

**Project Title:** Development of an Optimal Ramp Metering Control Strategy for I-12

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**Project Summary**

Urban freeways in major cities in the U.S. are operating near or beyond capacity conditions during peak periods due to increased travel demand. Such conditions often result in traffic breakdowns and heavy congestion, which continue to escalate and spread over the surface transportation network in the U.S. The transportation community of practitioners, researchers, and public agencies now recognizes the need for better management of the existing network capacity as a viable alternative to capacity expansion projects. In recent years, more emphasis has been placed on Active Traffic Management (ATM) strategies such as ramp metering, speed harmonization, managed lanes, and others. Ramp metering is one of the successful active traffic control strategies to control the flow of traffic entering the freeway facility from on-ramps and reduce the occurrence of breakdowns at merging areas by preserving the maximum traffic flow on the mainline. Optimal ramp metering control helps reduce the breakdown probability at merging locations, which is typically caused by a sudden influx of traffic from the on-ramp attempting a forced merge with mainline traffic.

Ramp metering with fixed time control was implemented in June 2010 on I-12 in Baton Rouge, Louisiana, in order to mitigate traffic congestion and improve traffic safety. A recent evaluation study for DOTD showed slight improvements in traffic conditions at some locations with fixed time ramp meters. Other locations exhibited no improvements or deterioration in traffic conditions, which may be attributed to the construction work on I-12 at some locations at the time of analysis and/or the inability of the fixed time ramp metering strategy to cope with the varying demand on the mainline. Therefore, this study proposes a comprehensive evaluation of various ramp metering strategies in order to identify the optimum algorithm that can help improve traffic conditions on I-12. The analysis will include the performance of the current fixed time ramp meters after the construction work was completed on I-12, in addition to the other ramp metering control strategies. The evaluation of performance for each ramp metering strategy will be conducted using a microscopic simulation platform.