

## Queue Warning System

Queue Warning Systems inform drivers of the presence of downstream stop-and-go traffic (based on real-time traffic detection) using warning signs and flashing lights. Drivers can anticipate emergency braking or slow down, avoid erratic behavior, and reduce queuing-related collisions.

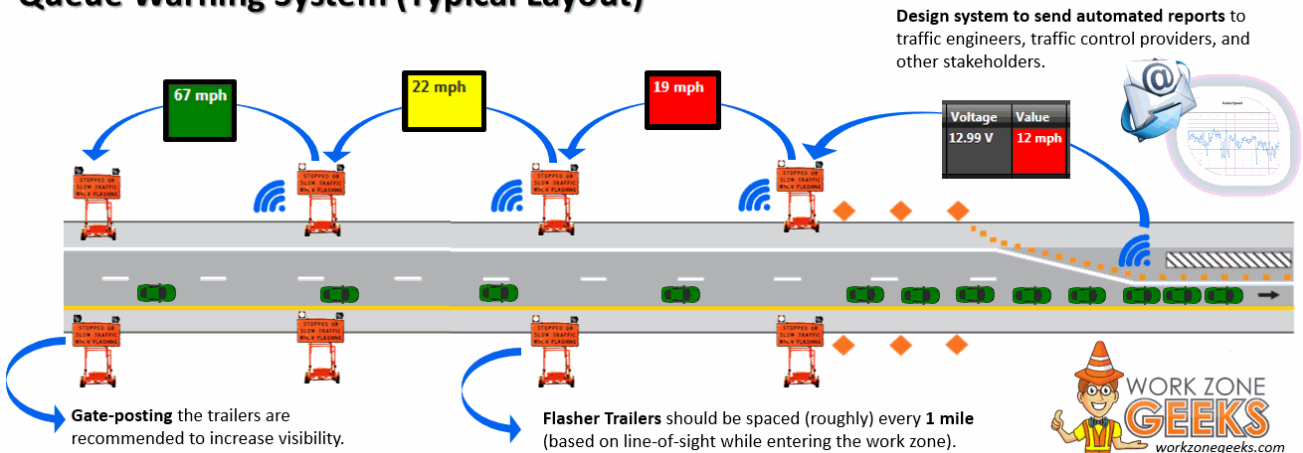


LET'S WORK TO PREVENT THIS:



Queue Warning Systems can help reduce primary and secondary crashes by alerting drivers to congested conditions. Incident severity is reduced because drivers are prepared for impending congestion. Stopped Traffic Advisory Systems can also help delay the onset of congestion. With more uniform speeds, traffic flows more smoothly and efficiently.

### Queue Warning System (Typical Layout)



Changeable Message Signs also available for use with Queue Warning System



For More Information:

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# Queue Warning System



The system shall be a fully automated, stand-alone system, capable of providing real-time warnings for Stopped Traffic Queues.

The system will post static signs with remote actuated warning lights at locations shown in the Plan. Sensors along the roadway will detect traffic queues and activate the appropriate warning signs. The data collected by the sensors will be aggregated with the system activations and delivered via email at the end of each day/week to the appropriate personnel to identify system functionality and appropriate set points.

## SYSTEM REQUIREMENTS

- Temporary “warning signs”: STOPPED OR SLOW TRAFFIC, WHEN FLASHING. Two signs shall be placed at each location (one left side and one right side). See the Traffic Control Plan for the proposed sign locations. The signs will be located at the direction of the Engineer. The initial installation will be in advance of the any lane closures. The signs shall remain in place until the completion of the Project.
- Sufficient traffic detection device(s) to sequentially activate the stopped traffic flashers as the queue extends. The system shall be capable of identifying stopped/slowed traffic conditions in advance of the lane closure taper. The system shall self-test for communication or sensor failures. All sensors shall be of a type whose accuracy is not degraded by inclement weather or degraded visibility conditions including precipitation, fog, darkness, excessive dust, and road debris. The operational status of the sensors shall be shown in the reports.
- The system shall have reporting features to a secure website , and/ or text message or email. The website shall, at a minimum, show the current speeds at each detector location and whether the warning flashers are activated. The text messages and/or email notifications shall be generated in real time when the system has detected an event and provide event detail and system operational status. The website shall provide access to archival data for the duration of the Project. This archival data shall be printable.
- The system shall provide data logging of system events and key detection data. The data should include the dates and times that the system was activated, which signs were activated, duration of the activation, and average speeds at each detection device. This data shall be provided to the Engineer in a CSV format at the close of the Project, or pushed in a selectable daily/weekly report basis, in a graphical representation to the Engineer.
- The system shall use 12” LED beacons mounted 12” above the sign display. The flash rate shall be 55 flash cycles per minute, as defined by the MUTCD.

## SYSTEM OPERATION AND PERFORMANCE

- The system shall be capable of continuous 24/7 operation. The remote web access shall allow the system manager or Project Engineer to shut-down the system during apparent failures.
- The system shall activate the warning signs whenever average traffic speeds fall below 40 mph and turn-off when the average speed returns to above 55 mph. These speeds are only suggested and actual field trials will determine the appropriate trigger values to be approved by the Engineer. The adjustments to set points shall be incidental to the system. The system shall be configured so that during low volume time periods such as early morning, the lack of traffic does not produce an average speed that activates the stopped traffic flashers.