ATTACHMENT B

MEMORANDUM

To: Bob Goebel, Public Works Director

Thru: Dan Sailer, Assistant Public Works Director
Ryan Germeroth, Transportation Planning & Traffic Engineering Manager

From: Brian Tennent, Traffic Operations Engineer

Date: April 4, 2016

Subject: Removal of Late Night Traffic Signal Flash in Castle Rock

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The Town of Castle Rock has been running nighttime flash operations at most Town traffic signals for several years now between midnight and 5:30 AM. This type of operation is when the main street approaches flash yellow with the side street flashing red. This is commonly referred to as yellow-red flash. Most towns, cities, and municipal agencies implement this type of operation when there are low volumes on the road at night. The benefit of having this type of operation is that a driver on the main street can traverse the corridor without having to stop for a red light. A car on the side street will have to come to a complete stop, but if no vehicles are coming on the main street then they can turn onto the main street with minimal delay. Since delay decreases with this operation the level of service (LOS) is typically better. This is the main benefit and one that motorists traveling streets in Castle Rock have become accustomed to.

However, there are also several downsides to nighttime flash including but not limited to inactive pedestrian phases while in flash, driver unfamiliarity with how to navigate a flashing signal, safety aspects associated with crashes and emergency response.

When a traffic signal controller is in controller flash during nighttime flash operations, the pedestrian buttons or indications cannot be activated. If a pedestrian comes to a signal that is in nighttime flash the pedestrian will not be given a walk signal indication to cross the street. Instead, the pedestrian will have to treat the intersection as a two way stop and cross the street when there is a gap in traffic. Other aspects to consider are some drivers are unfamiliar with how to navigate a traffic signal in yellow-red flash as well as the safety of the yellow-red flash. Not all motorists know how to approach or drive through a flashing yellow-red intersection. Observations have been made, both here in Castle Rock and nationwide, that occasionally drivers on one side of the flashing yellow approaches will stop either because they think they are supposed to stop or because they are attempting to let traffic from the side street make their turn. This increases the potential for rear-end collisions. Additionally, as with any other two-way stop controlled intersection, there is an increased chance for right angle collisions because a driver coming off the side street may have trouble judging on how fast the driver is going on the main street.

Right angle crashes tend to escalate during late night flash operations because a driver coming off the side street has a hard time judging the distance of the approaching vehicle. The report done by the Federal Highway Administration (FHWA) titled Removal of Signal Flashing Mode During Late-Night/ Early Morning Operation looked at eight locations in Winston-Salem, North Carolina. Of those eight signalized intersections they evaluated them on three categories; total crashes, right angle, and injury. All of these locations were running late night flash operations prior to the study. During the observation periods ranging from thirty-five to fifty-one months in which normal signal operations were run, it was found that all three categories of crashes had decreased. The Director of Transportation at the time Stan Polanis says, "Use of flashing signal operation requires careful application and additional monitoring. We have found that it is better to have positive control rather than leaving the driver to decide when it is safe to proceed into the intersection." Crashes especially ones correctable through signal operation including but not limited to right angle and head-on are minimal during the existing nighttime flash hours, as the Town grows in population it is estimated that so will the number of crashes. Based on the U.S. Census Bureau data from July 2015 Winston-Salem is four times the size of Castle Rock. As Castle Rock continues to grow in population the law of probability suggest that the number of crashes will also continue to rise. We are taking a proactive approach in order to minimize projected crash tends for the future.

Finally, the impact to emergency response times during nighttime flash can also be a downside. With the population continuing to grow in Castle Rock so does the number of emergency calls being reported between midnight and 5:30 AM. All of the traffic signals in Castle Rock are equipped with emergency vehicle preemption equipment, which during standard signal operations, provides a green indication for the direction that Castle Rock Fire vehicle is coming from. However, when nighttime flash is in operation and an emergency vehicle preemption is received by the traffic signal, the signal must first come out of flash with a two second red phase on all approaches before providing a green to the approach that the Fire vehicle is coming from. This type of operation can delay the emergency vehicle. Castle Rock Fire has a policy that a Fire truck must come to a complete stop at all stop signs and red lights even during an emergency call. This is done to assure the safety of any cross traffic from the intersecting street. On average it takes around twenty seconds for a fire truck to accelerate to a velocity of forty miles per hour from a complete stop. The fire department has stringent performance measures and performance goals associated with response time to an emergency. The advantage of the signal staying in normal operation versus nighttime controller flash is that the signal will turn green right away instead of going through an all red phase which will help to reduce response times between midnight and 5:30 AM. Castle Rock Fire has provided a memorandum (attached) that outlines the impact nighttime flash is having on their emergency response times.

In order for Town staff to remove nighttime flash while minimizing the impact to the traveling public, we would have to keep both main street and side street delays manageable. In order to accomplish this we will implement times into the traffic signal controller that will be able to adjust with the lower volume demand. We will simulate progression by having the main streets remain green (green rest), and only cycle to the side street when a vehicle approaches. We have a good grasp on how to balance the progression with the side street demand during this time period based on the traffic

volume data collected over the years. If done properly, the delay to the traveling public with the signals operating in green rest is not expected to be substantially different from the current nighttime flashing operation but the benefit will be a fully functional signal at all times.

We plan to implement this change during the upgrade to the new traffic signal system. We have reached out to Community Relations who suggested we address questions from the public on an as needed basis as opposed to putting out a Town-wide electronic notification given the relatively limited number of residents expected to be impacted by the change. However, similar to the Traffic Engineering staff answering public comments on this change Community Relations will also be available to provide feedback through social media.

In summary there are both benefits and disadvantages to having and not having nighttime flash. Other than a very marginal decrease in delay when the signals are in nighttime flash, there are more advantages to operate the signals in normal operation during the late night hours. Most of the advantages have a safety aspect to them for both motorists and pedestrians. This will also help the Fire Department continue to meet their response time performance measures as the number of late night emergency calls continues to increase in Castle Rock.

Attachments:
Attachment A – Memorandum from Deputy Fire Chief Norris Croom

MEMORANDUM

Castle Rock Fire and Rescue Department

Date: 17 September 2015

To: Brian Tennent, Traffic Operations Manager
Megan Lobban, Traffic Engineering Technician
Ryan Germeroth, Transportation Planning and Traffic Engineering Manager

cc: None

From: Norris W. Croom III, Deputy Chief
Operations Division

Through: None

Subject: Nighttime Flashing Traffic Signals and Opticoms

First, let me thank you for taking the time to meet yesterday to discuss the challenges we are encountering with nighttime flashing traffic signals and opticom operations during emergent responses.

As we discussed yesterday, the challenge that we have with nighttime flashing traffic signals is that they turn red when the opticom activates the sensor. By policy, Administrative Directive 2007-08, Apparatus Operations, Section 2.5, states, “During emergency response, Driver/Operators shall bring the apparatus to a complete stop for any of the following:

a. When directed by a law enforcement officer
b. Red traffic lights
c. Stop signs
d. Negative right-of-way intersections
e. Blind intersections
f. When all lanes of traffic in an intersection cannot be accounted for or other intersection hazards are present
g. At all unsignaled/unguarded railroad crossings
h. When encountering a stopped school bus with flashing warning lights”

We do not allow for any deviations from this directive based on time of day, weather conditions, type of emergency, etc.

As part of our accreditation requirements, our response time goal is 4 minutes 29 seconds 90 percent of the time. When an apparatus has to come to a complete

stop, it takes approximately 20 seconds for the apparatus to get back up to a speed of 45 mph. Using Meadows Boulevard as an example, if Engine 154 responds to a call at Meadows and Springmeadow Drive, they will encounter four traffic lights between the station and the intersection. Stopping at each light because it has turned red can add an additional 80 seconds to the response time, which means we now only have 3 minutes 9 seconds to get to the scene. Obviously, this is not achievable.

Additionally, we have seen an average of a 4.3% increase in call volume per year between the hours of 2300 and 0600 since 2012. As the Town continues to grow, so does our call volume, and thus we are encountering these nighttime flashing operations on a more frequent basis.

Therefore, we are requesting that you consider either re-programming the lights so that they would change from flashing yellow to green when triggered by the opticom. If this is not possible, then we would request to eliminate the nighttime flashing operation all together so that the light would function normally when triggered by the opticom.

I appreciate your consideration of this request. If you have any questions or need additional information, please do not hesitate to contact me.