

Temecula Implements Citywide Adaptive Traffic Signal Control to Optimize Traffic Flow

CASE STUDY

QuicTrac™ Adaptive Software Reduces Arterial Congestion and Residual Queuing on Freeways, Promoting Mobility for City Residents.

EXECUTIVE SUMMARY:

Temecula Significantly Improves Traffic Flow to Enhance Quality of Life for Residents

The City of Temecula deployed *QuicTrac* adaptive control software on seven major arterials, including 83 signalized intersections spanning 18 miles, to reduce congestion and improve traffic flow.

Significant improvements in mobility were achieved through three main initiatives. First, new signal timing plans were engineered to reflect current demand. Next, communication was established with Caltrans' signals to integrate corridors with the freeway. Lastly, adaptive control technology was implemented to ensure perpetual optimization of arterials, allowing signals to optimize signal timing on-the-fly to meet demand. Citywide results included:

- 29% fewer stops during peak periods
- 17% improvement in speed
- 14% reduction in travel time

THE SITUATION:

Hefty Commute Times and Congestion Plagued the City's Primary Arterials and Freeway Interchanges

Temecula's major corridors connect the City's residential communities to commercial districts, institutions and the region's primary interstate, the I-15 freeway.

Existing signal coordination did not respond to prevailing traffic conditions causing unnecessary congestion. In addition, the lack of communication with I-15 signal interchanges caused traffic to backup on the off-ramps, causing residual queuing during the morning and evening rush hours:

- Morning Peak (7:00 AM - 9:00 AM)
- Evening Peak (4:00 PM - 6:00 PM)

Project at a Glance

PROJECT SCOPE

Seven major arterials spanning 18 miles of roadway, connecting residential communities, commercial districts, and the freeway.

- Two peak periods
- Significant congestion levels
- Traffic backup on off-ramps
- Major intersections that include freeway access

SOLUTION

McCain's *QuicTrac* adaptive control software optimized traffic signal coordination for 83 signalized intersections, including 7 Caltrans signals, smoothing traffic flow and enhancing freeway access.

TOP BENEFITS / RESULTS

- ✓ Achieved communication with Caltrans' signals and minimized queuing at freeway ramps
- ✓ Lifetime benefit-to-cost ratio of 30:1
- ✓ 81.3% of intersections showed reduction in delays during peak periods
- ✓ Minimal displacement to traffic traveling opposite to the optimized direction of traffic
- ✓ Delivered maximum public benefit at minimal cost

CASE STUDY

THE SOLUTION:

Establish Communications with Caltrans' Signals & Optimize Coordination with QuicTrac Adaptive

McCain's *QuicTrac* adaptive control software was implemented to lower congestion and maximize thoroughfare with a system that is easy to understand, and simple to set up and maintain. It was selected for its proven local success and ability to maximize use of Temecula's existing infrastructure - detectors, controllers, and central control software.

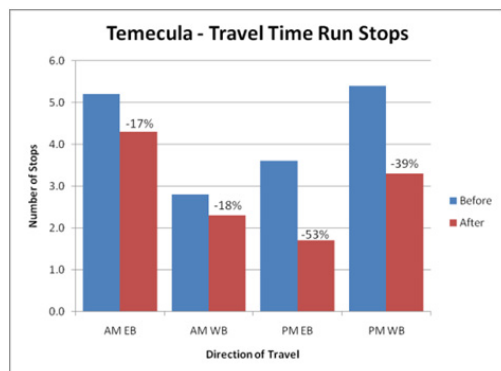
Traffic flow was improved by optimizing signal timing & establishing communication with Caltrans' signals.

System Deployment: Each arterial was evaluated for current conditions highlighting necessary infrastructure improvements (i.e. separating loop detectors to provide lane-by-lane vehicular data) and signal timing plan updates. New traffic volume counts were collected and analyzed to engineer new coordination plans that served as the base parameters for adaptive operations.

At the major freeway access points, yellow yield or one-way communication with Caltrans' signals was established. Coordination plans were then implemented to clear traffic from the ramp signals onto the main corridors to minimize queuing down the ramps, whereas normal coordination emphasizes only movement along the corridor.

Results at a Glance

Project Performance Measures	Benefits
Average Speed Increase	17%
Average Decrease in Travel Time	14%
Benefit-to-Cost Ratio	30:1
First Year Fuel Savings	120,000 gal
First Year Emissions Reduction	14,000 lbs.



Temecula Citywide Travel Time Run Stops

THE RESULTS:

Temecula Residents Experience Reduced Commute Times and Improved Quality of Life

Temecula successfully achieved their goal of improving the quality of life for residents by reducing commute times and smog producing vehicle emissions.

Results varied on an arterial by arterial basis, yielding significant citywide improvements in travel time (14%) and corridor speeds (17%), as well as reductions in stops (29%) that far exceeded expectations.

Results also showed enhancements in the level of service (LOS), measured in delay per vehicle (sec/veh), for each intersection during AM and PM peaks.

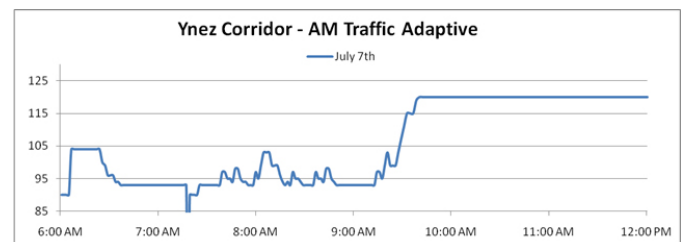
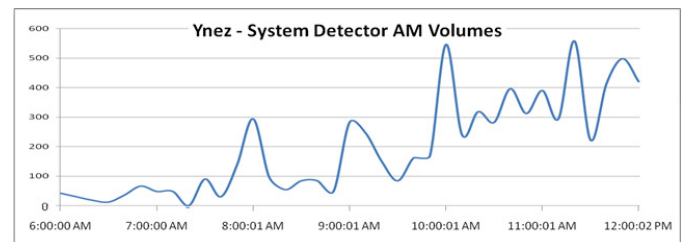
- 81.3% showed improvements in delay
- 30.6% improved by a full grade or more (LOS)

In addition, the optimization of traffic flow made a positive impact on commuter's wallets and the environment.

- \$2.6 million in annual travel time savings
- \$437,000 in annual fuel costs saved

With a benefit-to-cost ratio of 30:1, the system has succeeded in offering a maximum benefit to the public at a minimal cost to the City.

The City of Temecula has joined the ranks of cities recognized nationwide for their advanced traffic solutions.



Ynez Corridor - Real Time Cycle Length and Volume Comparison