

TRANSPORTATION SYSTEMS MANAGEMENT & OPERATIONS TOOLS

Transportation Systems Management & Operations, or TSMO, focuses on cost-effective strategies that prioritize the safety, access, and reliability of the multimodal transportation system.



PLANNING
AND POLICY
DEVELOPMENT



TRANSPORTATION
OPERATIONS



COOPERATIVE
AUTOMATED
TRANSPORTATION
& TECHNOLOGY



INTELLIGENT
TRANSPORTATION
SYSTEMS (ITS)



TRANSPORTATION
DEMAND
MANAGEMENT

Transportation Operations focuses on moving people and goods safely and efficiently. Active Warning Signs alert drivers of an impending queue allowing drivers time to reduce speeds and collisions.

ITS refers to the integration of technology into the transportation infrastructure where in this case the Active Warning Signs leveraged vehicle detection equipment to activate messages in real-time without operator intervention.

Why use Active Warning Signs?

Active Warning Signs (AWS) can be used on roads where drivers encounter unexpected queues due to high congestion or physical characteristics such as curves or steep grades. This strategy utilizes vehicle sensors to detect queues, which then activate a Variable Message Sign with alerts such as “Stopped Traffic Ahead” and flashing beacons that are attached to the sign structure. When the vehicle sensors detect no queues, the Variable Message Sign is turned off and no message is displayed.

By providing drivers with early information of congestion ahead,

AWS can reduce emergency braking and queue-related crashes such as rear-end collisions. It can also reduce stop-and-go traffic resulting in lower emissions and fuel consumption. These warnings also provide drivers with early information to change lanes or make other route-related decisions improving traffic flow.

BENEFITS:

- Reduces queue-related crashes
- Travel time savings
- Congestion management
- Reduces emissions by decreasing stop-and-go traffic

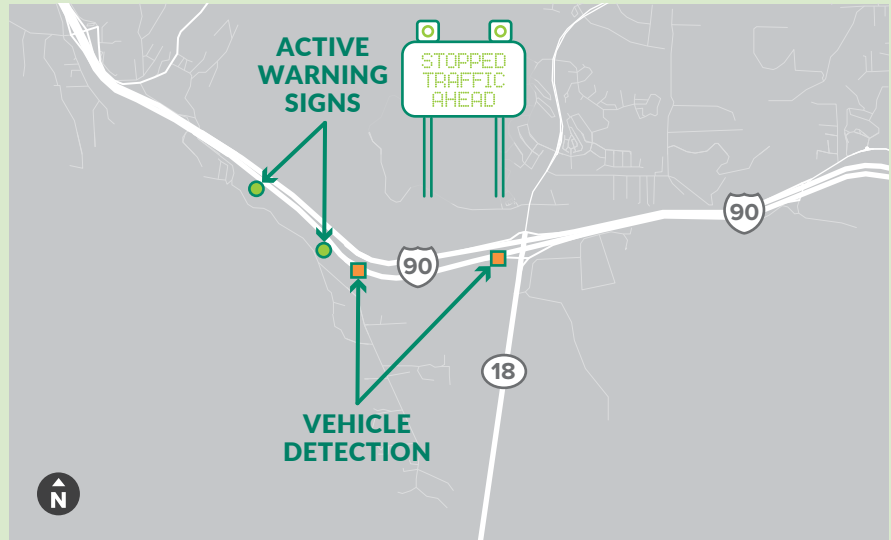


A variable message sign on the side of a freeway displays the message “Stopped Traffic Ahead” and attached beacons flash orange lights.

Case Study

I-90 East Active Warning Signs Issaquah, Washington

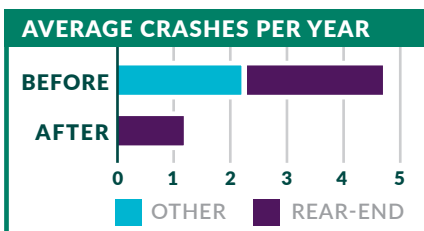
The I-90 and SR 18 interchange experiences heavy congestion due to drivers commuting from Seattle and Bellevue to the suburbs surrounding Issaquah. In May 2019, WSDOT installed two Active Warning Signs on mainline eastbound I-90 to warn drivers approaching upcoming queues present at the exit ramps. In-pavement loops were also installed in the right lane at two locations that trigger the Active Warning Signs when queues are detected.



MEASURED SAFETY TRENDS:

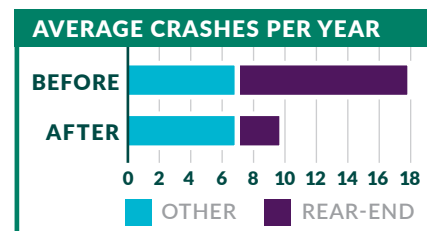
ON THE OFF-RAMP TO WESTBOUND SR 18:

↓ 75%
REDUCTION IN TOTAL CRASHES



ON MAINLINE EASTBOUND I-90:

↓ 62%
REDUCTION IN TOTAL CRASHES



↓ 75%
REDUCTION IN REAR-END CRASHES

↓ 47%
REDUCTION IN PM PEAK HOUR (3PM - 6PM) CRASHES

*January 2015-December 2018 crash data was used for the before condition. July 2019-December 2021 data was used for the after condition although vehicle volumes were lower than pre-pandemic conditions. WSDOT will continue to collect data and report changes as a result of the TSMO strategy implemented.

QUESTIONS? CONTACT:

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TO LEARN MORE ABOUT TSMO
VISIT: <https://tsmowa.org>