



CITY OF CONCORD

REPORT TO THE MAYOR AND CITY COUNCIL

FROM: Robert J. Mack, PE, PTOE
Traffic Engineer

DATE: March 17, 2017

SUBJECT: Report from the Traffic Engineer on behalf of the Traffic Operations Committee recommending an update in the traffic signal operation at the Pleasant/South/Green intersection.

Recommendation

Accept this report.

Background

At its February 21, 2017 meeting, the Traffic Operations Committee (TOC) discussed traffic signal operation at the Pleasant/South/Green intersection. In an effort to update signal operation to comply with current Federal standards as well as reduce unnecessary user delays, TOC recommends changing the signal phasing pattern to eliminate the current use of the 'advance green' traffic movements.

Discussion

Traffic signal phasing at this intersection has for many years been timed to allow 'advance green' indications for both the Pleasant Street westbound and the South Street northbound approaches. The same round green signal faces are used to indicate both an advance green phase which gives potential left-turners a 'protected' left turn movement, and a subsequent 'permissive' left turn phase in which they must yield to opposing traffic. Use of the same round signal faces for differing left-turn operation can cause uncertainty for drivers turning left. As such, current Federal standards require left-turn arrow indications to be present where 'protected' movements are to be indicated. Addition of left-turn arrow signals have not only a cost component, but in this case require consideration of the structural limits of the signal mast arm to support additional signal loads for which it was not originally designed. Full replacement of traffic signal equipment at this intersection is programmed for FY2021.

Use of protected left-turn phasing is effective where there are separate left-turn lanes to consolidate waiting left-turn traffic. This is not the case with the subject intersection where left turns are combined in the same lane with heavier through-traffic flows (space is not available to install left-turn lanes without substantial street widening and/or parking removal). When the roughly 10 second fixed-time 'advance green' occurs, there is frequently no vehicle there to turn left; occasional left-turners are more likely to be located further back in the line of heavier through traffic and ultimately turn left during the permissive part of the green phase when they must yield to opposing through traffic. Thus the advance green times out each cycle, whether left-turners are there or not, while unnecessarily delaying opposing traffic with an extended red light. During commuter peaks, it is not uncommon to see significant traffic queues build up on the Pleasant Street eastbound and Green Street southbound approaches; this is a direct result of the inefficient use of 'advance greens' on the opposing intersection approaches.

The subject intersection is the last location in the city using this outdated form of 'advance green'. A conversion of similarly-outdated signal phasing was done at the Main/Pleasant intersection as part of the Main Street Complete Street Project. After nearly two years of operation, it is apparent that removal of the outdated 'advance greens' had no significant effect on the ability of drivers to turn left during the green time allotted. Furthermore, this revision would also make operation at the subject intersection consistent with the rest of the nearby intersections in the downtown core such as Pleasant/Spring; Pleasant/State; Main/Peasant; N. State/Warren; N. State/School; N. State/Capital; and S. State/Perley. Note that all of our downtown signals have vehicle-detection capability that extends green time so that waiting vehicles can clear the intersection, including vehicles momentarily delayed by left turns.

TOC recommends removal of both advance-green phases and conversion of the signal to a simple two-phase operation. The four overhead signs noting advance or delayed green would be removed and the new signal timings would be set in the signal control cabinet. Message boards would be deployed on the Pleasant Street northbound and South Street northbound approaches for a week or so to inform drivers of discontinuance of the 'advance greens'. This would be a no-cost, proactive change in signal operation that would be implemented by staff. Benefits to the City and traveling public include: bringing an outdated signal operation into compliance with Federal standards without significant cost; maintaining signal operation that is consistent with other nearby signals; and reducing unnecessary vehicle delays and queuing on the eastbound and southbound approaches. Staff will monitor traffic operations at the intersection following the changes.

cc: Traffic Operations Committee