanes, sidewalks, etc.) occurred or are scheduled to occur at the intersections from four years ago to two years or so from now. Written documentation on these projects would be great, but personal recollections will serve well too.

Finally, we would also like to have access to the video validation that ACS conducted. We will review this information as part of a related effort we are making on the time distribution of violations.

### **WHAT WE WILL PROVIDE TO CHAPEL HILL**

We would like to give the Town of Chapel Hill a one-of-a-kind study that is not refutable and is statistically valid. This study will show the safety advantages, or disadvantages, of cameras based on the before and after collision data at the camera intersections relative to the control intersections. We will set the study up and analyze the data for one "after" year (until September, 2004), providing a report to the Town and GHSP when our contract with GHSP expires. After that time, it is likely that additional collision data will still be useful to provide a more stable estimate of the safety effect. Therefore, we will brief the Town staff on how to continue to follow-up the analysis in subsequent years. Once the study is set up, the analysis is relatively easy (the math is straightforward).