Evaluation of Cedar Rapids Automated Traffic Enforcement Report - Primary Highway System

Introduction:

Automated traffic enforcement (ATE) is one of many safety countermeasures that can be used to enhance roadway safety. Automated enforcement may involve the enforcement of red-light running violations and speed limit violations. The city of Cedar Rapids uses ATE systems to enforce red-light running and speed violations at three signalized intersections on the primary highway system. In addition, they use ATE systems to enforce speed violations at four locations along I-380.

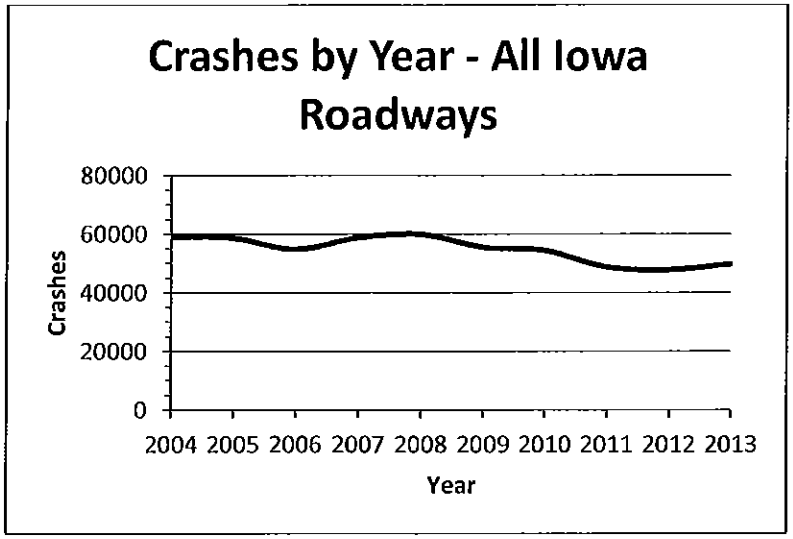
In 2012 Iowa State University developed a report titled, "Toolbox of Countermeasures to Reduce Red Light Running". The report documented that at signalized intersections, red-light running crashes make up 24.5% of all crashes and account for 31.7% of all fatal and major injury crashes. This toolbox is to aid practitioners in ways to identify and address red-light crashes at signalized intersections. The report focuses primarily on engineering and enforcement solutions. The report has two main parts; 1.) Guidelines to identify problem intersections and the causes of red-light running, and 2.) Roadway-based and enforcement countermeasures. This second part details 20 potential safety countermeasures that can be used at signalized intersections to address these types of crashes. Automated enforcement is one of those potential countermeasures.

The National Highway Traffic Safety Administration (NHTSA) conducted one of the most comprehensive reports to date on the causation of crashes in the United States. This report titled, "National Motor Vehicle Crash Causation Survey – Report to Congress" was published in 2008 and documents the investigation of 6,950 crashes nationwide. This study involved researchers being at the crash scene to assess relatively undisturbed information pertaining to the events and factors that led up to the crash and the opportunity to discuss the circumstances of the case with drivers, passengers, and witnesses while it was still fresh in their minds. The researchers on the scene were in an ideal position to gather first-hand information related to the vehicle, the roadway, the environmental conditions, and the human behavior factors. Some of the critical findings include:

- 95% of all crashes were caused by the drivers, 2.5% were caused by the vehicles, and 2.5% were caused by roadway/weather
- Of the 95% that were attributed to drivers:
    - 40.6% was driver recognition error (inadequate surveillance, internal/external distraction, inattention, etc.)
    - 34.1% was driver decision error (too fast for conditions, too fast for curve, false assumptions, illegal maneuver, misjudgment, etc.)
    - 10.3% was driver performance error (overcompensation, poor control, etc.)
    - 7.1% was driver non-performance error (sleep, heart attack/other physical impairment, etc.)
    - 7.9% was other/unknown driver error

This report helps us better understand the primary causation of crashes. The speed at which a driver chose to drive was a primary cause in some of the crashes. Specifically, 8.4% were driving too fast for conditions and 4.9% were driving too fast for a curve. However, speed was not the primary causation in 86.7% of crashes caused by the driver, nor the crashes caused by vehicles or roadway/weather.

On a statewide basis, crashes in Iowa have been decreasing. Specifically, over a 10 year period, crashes have decreased 15.6% from 59,192 in 2004 to 49,968 in 2013. Below is a chart showing the total number of crashes in Iowa.



Review of Cedar Rapids Annual Report:

We have completed our review of your automated traffic enforcement (ATE) report as required in Iowa Administrative Code 761--144. The following documents were considered by the DOT in connection with this review:

- "Report to Iowa Department of Transportation, City of Cedar Rapids Automated Traffic Enforcement on Primary Roadway 2013" of May 2014;
- "Evaluating the Effectiveness of Red Light Running Camera Enforcement in Cedar Rapids and Developing Guidelines for Selection and Use of Red Light Running Countermeasures, Final Report – 2011" by Center for Transportation Research and Education (CTRE) at Iowa State University (including the Technical Report Documentation Page for project 10-386 and pages 40-41 containing "Conclusions and Recommendations");
- September 8, 2014 e-mail from Mike Wallerstedt to Steve Gent;
- September 15, 2014 e-mail from Mike Wallerstedt to Steve Gent;
- I-380 Cedar Rapids Corridor Safety Initiatives – tracking document for 2009 Safety Audit.

Intersection speed and red light cameras:

The city has speed and red-light violation cameras at three intersections on the primary highway system. DOT's findings and resulting action for these locations are set forth below.

1st Ave and 10th St East

Findings:

- Cameras activated 3/14/2010.
- Eastbound and westbound approaches are subject to traffic camera enforcement.
- Crash data: 11 before activation (total for 2008 and 2009); 9 after activation (total for 2012 and 2013) – from city provided crash data.
- Crash data: 25 before activation (total for 2008 and 2009); 21 after activation (total for 2012 and 2013) – from city provided collision diagrams.
- The westbound cameras at 1st Ave and 10th Street are located approximately 300 feet after a lower speed limit sign (35 mph to 30 mph).
    - Iowa Administrative Code 761-144.6(1)(b)(10) provides that automated enforcement should not be placed within the first 1,000 feet of a lower speed limit.

Resulting Action:

- Disable speed detection from the camera system at the 1st Ave. and 10th Street intersection for the following reason: the westbound speed camera is within the first 1,000 feet of a lower speed limit.

Williams Blvd and 16th Ave SW

Findings:

- Cameras activated 12/18/10.
- Northbound and southbound approaches are subject to traffic camera enforcement.
- Crash data: 14 before activation (total for 2008 and 2009); 4 after activation (total for 2012 and 2013).
- Crash data: 27 before activation (total for 2008 and 2009); 12 after activation (total for 2012 and 2013) – from city provided collision diagrams.

Resulting Action:

- Continue operation of speed and red-light cameras at this location.

1st Ave and L St SW

Findings:

- Cameras activated 6/1/2011.
- Eastbound and westbound approaches are subject to traffic camera enforcement.
- Crash data: 10 before activation (total for 2008 and 2009); 11 after activation (total for 2012 and 2013) – from city provided data.

- Crash data: 31 before activation (total for 2008 and 2009); 15 after activation (total for 2012 and 2013) – from city provided collision diagrams.
- Crash data: 24 before activation (total for 2008 and 2009); 20 after activation (total for 2012 and 2013) – from DOT crash records totaling all crashes within 150 feet of center of intersection.

Resulting Action:

- Continue operation of this speed and red-light cameras at this location.

Fixed Speed Cameras on I-380:

Fixed speed cameras: The city has four sets of fixed speed cameras located on I-380; two northbound and two southbound. DOT's findings and resulting action as to each location are set forth below.

General Findings:

- Crash data: 82 before activation (total for 2008 and 2009); 59 after activation (total for 2012 and 2013) – from city provided data.
- Four sets of interstate cameras is a high number compared to other cities in Iowa and USA.
    - Des Moines has one set of cameras on I-235 and Sioux City typically uses two portable speed cameras on I-29. Iowa is the only state in the nation, that we are aware of, that has permanent speed cameras on the interstate system.
- The primary safety concern on I-380 through Cedar Rapids is the "S" curve through downtown. Most of this "S" curve is located on an elevated structure which creates some additional safety concerns. Speeding motorists *entering* an "S" curve present an increased safety risk. This same risk is not present as motorists *leave* the "S" curve.
- Iowa Administrative Code 761-144.4(1)(c) provides that automated enforcement should only be considered in extremely limited situations on interstate roads because they are the safest class of any roadway in the state and they typically carry a significant amount of non-familiar motorists.
    - Local drivers are typically aware of speed cameras and therefore monitor their speed accordingly. Non-familiar drivers often do not see/read the photo enforced signs and therefore may not monitor their speed accordingly.
- Many safety countermeasures have been added to this section of roadway as a result of the I-380 Safety Audit conducted in late 2008 (final report March 2009), and other safety projects.

I-380 Northbound near Diagonal Dr

Findings:

- Cameras activated 6/12/10.
- The number of speed citations at this location is moderate: 9,190 in 2011, 10,109 in 2012 and 4,218 in 2013.

- This set of cameras is located 859 feet beyond a speed limit reduction from 60 mph to 55 mph.
    - Iowa Administrative Code 761-144.6(1)(b)(10) provides that automated enforcement should not be placed within the first 1,000 feet of a lower speed limit.

Resulting Action:

- Move the northbound interstate speed cameras located south of Diagonal Drive to the next truss north; located near 1st Ave.
    - This allows this camera location to comply with the 1,000 foot requirement of Iowa Administrative Code 761-144.6(1)(b)(10) and will locate the camera closer to the beginning of the critical "S" curve.

I-380 Northbound near J Ave

Findings:

- Cameras activated 8/27/10.
- This camera is located well beyond (approximately 3,800 feet) where a driver has exited the "S" curve.
- The number of speed citations at this location is extremely high: 36,775 in 2011, 35,327 in 2012 and 36,069 in 2013.

Resulting Action:

- Remove or disable the northbound I-380 cameras near J Ave.
    - The location of the camera is well beyond the "S" curve and therefore beyond the area of concern.
    - Iowa Administrative Code 761-144.4(1)(c). Limited use on interstate roadways.

I-380 Southbound near J Ave

Findings:

- Cameras activated 10/16/10.
- This set of cameras is located 896 feet beyond a speed limit reduction from 60 mph to 55 mph.
- The number of speed citations at this location is extremely high: 44,775 in 2011, 38,052 in 2012 and 44,529 in 2013.

Resulting Action:

- Move the southbound interstate speed cameras located near J Ave to the next truss south; located near G Ave.
    - This allows this camera location to comply with the 1,000 foot requirement of Iowa Administrative Code 761-144.6(1)(b)(10) and will locate the camera closer to the beginning of the critical "S" curve.

I-380 Southbound near 1st Ave Ramp

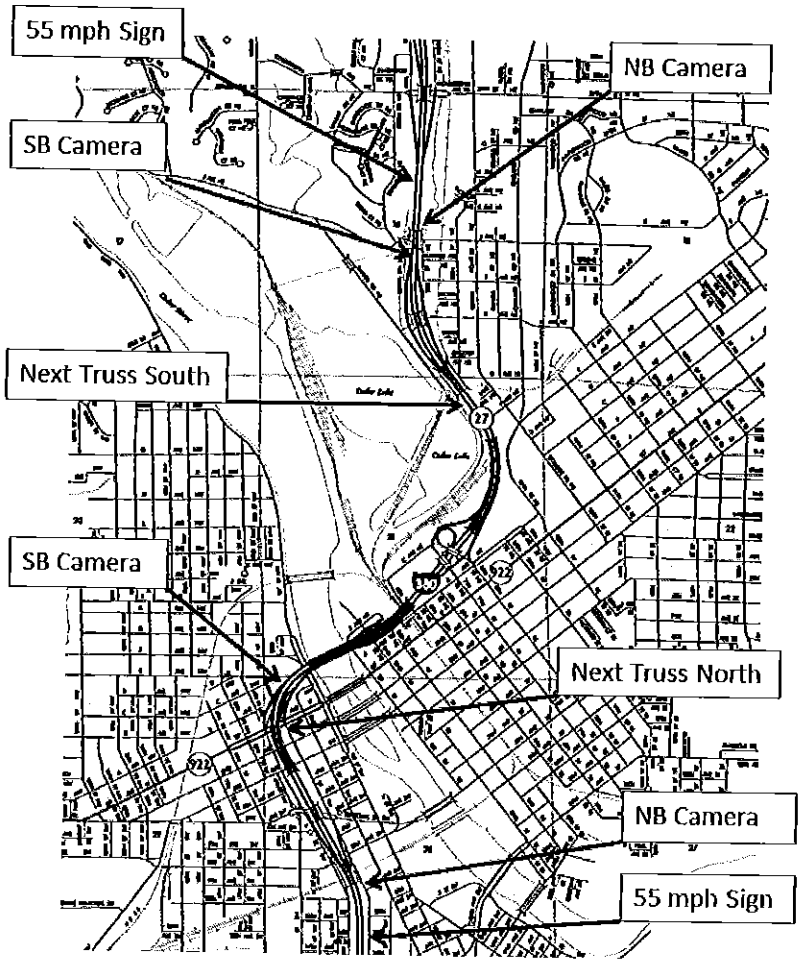
Findings:

- Cameras activated 12/18/10.
- This camera is located near where a driver exits the "S" curve.
- The number of speed citations at this location is low: 1,226 in 2011, 986 in 2012 and 1,234 in 2013.
- This camera is located where a driver exits, or has exited, the "S" curve.

Resulting Action:

- Remove or disable the southbound I-380 cameras near 1st Ave. ramp.
    - The location of the camera is beyond most of the "S" curve and therefore beyond most of the area of concern.
    - Iowa Administrative Code 761-144.4(1)(c). Limited use on interstate roadways.

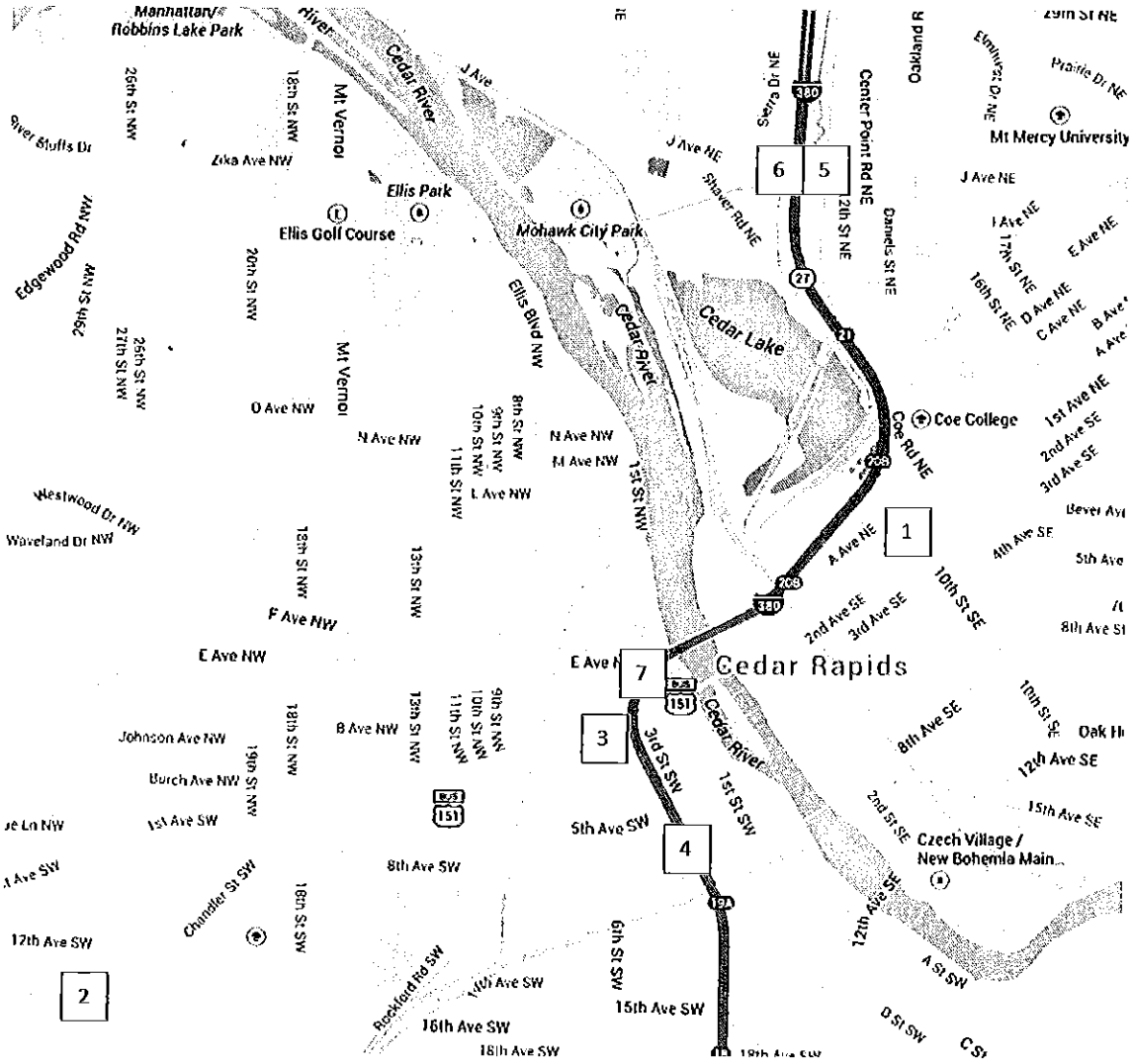
Map showing I-380 speed camera locations, existing and proposed



Timeframe:

The city shall implement the resulting actions by April 17, 2015. The city may appeal this decision pursuant to Iowa Administrative Code 761—144.9(307). Such an appeal should be submitted to the Iowa Department of Transportation Director within 30 days of the date of this decision.

Map of Cedar Rapids ATE systems on the primary highway system:



1. 1st Ave and 10th St East
2. Williams Blvd and 16th Ave SW
3. 1st Ave and L St SW
4. I-380 NB near Diagonal Dr
5. I-380 NB near J Ave
6. I-380 SB near J Ave
7. I-380 SB near 1st Ave Ramp